Cisco 640-802

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Q&A with explanations

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Topic 1, DESCRIBE HOW A NETWORK WORKS (90 questions)

Section 1: Describe the purpose and functions of various network devices (9 questions)

QUESTION NO: 1
Both switches and hubs are being utilized within the TestKing network. Which of the following is true regarding the use of switches and hubs for network connectivity in this network?

A. Switches take less time to process frames than hubs take
B. Hubs can filter frames
C. Switches do not forward broadcasts
D. Switches increase the number of collision domains in the network
E. Using hubs can increase the amount of bandwidth available to hosts
F. None of the above

Answer: D
Explanation:
The biggest benefit of using switches instead of hubs in your internetwork is that each switch port is actually its own collision domain. (Conversely, a hub creates one large collision domain.) But even armed with a switch, you still can't break up broadcast domains. Neither switches nor bridges will do that. They'll typically simply forward all broadcasts instead. Switch creates the collision domain per port, so we can say switch increase the number of collision domains.

QUESTION NO: 2
Which one of the following characteristics is true regarding the use of hubs and switches?

A. Hubs can have their ports be configured with VLANs
B. Using hubs is costly with regard to bandwidth availability.
C. Switches can not forward broadcasts.

D. Switches are more efficient than hubs in processing frames.
E. Switches increase the number of collision domains in the network.

Answer: E
Explanation: Switches increases the number of collisions domains in the network. Switches that are configured with VLANs will reduce the size of the collision domains by increasing the number of collision domains in a network, but making them smaller than that of one big, flat network.
Incorrect Answers:
A. Switches are capable of VLAN configurations, but hubs are not.
B. Hubs are generally the least costly method possible to connect multiple devices together in a network.
C. Switches forward broadcasts and multicasts, by default, to all ports within the same VLAN. Only routers block all broadcast traffic by default.
D. Switches and hubs can be equally efficient in processing frames, in theory. In practice, switches are generally more efficient as they usually have more CPU and memory allocated to them, and are generally much more expensive than a simple hub.

QUESTION NO: 3
When comparing and contrasting the similarities and differences between bridges and switches, which of the following are valid statements? Choose all the valid answer choices)

A. Bridges are faster than switches because they have fewer ports.
B. A switch is a multiport bridge,
C. Bridges and switches learn MAC addresses by examining the source MAC address of each frame received.
D. A bridge will forward a broadcast but a switch will not.
E. Bridges and switches increase the size of a collision domain.
F. None of the above statements are true.

Answer: B, C
Explanation:
Both bridges and switches build the bridge table by listening to incoming frames and examining the source MAC address in the frame.
Switches are multiport bridges that allow you to create multiple broadcast domains. Each broadcast domain is like a distinct virtual bridge within a switch.
Incorrect Answers:

A. Switches are generally faster than bridges. Bridges also do not necessarily have fewer ports than switches.
D. Both bridges and switches will forward broadcast and multicast traffic, assuming that the traffic remains in the same VLAN.
E. The use of VLANs in a switch can decrease the size of the collision domain, by creating additional, smaller collision domains.

QUESTION NO: 4
Which of the following correctly describe the various functions and virtues of a router? (Select all valid answer choices)

A. Packet switching
B. Collision prevention on a LAN segment.
C. Packet filtering
D. Broadcast domain enlargement
E. Broadcast forwarding
F. Internetwork communication
G. None of the above

Answer: A, C, F
Explanation:
The main function of a router is to connect different, separated networks together. In doing so, switching packets from one network to another is a primary function, along with providing for communication between networks. As an additional feature, routers are capable of providing filtering on a network address and application port level, so choice C is also correct.
Incorrect Answers:
B. Routers can indeed be used to segment a network separate a collision domain, since routers do not forward LAN broadcasts and multicasts to other interfaces. However, routers alone can not prevent all collisions from occurring on any given LAN segment.
D. Routers actually segment LANs into smaller broadcast domains.
E. Routers do not forward broadcast and multicast traffic out the additional interfaces by default. Unless bridging or IP helpers are configured on the router, LAN broadcasts are blocked at the router level.

QUESTION NO: 5

The LAN needs are expanding at the Testking corporate office, which is quickly growing. You are instructed to enlarge the area covered by a single LAN segment on the TestKing network.
Which of the following are layer 1 devices that you can use? (Choose all that apply.)

A. A switch
B. A router
C. A network adapter card
D. A hub
E. A repeater

Answer: D, E
Explanation:
A hub simply repeats the electrical signal and makes no attempt to interpret the electrical signal (layer 1) as a LAN frame (Layer 2). So, a hub actually performs OSI layer 1 functions, repeating an electrical signal, whereas a switch performs OSI layer 2 functions, actually interpreting Ethernet header information, particularly addresses, to make forwarding decisions. Hubs can be used to increase the number of stations that can be supported on a LAN.
Because the repeater does not interpret what the bits mean, but does examine and generate electrical signals, a repeater is considered to operate at Layer 1. Repeaters can be used to physically extend the LAN to greater distances.

QUESTION NO: 6
Cisco is the leader in the router market space. What basic functions do their routers perform in a network? (Choose two)

A. The microsegmentation of broadcast domains
B. Path selection
C. Packet switching
D. Bridging between LAN segments
E. Access layer security
F. VLAN membership assignment
G. Application optimization

Answer: B, C
Explanation:

The primary functions of a router are: Packet Switching and Path Selection. It is the routers job to determine the best method for delivering the data, and switching that data as quickly as possible.

QUESTION NO: 7
Both bridges are switches are being used throughout the TestKing LAN. Which of the following statements are true regarding bridges and switches in this network? (Choose 3)

A. Switches are primarily software based while bridges are hardware based.
B. Switches usually have a higher number of ports than most bridges.
C. Bridges are frequently faster than switches.
D. Bridges define broadcast domains while switches define collision domains.
E. Both bridges and switches forward Layer 2 broadcasts.
F. Both bridges and switches make forwarding decisions based on Layer 2 addresses.

Answer: B, E, F

QUESTION NO: 8
As a network administrator, you will need to decide on the appropriate network devices to use. Which of the following correctly describes the roles of devices in a WAN? (Choose three)

A. A CSU/DSU terminates a digital local loop.
B. A router is commonly considered a DCE device.
C. A modem terminates an analog local loop.
D. A router is commonly considered a DTE device.
E. A modem terminates a digital local loop.
F. A CSU/DSU terminates an analog local loop.
G. A modem is used to terminate a T1

Answer: A, C, D
Explanation:
Layer 2 switching is considered hardware-based bridging because it uses specialized hardware called an application-specific integrated circuit (ASIC). ASICs can run up to gigabit speeds with very low latency rates.

Switches usually have higher port number then bridge. Generally bridges have two ports. Both operates on Data link layer.

QUESTION NO: 9
The TestKing network administrator needs to determine what LAN devices to install on the TestKing network. What are two advantages of using Layer 2 Ethernet switches over hubs? (Choose two)

A. Allowing simultaneous frame transmissions
B. Increasing the size of broadcast domains
C. Increasing the maximum length of UTP cabling between devices
D. Filtering frames based on MAC addresses
E. Decreasing the number of collision domains

Answer: A, D
Explanation:
A: A half duplex connection is where only one device can send or receive at a time. A full duplex connection is where both devices can send and receive at the same time.
Thus, if you have a 100Mb half-duplex connection, only sending at 100Mb OR receiving at 100Mb can happen at the same time. If you have a 100Mb full duplex connection, you can effectively get 200Mb out of the link because you could be sending 100Mb and receiving 100Mb at the same time.
D: Switches are capable of filtering frames based on any Layer 2 fields. For example, a switch can be programmed to reject (not forward) all frames sourced from a particular network. Because link layer information often includes a reference to an upper-layer protocol, switches usually can filter on this parameter. Furthermore, filters can be helpful in dealing with unnecessary broadcast and multicast packets.

Section 2: Select the components required to meet a network specification (5 questions)

QUESTION NO: 1
CDP is being used throughout the TestKing network. What are two reasons why the TestKing network administrator would use CDP? (Choose two)

A. To determine the status of network services on a remote device
B. To obtain the IP Address of a connected device in order to telnet to the device
C. To verify the type of cable interconnecting two devices
D. To verify Layer 2 connectivity between two devices when Layer 3 fails
E. To obtain VLAN information from directly connected switches
F. To determine the status of the routing protocols between directly connected routers
G. To support automatic network failover during outages

Answer: B, D
Explanation:
Cisco Discovery Protocol (CDP) is a proprietary protocol designed by Cisco to help administrators collect information about both locally attached and remote devices. By using CDP, you can gather hardware and protocol information about neighbor devices, which is useful info for troubleshooting and documenting the network.

You can use:

Show cdp neighbor
Show cdp neighbor details
Commands to gather the information of connected neighbors.

QUESTION NO: 2
CDP is running between two TestKing devices. What information is supplied by CDP? (Select three)

A. Device Identifiers
B. Capabilities list
C. Platform
D. Route identifier
E. Neighbor traffic data

Answer: A, B, C
Explanation:

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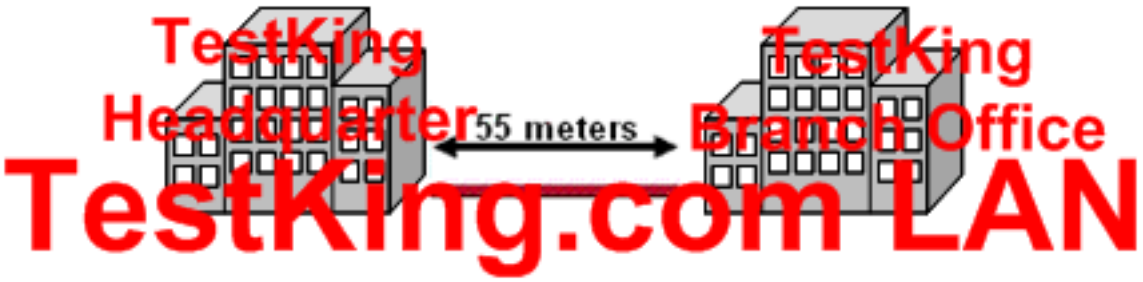
CDP is a Cisco proprietary protocol; to support forwarding CDP messages over an interface, that interface must support SNAP headers. Any LAN interface, HDLC, Frame Relay, and ATM all support CDP. The router or switch can discover Layer 3 addressing details of neighboring routers—without even configuring that Layer 3 protocol—because CDP is not dependent on any particular Layer 3 protocol.

CDP discovers several useful details from the neighboring device:

- **Device Identifier**—Typically the host name.
- **Address list**—Network and data link addresses.
- **Port Identifier**—Text that identifies the port, which is another name for an interface.
- **Capabilities list**—Information on what the device does—for instance, a router or switch.
- **Platform**—The model and OS level running in the device.

QUESTION NO: 3
Two TestKing offices are connected as shown below:



Two buildings on the London campus of a the TestKing corporation must be connected to use Ethernet with a bandwidth of at least 100 Mbps. TestKing is concerned about possible problems from voltage potential differences between the two buildings. Which media type should be used for the connection?

A. Coaxial cable
B. Fiber optic cable
C. UTP cable

D. STP cable
E. None of the above

Answer: B
Explanation:
Current Ethernet technology typically comes via either copper UTP or fiber cables. In this scenario the distance between the buildings is only 55 meters so either copper or fiber could be used, as the distance limitation for 100M UTP Ethernet is 100 meters. However, fiber would be a better fit as it is not prone to errors that could occur due to the voltage potential differences. Because fiber is a dielectric material, it's not susceptible to electrical interference. FO-product vendors also claim that fiber systems make secure communications easier. Interference immunity and lack of emissions are givens in FO systems and in the fiber medium itself.

QUESTION NO: 4
Refer to the TestKing network shown below:

You work as a network technician at TestKing.com. Please study the exhibit carefully. Based on the information shown above, what is needed to allow host TestKing1 to ping host TestKing2?

A. a crossover cable connecting the switches
B. a backbone switch connecting the switches with either fiber optic or straight-through cables
C. a straight-through cable connecting the switches
D. a CSU/DSU connected to the switches with straight-through cables

E. a router connected to the switches with straight-through cables

Answer: E
Explanation:
Routers are Layers 3 devices used for inter-network communication. In this scenario there are two different networks, so both switches need to connect to a router using straight-through cables.
A straight-through cable is used to connect two different devices like, switch to router, host to switch. Since we need to insert a router for communication between the two switches, straight through cables will be used between the switches and the router.

QUESTION NO: 5
Exhibit:

A new TestKing office is opening, and a network device needs to be installed in the place of the icon labeled Network Device to accommodate a leased line T1 to the Internet. Which network device and interface configuration meets the minimum requirements for this installation?

A. A switch with two Ethernet interfaces
B. A router with two Ethernet interfaces
C. A switch with one Ethernet and one serial interface
D. A router with one Ethernet and one serial interface
E. A router with one Ethernet and one modem interface
F. None of the above

Answer: D
Explanation:
Only a router can terminate a leased line T1 access circuit, and only a router can connect two different IP networks. Here, we will need a router with two interfaces, one serial connection for the T1 and one Ethernet interface to connect to the switch on the LAN.

Section 3: Use the OSI and TCP/IP models and their associated protocols to explain how data flows in a network (13 questions)

QUESTION NO: 1
As a CCNA candidate, you must know the various layers of the OSI model. At which layers of the OSI Model do Wide Area Networks operate in? (Choose two)

A. Physical Layer
B. Datalink Layer
C. Network Layer
D. Session Layer
E. Transport Layer
F. Presentation Layer
G. Application Layer

Answer: A, B
Explanation:
A WAN is a data communications network that covers a relatively broad geographic area and that often uses transmission facilities provided by common carriers, such as telephone companies. WAN technologies generally function at the lower two layers of the OSI reference model: the physical layer and the data link layer as shown below.

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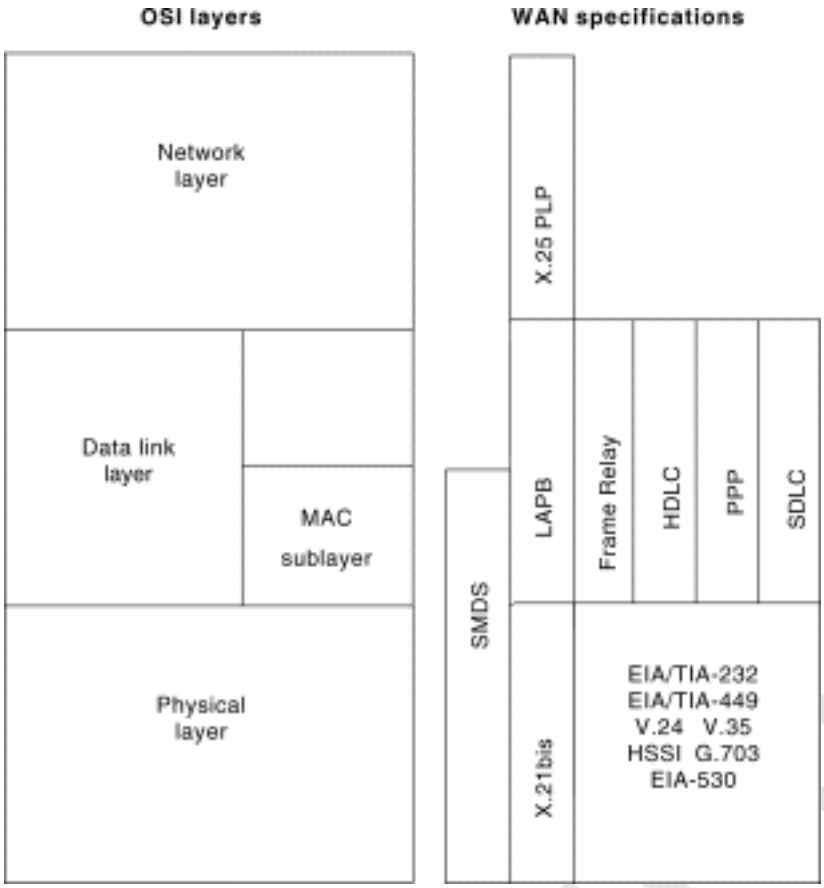

Note: Occasionally WAN's would also be considered to operate at layer 3, but since this question asked for only 2 choices layers 1 and 2 are better choices.

QUESTION NO: 2
While troubleshooting a connectivity problem on the network, you issue the ping command from your PC command prompt, but the output shows "request times out."

At which OSI layer is this problem associated with?

A. The data link layer
B. The application layer
C. The access layer
D. The session layer
E. The network layer

Answer: E
Explanation:
TCP/IP includes ICMP, a protocol designed to help manage and control the operation of a TCP/IP network. The ICMP protocol provides a wide variety of information about a network's health and operational status. Control message is the most descriptive part of a name. ICMP helps control and manage IP's work and therefore is considered part of TCP/IP's network layer.
Reference:
CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) page 277.

QUESTION NO: 3
You download a file from an FTP site on the Internet. What is the highest layer in the OSI model used in this FTP operation?

A. Application
B. Presentation
C. Session
D. Transport
E. Internet
F. Data Link
G. Physical

Answer: A
Explanation:
Layer 7 is the application layer, which is the highest layer in the OSI model. This layer describes the use of end user applications, such as opening movie files (avi, mpeg, etc) used Microsoft Office applications, using WWW browsers, using Telnet, and using FTP.

QUESTION NO: 4
A host computer has been correctly configured with a static IP address, but the default gateway is incorrectly set. Which layer of the OSI model will be first affected by this configuration error?

A. Layer 1
B. Layer 2
C. Layer 3

D. Layer 4
E. Layer 5
F. Layer 6
E. Layer 7

Answer: C
Explanation:
IP Addressing and IP routing resides on the OSI Network layer, which is layer 3.

QUESTION NO: 5
Which layer of the OSI reference model is responsible for ensuring reliable end-to-end delivery of data?

A. Application
B. Presentation
C. Session
D. Transport
E. Network
F. Data-Link

Answer: D
Explanation:
A key function of the transport layer is to provide connection services for the protocols and applications that run at the levels above it. These can be categorized as either connection-oriented services or connectionless services. Some protocol suites, such as TCP/IP, provide both a connection-oriented and a connectionless transport layer protocol, to suit the needs of different applications.
The transport layer is also the place in the layer stack where functions are normally included to add features to end-to-end data transport. Where network layer protocols are normally concerned with just "best effort" communications, where delivery is not guaranteed. Transport layer protocols are given intelligence in the form of algorithms that ensure that reliable and efficient communication between devices takes place. This encompasses several related jobs, including lost transmission detection and handling, and managing the rate at which data is sent to ensure that the receiving device is not overwhelmed.

Transmission quality, meaning ensuring that transmissions are received as sent, is so important that some networking references define the transport layer on the basis of reliability and flow-control functions. However, not all transport layer protocols provide these services. Just as a protocol suite may have a connection-oriented and a connectionless transport layer protocol, it may also have one that provides reliability and data management services, and one that does not. Again, this is the case with TCP/IP: there is one main transport layer protocol; TCP, that includes reliability and flow control features, and a second, UDP, that doesn't.

QUESTION NO: 6
At which OSI layer is a logical path created between two host systems named TK1 and TK2 on the TestKing LAN?

A. Physical
B. Session
C. Data link
D. Transport
E. Network
F. Application
G. Presentation

Answer: E
Explanation:
The Network layer (also called layer 3) manages device addressing, tracks the location of devices on the network, and determines the best way to move data, which means that the Network layer must transport traffic between devices that aren't locally attached. Routers (layer 3 devices) are specified at the Network layer and provide the routing services within an internetwork.

QUESTION NO: 7
Which OSI layer is associated with the following: The acknowledgement of transmissions, sequencing, and flow control across a network?

A. Layer 2
B. Layer 3
C. Layer 4
D. Layer 5

E. Layer 6
F. Layer 7

Answer: C
Explanation:
The Transport layer (Layer 4) defines several functions, including the choice of protocols. The most important Layer 4 functions are error recovery and flow control. The transport layer may provide for retransmission, i.e., error recovery, and may use flow control to prevent unnecessary congestion by attempting to send data at a rate that the network can accommodate, or it might not, depending on the choice of protocols. Multiplexing of incoming data for different flows to applications on the same host is also performed. Reordering of the incoming data stream when packets arrive out of order is included. Examples include: TCP, UDP, and SPX.

QUESTION NO: 8
Which OSI layer header contains the address of a destination host that is on another network?

A. Application
B. Presentation
C. Session
D. Transport
E. Network
F. Data link
G. Physical

Answer: E
Explanation:
Only network address contains this information. To transmit the packets the sender uses network address and datalink address. But the layer 2 address represents just the address of the next hop device on the way to the sender. It is changed on each hop. Network address remains the same.

QUESTION NO: 9
Which of the following correctly describe steps in the OSI data encapsulation process? (Choose two)

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A. The presentation layer translates bits into voltages for transmission across the physical link.
B. The transport layer divides a data stream into segments and adds reliability and flow control information.
C. Packets are created when the network layer adds Layer 3 addresses and control information to a segment.
D. The data link layer adds physical source and destination addresses and an FCS to the segment.
E. Packets are created when the network layer encapsulates a frame with source and destination host addresses and protocol-related control information.

Answer: B, C
Explanation:
The Transport Layer:
You can think of the transport layer of the OSI model as a boundary between the upper and lower protocols. The transport layer provides a data transport service that shields the upper layers from transport implementation issues such as the reliability of a connection.
The transport layer provides mechanisms for:
 Segmenting upper layer applications
 The establishment, maintenance, and orderly termination of virtual circuits
 Information flow control and reliability via TCP.
 Transport fault detection and recovery

The Network Layer:
Layer three of the OSI model is the network layer.
 The network layer creates and sends packets from source network to destination network.
 It provides consistent end-to-end packet delivery services and control information.
 It creates and uses layer 3 addresses for use in path determination and to forward packets.
Incorrect Answers:
A: This correctly describes the physical layer, not the presentation layer.
D: Although the data link layer adds physical (MAC) source and destination addresses, it adds it to a frame, not a segment.
E: Packets are encapsulated, not frames.

QUESTION NO: 10

When files are transferred between a host and an FTP server, the data is divided into smaller pieces for transmission. As these pieces arrive at the destination host, they must be reassembled to reconstruct the original file. What provides for the reassembly of these pieces into the correct order?

A. The sequence number in the TCP header
B. The Start Frame Delimiter in the 802.3 Preamble
C. The TTL in the IP header
D. The acknowledgement number in the segment header
E. The frame check sequence in the Ethernet frame trailer

Answer: A
Explanation:
The Transport layer can provide reliable networking via acknowledgments, sequencing, and flow control.
Acknowledgments Delivered segments are acknowledged to the sender. If they are not acknowledged, the sender will retransmit.
Sequencing Data segments are sequenced into their original order when they arrive at the destination.
Flow Control Provides buffer controls that prevent packet flooding to the destination host. Buffers store bursts of data for processing when the transmission is complete.

Layer 4 protocols include the following:
Transmission Control Protocol (TCP)
User Datagram Protocol (UDP)
Sequenced Packet Exchange (SPX)A reliable communications protocol created by Novell NetWare

QUESTION NO: 11 DRAG DROP
You work as a network administrator at TestKing.com.
Your boss, Mrs. Tess King, is interested in the OSI layers. Match the terms with the appropriate layer. Some options are not used.

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Answer:
Explanation:

The Transport layer segments and reassembles data into a data stream. Services located in the Transport layer segment and reassemble data from upper-layer applications and unite it into the same data stream. They provide end-to-end data transport services and can establish a logical connection between the sending host and destination host on an internetwork.

TCP and UDP transport protocol lies on Transport Layer, which break down the data coming from upper layer into segment.

Windows are used to control the amount of outstanding, unacknowledged data segments that is also on Transport Layer.

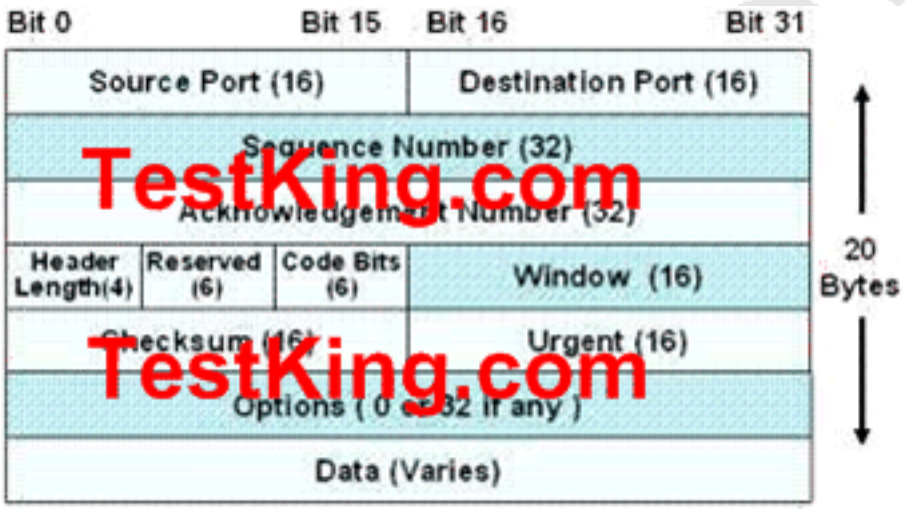
Network Layer:

The Network layer (also called layer 3) manages device addressing, tracks the location of devices on the network, and determines the best way to move data, which means that the Network layer must transport traffic between devices that aren't locally attached. Routers (layer 3 devices) are specified at the Network layer and provide the routing services within an internetwork.

Protocol Data Packets (PDU) on Network Layer is known as Packets. Routing and Routed protocols are lies on Network Layer.

Routing Protocol: RIP, IGRP, EIGRP, OSPF, BGP
Routed Protocol: IP, IPX

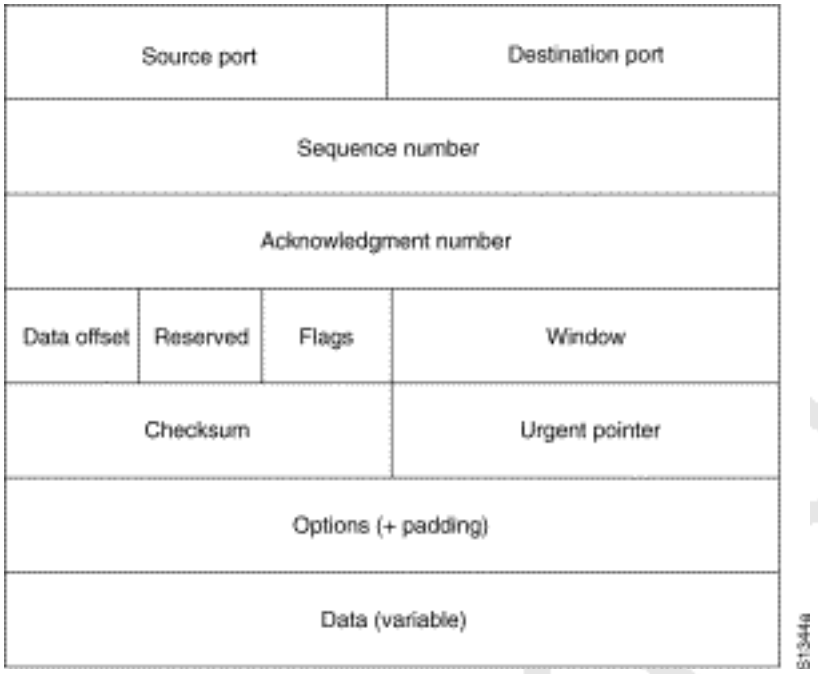
QUESTION NO: 12
Refer to the following exhibit:



What data structure is described in the exhibit shown above?

A. IP datagram
B. TCP segment
C. Ethernet frame
D. UDP datagram
E. FDDI frame
F. Token Ring frame
G. None of the above

Answer: B
Explanation:
The Figure below illustrates the fields and overall format of a TCP packet.
Twelve fields comprise a TCP packet.



The following descriptions summarize the TCP packet fields illustrated above.
1. SourcePort and DestinationPort-Identifies points at which upper-layer source and destination processes receive TCP services.
2.
3. Sequence Number-Usually specifies the number assigned to the first byte of data in the current message. In the connection-establishment phase, this field also can be used to identify an initial sequence number to be used in an upcoming transmission.
4.
5. Acknowledgment Number-Contains the sequence number of the next byte of data the sender of the packet expects to receive.
6.
7. Data Offset-Indicates the number of 32-bit words in the TCP header.
8.
9. Reserved-Remains reserved for future use.
10.
11. Flags-Carries a

variety of control information, including the SYN and ACK bits used for connection establishment, and the FIN bit used for connection termination.
12.
13. Window-Specifies the size of the sender's receive window (that is, the buffer space available for incoming data).
14.
15. Checksum-Indicates whether the header was damaged in transit.
16.
17. Urgent Pointer-Points to the first urgent data byte in the packet.
18.
19. Options-Specifies various TCP options.
Data-Contains upper-layer information.

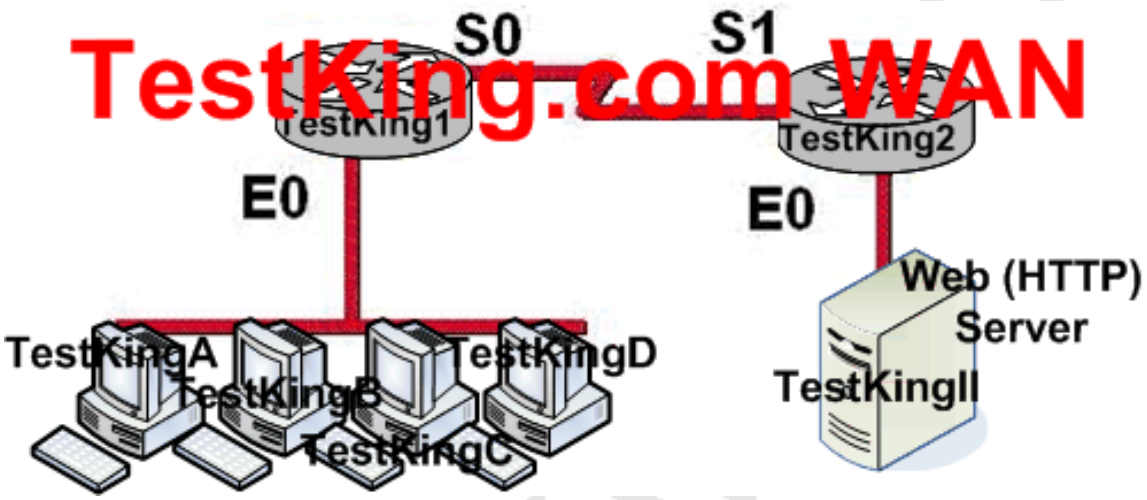
QUESTION NO: 13
Network equipment supporting the use of flow control mechanisms has been recently installed in the TestKing network. What is the purpose of flow control in a data network?

A. It ensures that data is retransmitted if an acknowledgment is not received.
B. It reassembles segments in the correct order on the destination device.
C. It provides a mechanism for the receiver to control the transmission speed.
D. It regulates the size of each datagram segment.
E. All of the above are functions of flow control

Answer: C
Explanation:
Flow control paces the transmission of data between a sending device and a receiving device. Flow control ensures that the receiving device can absorb the data sent to it before the sending device sends more. When the buffers on the receiving device are full, a message is sent to the sending device to suspend transmission until the data in the buffers has been processed.
Incorrect Answers:
A. Data retransmission mechanisms are not handled by control. They are most often handled by transport layer protocols such as TCP.
B. This describes the reassembly portion of the segmentation and reassembly (SAR) function of network equipment.
D. The maximum transmission unit (MTU) handles the regulation of maximum frame sizes.

Section 4: Describe common networked applications including web applications (4 questions)

QUESTION NO: 1
Part of the TestKing network is displayed below:



Study the exhibit shown above. Host TestKingA has established a connection with the TestKingII server attached to interface E0 of the TestKing2 router. Which of the following statements describe the information contained in protocol data units sent from Host TestKing to TestKingII? (Choose three)

A. The destination port number in a segment header will have a value of 80
B. The destination IP address of a packet will be the IP address of the E0 interface of the TestKing1 router
C. The destination IP address of a packet will be the IP address of the network interface of the TestKingII server
D. The destination address of a frame will be the MAC address of the E0 interface of TestKing1 router

Answer: A, C, D

QUESTION NO: 2
You have just installed a new web server on the Testking network. You are required to ensure that the web server is accessible from the Internet. The network uses private addressing, so an IP-to-registered address mapping is required.
To do this, you enter the following command:

```
TestKing(config)# ip nat inside source static 192.168.2.1
198.18.1.254
```

You unsuccessfully try to ping the Internet from a PC host on the LAN. During the troubleshooting process, you enter the "show ip nat translations" command but the output is blank.
What is the most likely cause of the problem?

A. The keyword overload is missing from the command.
B. The NAT pool must be defined first.
C. An access list must be defined to create static NAT translations.
D. The interfaces must be configured for NAT.
E. None of the above

Answer: D
Explanation:
In order to successfully configure a static NAT translation, the interfaces must be configured for NAT, in addition to the global NAT command that was entered. The router interface that lies on the inside part of the network must be defined using the "ip nat inside" command. Similarly, the WAN interface that is being used for the Internet connection must be defined using the "ip nat outside" command.
Incorrect Answers:
A. In order to make an internal server reachable from the Internet, a static one to one NAT entry must be configured for the server. The keyword "overload" is used to configure many to one NAT, or PAT.
B, C. This need not be done in order to create a static NAT entry. These steps are typically done in setting up NAT so that inside LAN users can access the Internet via NAT.

QUESTION NO: 3
Which protocol below uses TCP port 443 at layer 4?

A. HTML
B. HTTPS
C. TFTP
D. Telnet
E. SMTP
F. None of the above

Answer: B
Explanation:
HTTPS is the secured version of the HTTP application, which normally uses 128 bit SSL encryption to secure the information sent and received on a web page. An example is a banking web site, or a trustworthy shopping web site that takes credit card information. It is an application layer protocol which uses TCP port 443.
Incorrect Answers:
A. HTML is not a protocol.
C. TFTP uses UDP port 69.
D. Telnet uses TCP port 23.
E. SMTP uses TCP port 25.

QUESTION NO: 4
As a CCNA candidate, you will be expected to know the OSI model very well. Which of the following are associated with the application layer (layer 7) of the OSI model? (Choose two)

A. TCP
B. Telnet
C. FTP
D. Ping
E. IP
F. UDP

Answer: B, C
Explanation:

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The application layer is the top layer of the OSI model and is used to describe the end user applications that can be used over a network.
Layer Name Examples
Application (layer 7) Telnet, HTTP, FTP, WWW browsers, NFS, SMTP gateways, SNMP
Incorrect Answers:
A. TCP resides at layer 4.
D. ARP is a function of the data link layer, which is layer 2.
E. IP is used at layer 3 (network layer).
Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 34.

Section 5: Describe the purpose and basic operation of the protocols in the OSI and TCP models (15 questions)

QUESTION NO: 1
As the TestKing network administrator, you are required to have a firm understanding of the OSI model. Why does the data communication industry use the layered OSI reference model? (Choose two)

A. It enables equipment from different vendors to use the same electronic components, thus saving research and development funds
B. It encourages industry standardization by defining what functions occur at each layer of the model
C. It divides the network communication process into smaller and simpler components; thus aiding component development, design and troubleshooting
D. It provides a means by which changes in functionality in one layer require changes in other layers
E. It supports the evolution of multiple competing standards and thus provides business opportunities for equipment manufacturers

Answer: B, C
Explanation:
The OSI (Open System Interconnection) reference model was created as a reference point for communications devices. A layered approach is used to segment the entire telecommunications process into a series of smaller steps.

A is correct because it encourages a level of standardization by encouraging that functions be compared to known layers. D is also correct because it allows engineers to focus on the development, refining, and perfection of simpler components.

QUESTION NO: 2
You need to describe the various types of flow control to your co-workers. Which of the following are types of flow control that can be used in a network? (Choose three)

A. Congestion avoidance
B. Windowing
C. Cut-through
D. Buffering
E. Load Balancing
F. Fast Forward

Answer: A, B, D

QUESTION NO: 3
Which of the protocols below use TCP at the transport layer? (Select four)

A. TFTP
B. SMTP
C. SNMP
D. FTP
E. HTTP
F. HTTPS

Answer: B, D, E, F
Explanation:
SMTP (Simple Mail Transfer Profile for email), FTP (File Transfer Protocol), and HTTP/HTTPS (Hyper Text Transfer Protocol for internet) all use TCP because of the reliable delivery mechanism. SMTP uses TCP port 25, FTP uses TCP ports 20 and 21, HTTP uses TCP port 80, and HTTPS uses TCP port 443.
Incorrect Answers:

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A, C: SNMP and TFTP use UDP as the transport mechanism. Generally speaking, protocols that use the keywords "trivial" or "simple" uses UDP, since connectionless, best effort delivery mechanism usually suffice.
Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 163.

QUESTION NO: 4
Exhibit:

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Source Port	Destination Port	Sequence Number	Acknowledgement Number	...	Window Size	..
21	12409	583974	292735	-	6000	-

The exhibit above displays the partial contents of an encapsulation header.
Which of the following are true of the network traffic represented in this diagram? (Select three)

A. This is a UDP header
B. This is an OSI layer 4 header.
C. This is traffic from an FTP server.
D. This is traffic from an Telnet client.
E. The last PDU received in this session had a sequence number of 292735.

Answer: B, C, E
Explanation:
As the header contains the sequence number and ACK number fields, it represents a TCP header. Choice B is correct as TCP works on Layer 4 i.e. Transport Layer.
Source Port mentioned in the header is 21 which indicate it is FTP Traffic because FTP uses port 20 and 21 for data and control. So choice C is correct.
The acknowledgment number refers to the sequence number of the last PDU received, which is 292735, making choice E also correct.

QUESTION NO: 5

Which fields are included in the TCP header? (Choose three).

A. Source Port
B. Acknowledgement Number
C. Request Number
D. Destination Address
E. Window
F. Data

Answer: A, B, E
Explanation:
TCP header:

Source Port: 16 bits.
Destination Port: 16 bits.
Sequence Number: 32 bits.
The sequence number of the first data byte in this segment. If the SYN bit is set, the sequence number is the initial sequence number and the first data byte is initial sequence number + 1.
Acknowledgment Number: 32 bits.
If the ACK bit is set, this field contains the value of the next sequence number the sender of the segment is expecting to receive. Once a connection is established this is always sent.
Data Offset: 4 bits.
The number of 32-bit words in the TCP header. This indicates where the data begins. The length of the TCP header is always a multiple of 32 bits.
Reserved: 3 bits.
Must be cleared to zero.
ECN, Explicit Congestion Notification: 3 bits.

Added in RFC 3168.
Control Bits: 6 bits.
Window: 16 bits, unsigned.
The number of data bytes beginning with the one indicated in the acknowledgment field which the sender of this segment is willing to accept.
Checksum: 16 bits.
This is computed as the 16-bit one's complement of the one's complement sum of a pseudo header of information from the IP header, the TCP header, and the data, padded as needed with zero bytes at the end to make a multiple of two bytes.
Urgent Pointer: 16 bits, unsigned.
If the URG bit is set, this field points to the sequence number of the last byte in a sequence of urgent data.
Options: 0 to 44 bytes.
Options occupy space at the end of the TCP header. All options are included in the checksum. An option may begin on any byte boundary. The TCP header must be padded with zeros to make the header length a multiple of 32 bits.
Data: Variable length.

QUESTION NO: 6
Acknowledgements, sequencing, and flow control are functions that are handled by which layer of the OSI model?

A. Layer 5
B. Layer 4
C. Layer 7
D. Layer 6
E. Layer 3
F. Layer 2
G. Layer 1

Answer: B

QUESTION NO: 7
A receiving host has failed to receive all of the segments that it should acknowledge. What can the host do to improve the reliability of this communication session?

A. Start a new session using UDP
B. Obtain a new IP address from the DHCP server
C. Use a different source port for the session
D. Decrease the sequence number
E. Decrease the window size

Answer: E
Explanation:
A TCP window the amount of outstanding (unacknowledged by the recipient) data a sender can send on a particular connection before it gets an acknowledgment back from the receiver that it has gotten some of it.
For example if a pair of hosts are talking over a TCP connection that has a TCP window size of 64 KB (kilobytes), the sender can only send 64 KB of data and then it must stop and wait for an acknowledgment from the receiver that some or all of the data has been received. If the receiver acknowledges that all the data has been received then the sender is free to send another 64 KB.
One way to improve the reliability of the TCP connection is to reduce the window size that the receiver needs to receive before sending an acknowledgement. However, this will reduce throughput as more segments and acknowledgements will need to be sent in order to transfer the same amount of data.

QUESTION NO: 8
You have set up an Internet based FTP server, where people can upload and download files. In terms of the OSI model, what is the highest layer used during the FTP sessions.

A. Application
B. Presentation
C. Session
D. Transport
E. Internet
F. Data Link
G. Physical

Answer: A
Explanation:
The application layer is the highest layer (layer 7) of the OSI model, and is reserved for end user applications. Since FTP is itself an application, layer 7 is the highest layer used.

Incorrect Answers:
B, C, D, E, F, G. In any given FTP session, all of these layers will be used at some point but they are incorrect because the question asked for the highest layer used by FTP.

QUESTION NO: 9
ICMP is often used in troubleshooting and verifying network. What statements are true regarding ICMP packets? (Choose two)

A. They acknowledge receipt of TCP segments.
B. They guarantee datagram delivery.
C. They can provide hosts with information about network problems.
D. They are encapsulated within IP datagrams.
E. They are encapsulated within UDP datagrams.
F. They are encapsulated within TCP datagrams.

Answer: C, D
Explanation:
ping may be used to find out whether the local machines are connected to the network or whether a remote site is reachable. This tool is a common network tool for determining the network connectivity which uses ICMP protocol instead of TCP/IP and UDP/IP. This protocol is usually associated with the network management tools which provide network information to network administrators, such as ping and traceroute (the later also uses the UDP/IP protocol).
ICMP is quite different from the TCP/IP and UDP/IP protocols. No source and destination ports are included in its packets. Therefore, usual packet-filtering rules for TCP/IP and UDP/IP are not applicable. Fortunately, a special "signature" known as the packet's Message type is included for denoting the purposes of the ICMP packet. Most commonly used message types are namely, 0, 3, 4, 5, 8, 11, and 12 which represent echo reply, destination unreachable, source quench, redirect, echo request, time exceeded, and parameter problem respectively.
In the ping service, after receiving the ICMP "echo request" packet from the source location, the destination
Incorrect Answers
ICMP is an IP protocol so A and E are incorrect.
ICMP doesn't guarantee datagram delivery so B is wrong as well.

QUESTION NO: 10

Which of the following services use TCP? (Choose three)

A. DHCP
B. SMTP
C. SNMP
D. FTP
E. HTTP
F. TFTP

Answer: B, D, E
Explanation:
TCP (Transmission Control Protocol) is a reliable mechanism for data delivery. SMTP, FTP and HTTP services use TCP via ports 25, 20/21, and 80, respectively.

QUESTION NO: 11
Which of the following are types of flow control? (Choose three)

A. Buffering
B. Cut-through
C. Windowing
D. Congestion avoidance
E. Load balancing

Answer: A, C, D
Explanation:
Data transmission flow control occurs at layer 4 with the help of buffering, windowing and congestion avoidance.
Reference: CCNA Cisco Certified Network Associate Study Guide, 5th Edition, Todd Lammle, chapter 1, page 17.

QUESTION NO: 12
Which Layer 4 protocol is used for a Telnet connection between two TestKing routers?

A. IP
B. ICMP

C. DNS
D. TCP
E. UDP
F. RTP

Answer: D
Explanation:
TCP is a reliable connection-oriented protocol. TCP uses acknowledgments, sequencing, and flow control to ensure reliability. Telnet uses TCP port 23.

QUESTION NO: 13
FTP, Telnet, DNS, and SMTP are all protocols being used in the TestKing network. Of these, which uses both TCP and UDP ports?

A. Telnet
B. FTP
C. DNS
D. SMTP
E. None of the above

Answer: C
Explanation:
The following port numbers for the protocols listed above are as follows:

FTP: TCP Port 20 and 21
SMTP: TCP Port 25
Telnet: TCP Port 23
DNS: both TCP and UDP Port 53

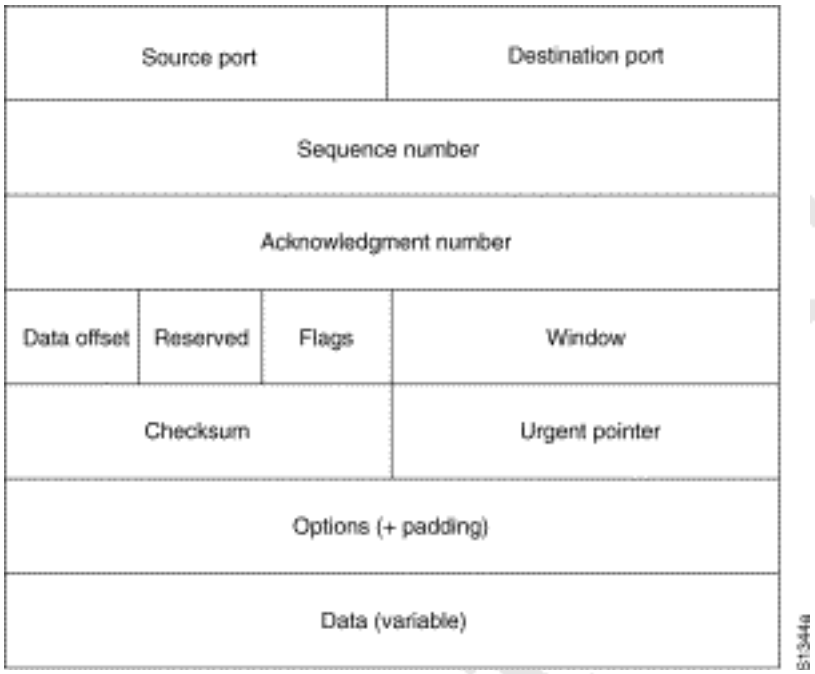
QUESTION NO: 14
Although TCP segments are similar to UDP segments, TCP packets contains some additional fields. Which of the following are found in a TCP header, but not in a UDP header? (Choose three)

A. Checksum
B. Sequence number

C. Destination port
D. Window size
E. Acknowledgment number
F. Source port

Answer: B, D, E
Explanation:
The Figure below illustrates the fields and overall format of a TCP packet.

Twelve fields comprise a TCP packet.



TCP Packet Field Descriptions
The following descriptions summarize the TCP packet fields illustrated in Figure 30-10:
1. Source Port and Destination Port-Identifies points at which upper-layer source and destination processes receive TCP services.
2. Sequence Number-Usually specifies the number assigned to the first byte of data in the current message. In the connection-establishment phase, this field also can be used to identify an initial sequence number to be used in an upcoming transmission.
3. Acknowledgment Number-Contains the sequence number of the next byte of data the sender of the packet expects to receive.
4. Data Offset-Indicates the number of 32-bit words in the TCP header.
5. Reserved-Remains reserved for future use.

6. Flags-Carries a variety of control information, including the SYN and ACK bits used for connection establishment, and the FIN bit used for connection termination.
7. Window-Specifies the size of the sender's receive window (that is, the buffer space available for incoming data).
8. Checksum-Indicates whether the header was damaged in transit.
9. Urgent Pointer-Points to the first urgent data byte in the packet.
10. Options-Specifies various TCP options.
11. Data-Contains upper-layer information.

User Datagram Protocol (UDP)

The User Datagram Protocol (UDP) is a connectionless transport-layer protocol (Layer 4) that belongs to the Internet protocol family. UDP is basically an interface between IP and upper-layer processes. UDP protocol ports distinguish multiple applications running on a single device from one another.

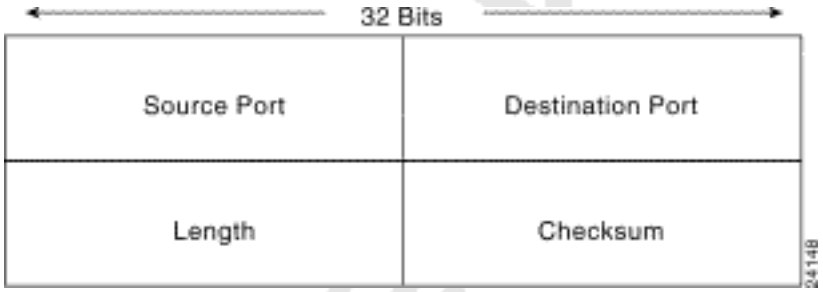
Unlike the TCP, UDP adds no reliability, flow-control, or error-recovery functions to IP. Because of UDP's simplicity, UDP headers contain fewer bytes and consume less network overhead than TCP.

UDP is useful in situations where the reliability mechanisms of TCP are not necessary, such as in cases where a higher-layer protocol might provide error and flow control.

UDP is the transport protocol for several well-known application-layer protocols, including Network File System (NFS), Simple Network Management Protocol (SNMP), Domain Name System (DNS), and Trivial File Transfer Protocol (TFTP).

The UDP packet format contains four fields, as shown in the figure below. These include source and destination ports, length, and checksum fields.

A UDP packet consists of four fields.



Source and destination ports contain the 16-bit UDP protocol port numbers used to demultiplex datagrams for receiving application-layer processes. A length field **s**pecifies the length of the UDP header and data. Checksum provides an (optional) integrity check on the UDP header and data.

Reference: http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/ip.htm#xtocid21

QUESTION NO: 15 DRAG DROP
You work as a network administrator at TestKing.com.
Your boss, Mrs. Tess King, is interested in the OSI layers. Match the items with the appropriate layers. Note that not all options are used.

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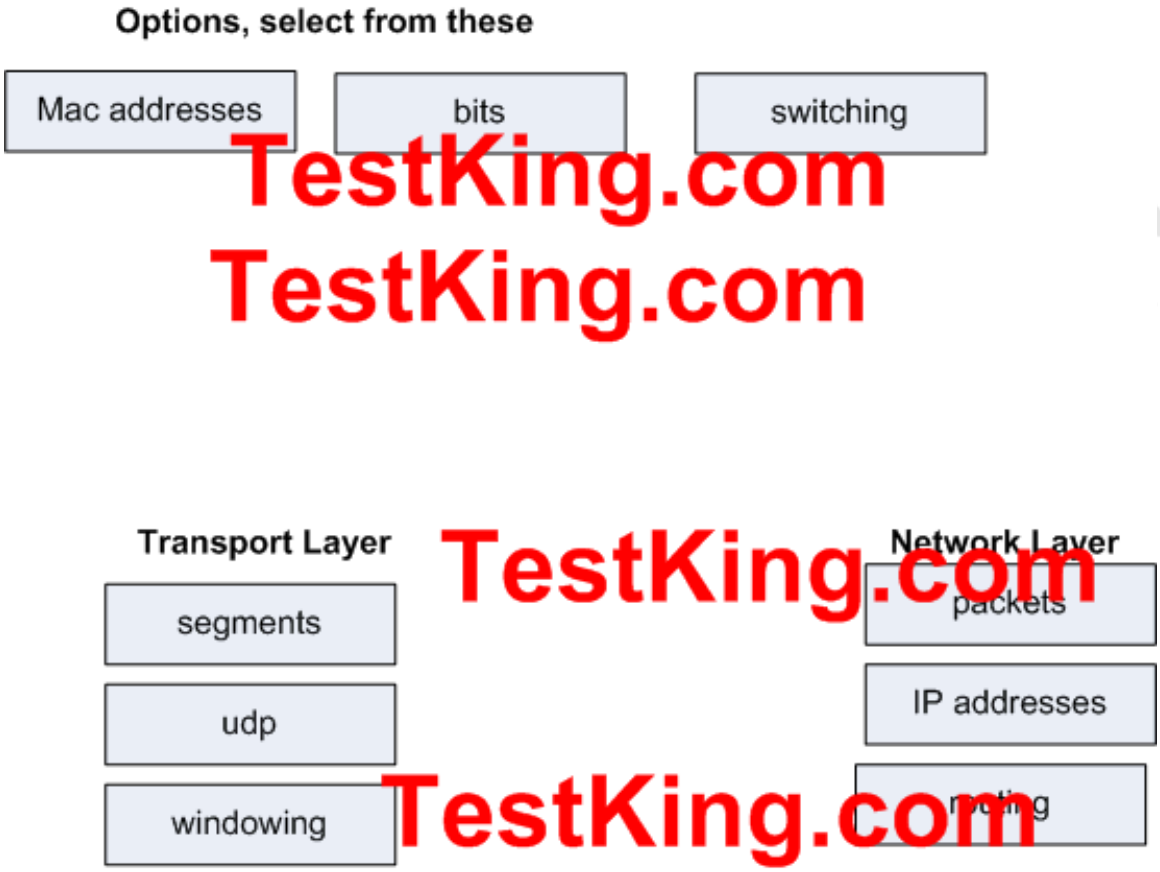
Answer:
Explanation:



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TestKing.com
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Section 6: Describe the impact of applications (Voice Over IP and Video Over IP) on a network (2 questions)

QUESTION NO: 1
TestKing is installing IP phones in a new office. The phones and office computers connect to the same device. To ensure maximum throughout for the phone data sessions, the company needs to make sure that the phone traffic is on a different network from that of the office computer data traffic. What is the best network device to which to directly connect the phones and computers and what technology should be implemented on this device? (Choose two)

A. VLAN
B. Subinterface
C. STP
D. Hub
E. Switch
F. Router
G. Wireless Access Point
H. VTP

Answer: A, E

QUESTION NO: 2
The corporate head office of TestKing has a teleconferencing system that uses VOIP (voice over IP) technology. This system uses UDP as the transport for the data transmissions. If these UDP datagrams arrive at their destination out of sequence, what will happen?

A. UDP will send an ICMP Information Request to the source host.
B. UDP will pass the information in the datagrams up to the next OSI layer in the order that they arrive.
C. UDP will drop the datagrams.
D. UDP will use the sequence numbers in the datagram headers to reassemble the data in the correct order.
E. UDP will not acknowledge the datagrams and wait for a retransmission of the datagrams.

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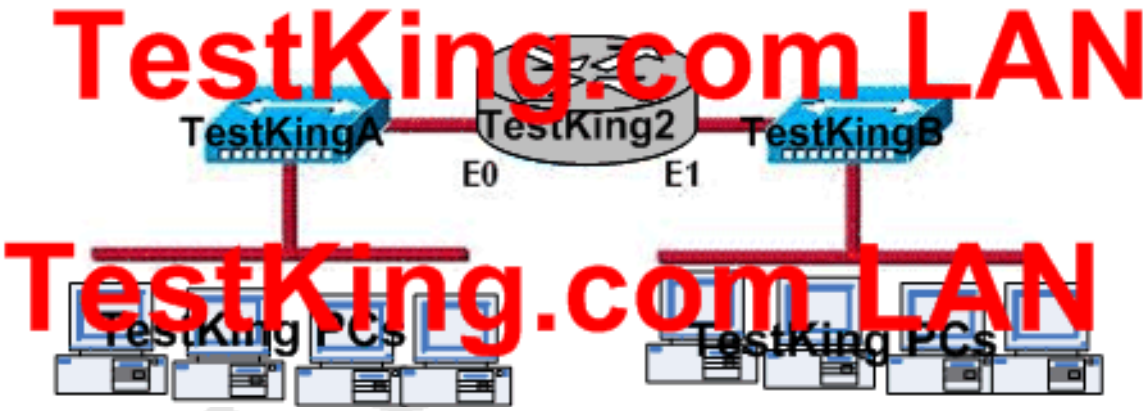
Answer: B
Explanation:
VOIP systems utilize UDP because it is faster and uses less overhead. In addition, the reliable transport mechanism used in TCP is useless to VOIP because if a packet gets dropped and needs to be resent, it will be already too late.
UDP provides a service for applications to exchange messages. Unlike TCP, UDP is connectionless and provides no reliability, no windowing, **and no reordering of the received data**. However, UDP provides some functions of TCP , such as data transfer, segmentation, and multiplexing using port numbers, and it does so with fewer bytes of overhead and with less processing required. UDP data transfer differs from TCP data transfer in that no reordering or recovery is accomplished. Applications that use UDP are tolerant of lost data, or they have some application mechanism to recover data loss.
Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 161.

Section 7: Interpret network diagrams (7 questions)

QUESTION NO: 1
Part of the TestKing network is shown below:



TestKing.com LAN
TestKing.com LAN

You work as a network technician for TestKing and are responsible for this network. Based on the diagram shown above, how many collision domains are there?

A. Six
B. Fourteen
C. Four
D. Two
E. Three
F. One
G. Eight

Answer: D
Explanation:
The multi-segment configuration guidelines apply only to a single Ethernet "collision domain." A collision domain is formally defined as a single CSMA/CD network in which there will be a collision if two computers attached to the system transmit at the same time. An Ethernet system composed of a single segment or multiple segments linked with repeaters is a network that functions as a single collision domain.

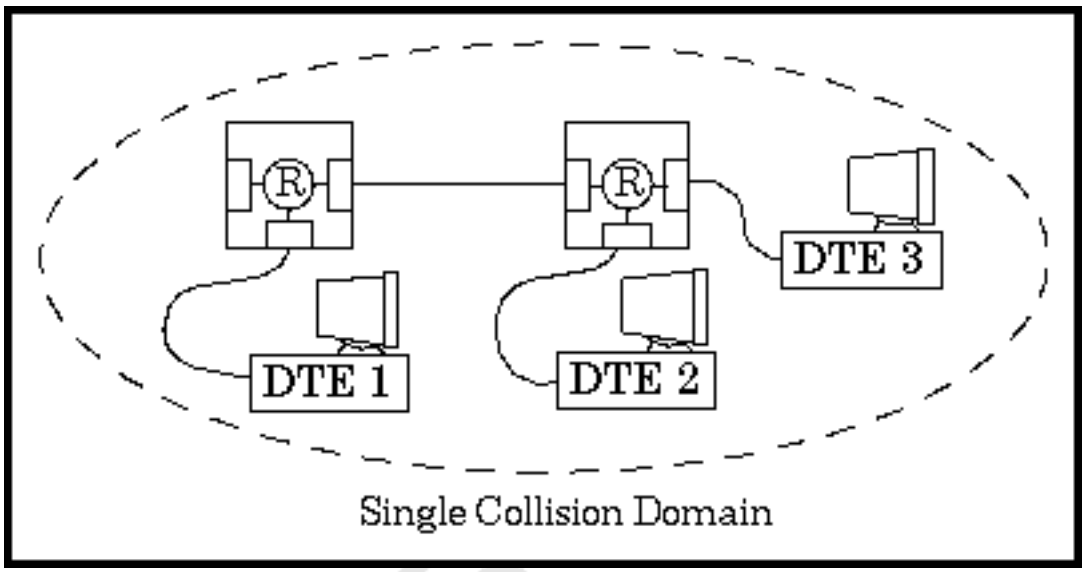


FIGURE 1 Repeater hubs create a single collision domain

The figure shows two repeater hubs connecting three computers. Since only repeater connections are used between segments in this network, all of the segments and computers are in the same collision domain.
In the next figure, the repeaters and DTEs are instead separated by a router (packet switch) and are therefore in separate collision domains, since routers do not forward collision signals from one segment to another. Routers contain multiple Ethernet interfaces and are designed to receive a packet on one Ethernet port and transmit the data onto another Ethernet port in a new packet.

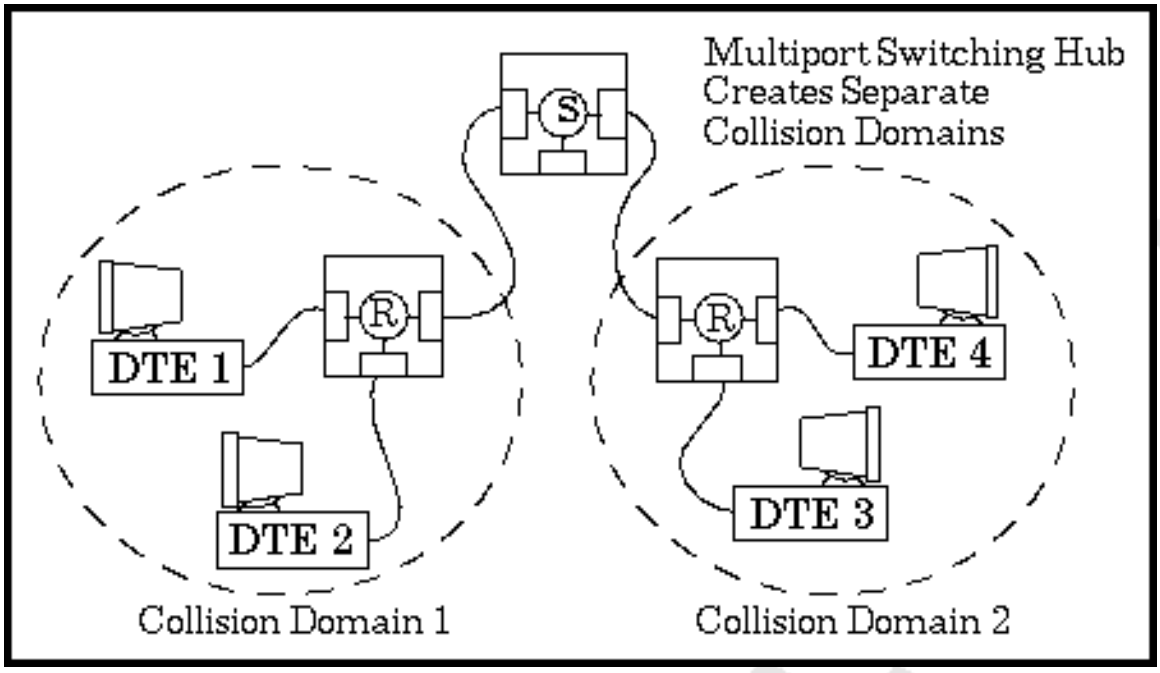
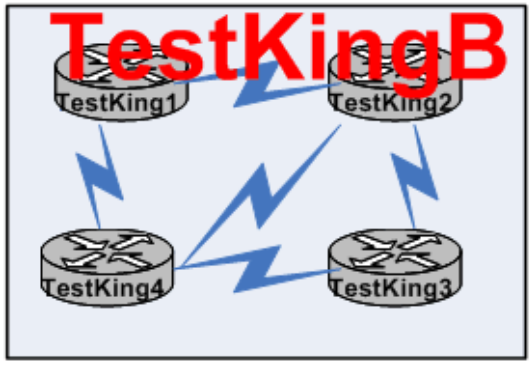


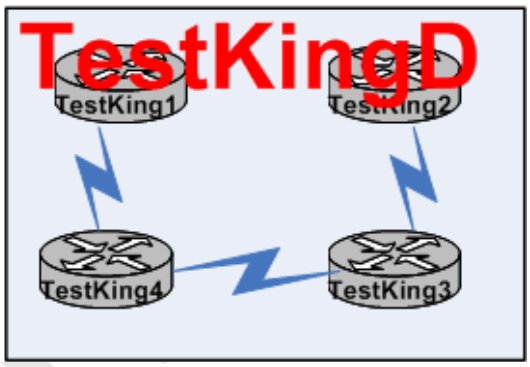
FIGURE 2 Routers creates separate collision domains

Instead of propagating collision signals between Ethernet segments, routers interrupt the collision domain and allow the Ethernets they link to operate independently. Therefore, you can use packet switching hubs to build larger network systems by interconnecting individual Ethernet systems.

QUESTION NO: 2
You work as a network technician at TestKing.com. You have been assigned the task of designing a new TestKing internetwork. The main priority is to achieve the highest reliability available. TestKing.com is willing to spend more dollars to avoid downtime caused by link failure.
Which of the following four designs is to be preferred?

Testking



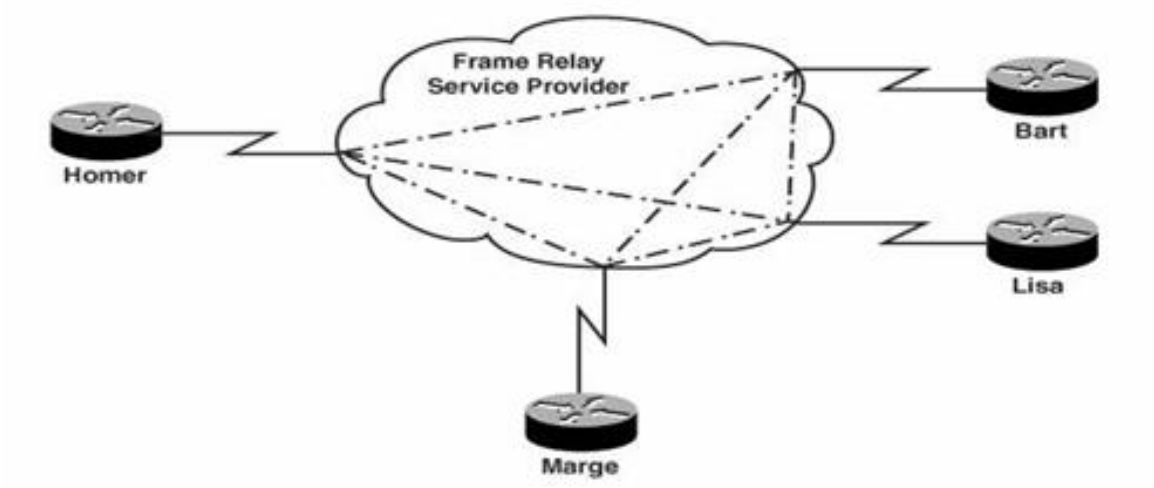


A. Design TestKingA
B. Design TestKingB
C. Design TestKingC
D. Design TestKingD

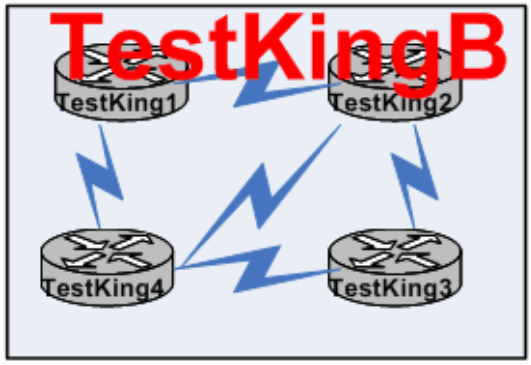
Answer: A
Explanation:

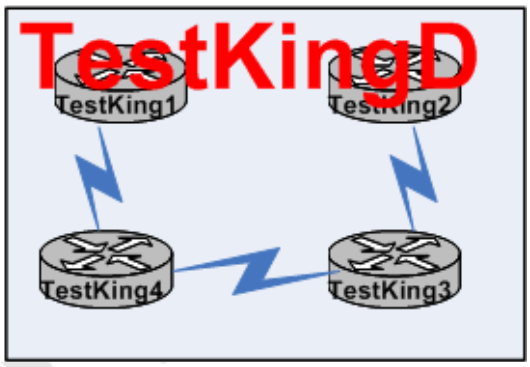
A network topology that is set up so that each device is directly connected to every other device on the network. This connection method has built-in redundancy. If one link goes down, the device will transmit via another link.

Example:
If the partial mesh design is a compromise between the network administrators and managers, then the full mesh design implies that the network administrators won. This design is every Cisco network administrator's picture of perfection over a Frame Relay cloud. It gives every site a direct virtual circuit to every other site, as shown in Figure This design gives maximum redundancy and minimum packet latency (latency describes how long it takes a packet to reach each location).



QUESTION NO: 3
You work as a network technician at TestKing.com. You have been assigned the task of designing a new TestKing internetwork. The main priority is the achieve the highest reliability available, however not at all costs. TestKing.com is willing to spend more dollars to avoid downtime caused by link failure.
Which of the following four designs would provide some redundancy and increase reliability for all four sites, but would cost less than a fully redundant topology?

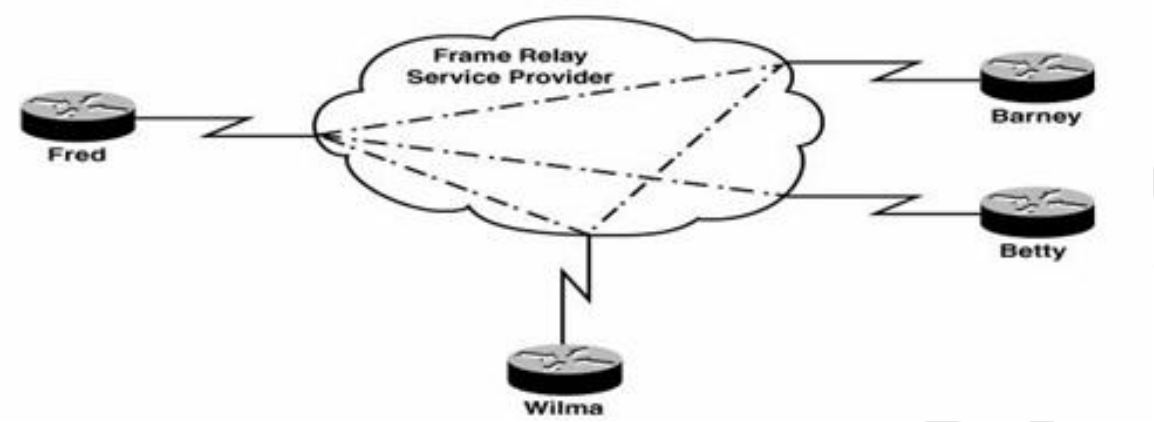




A. Design TestKingA
B. Design TestKingB
C. Design TestKingC
D. Design TestKingD

Answer: B
Explanation:
You can think of the partial mesh Frame Relay design as the compromise between network administrators and cost-saving managers.

Example:



QUESTION NO: 4
You work as a network technician at TestKing.com. You have been assigned the task of designing a new TestKing internetwork. The main priority is to minimize the link costs and at the same time wants to ensure the branch offices with direct connectivity to the main site.
Which of the following four designs is to be preferred?

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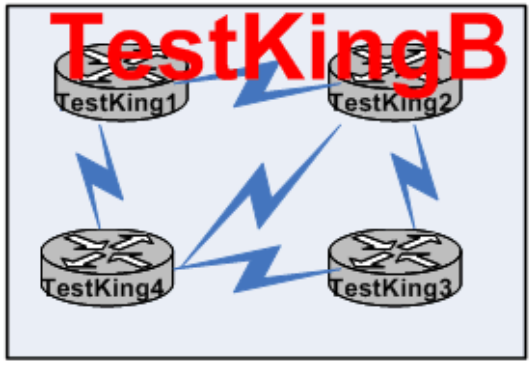
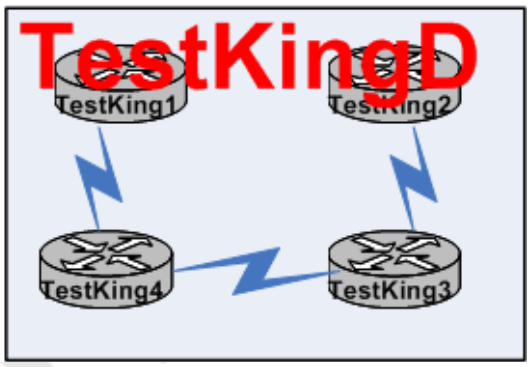
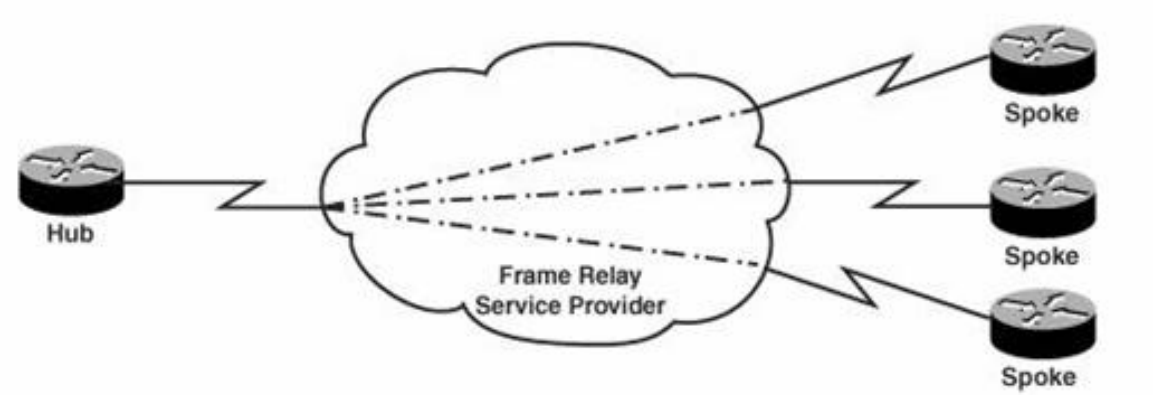




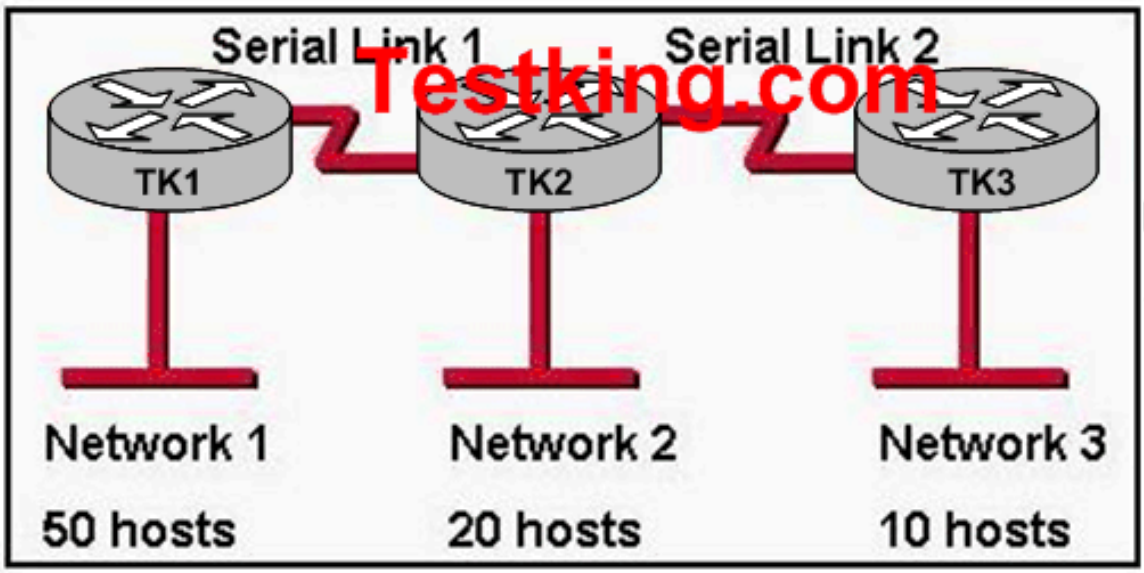
A. Design TestKingA
B. Design TestKingB
C. Design TestKingC
D. Design TestKingD

Answer: C
Explanation:
Every

network looks for cost efficiency. Redundancy is often sacrificed on the altar of monthly cost. Thus, the hub and spoke Frame Relay network design is one of the more common. In this configuration, you pick a centralized location (most likely, your largest, most connected office) as the "hub" of the network. All other locations are considered "spokes" and have a single virtual circuit connection back to the hub.
The major advantage of this configuration is the cost. It offers the cheapest monthly price tag, which cost-cutting corporations enjoy. The disadvantages are beginning to mount against this design, however. The redundancy is sorely lacking. If a single router (the central router) loses connectivity for any reason (if the router crashes, if a trenching company cuts through the line), your entire WAN goes down. The other disadvantage of this design is beginning to eclipse even redundancy. It is the disadvantage of tandem switching. Any time the spoke offices need to reach each other, they must go through the hub office.
Example:



QUESTION NO: 5
A TestKing network is shown in the exhibit below:



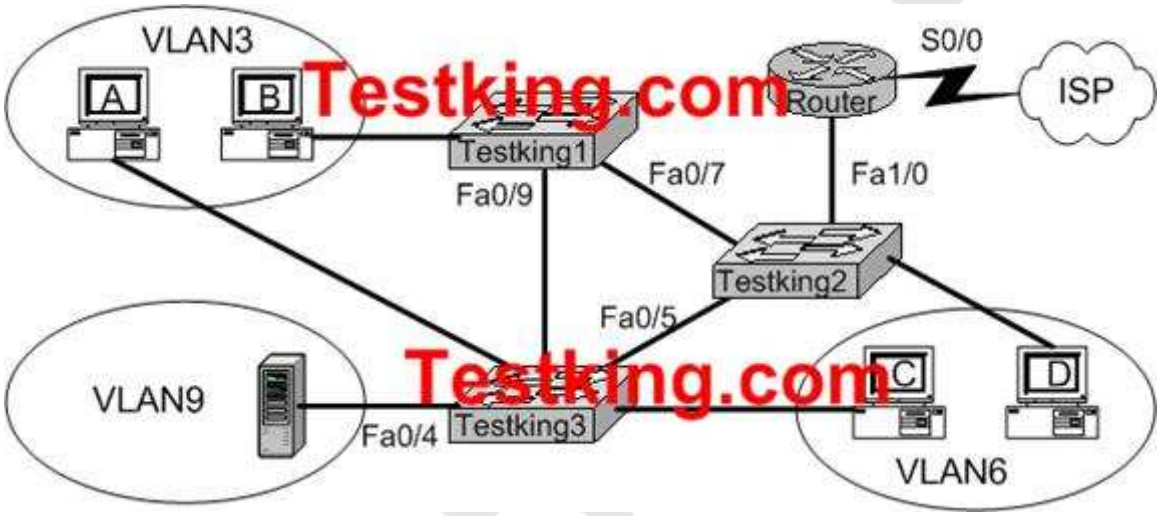
The routers in this network are running RIPv2. Which addressing scheme would satisfy the needs of this network yet waste the fewest addresses?

A. Network 1: 192.168.10.0/26Network 2: 192.168.10.64/26Network 3: 192.168.10.128/26Serial link 1: 192.168.20.0/24Serial link 2: 192.168.30.0/24
B. Network 1: 192.168.10.0/26Network 2: 192.168.10.64/28Network 3: 192.168.10.80/29Serial link 1: 192.168.10.88/30Serial link 2: 192.168.10.96/30
C. Network 1: 192.168.10.0/26Network 2: 192.168.10.64/27Network 3: 192.168.10.96/28Serial link 1: 192.168.10.112/30Serial link 2: 192.168.10.116/30
D. Network 1: 192.168.10.0/27Network 2: 192.168.10.64/28Network 3: 192.168.10.96/29Serial link 1: 192.168.10.112/30Serial link 2: 192.168.10.116/30

Answer: C
Explanation:
Network 1
Required Number of hosts :50
When We use the 26 bits for Network : 11111111.11111111.11111111.11000000 so 62 usable host can be in one network. 50 host for now and remaining hosts address for further growth.
Network 2
Required Number of Hosts: 20

When we use the 27 bits for Network: 11111111.11111111.1111111.11100000 so 30 usable hosts can be in one network.
Network 3
Required Number of Hosts: 10
When we use the 28 bits for Network: 11111111.11111111.11111111.11110000 so 14 usable hosts can be in one network.
Connection between TK1, TK2 and TK3 is WAN so when you use 30 bits network IP, you will not lose any IP addresses from network since this subnet allows for only 2 host addresses.

QUESTION NO: 6
The Testking network is shown below:



A technician is investigating a problem with the network shown above. These symptoms have been observed:

1. **All of the user hosts can access the Internet.**
2. **None of the user hosts can access the server in VLAN9**
3. **All of the hosts can ping each other.**

What could cause the symptoms?

A. Interface S0/0 on the router is down.
B. Interface Fa0/1 on the router is down.
C. Interface Fa0/5 on Testking3 is down.
D. Interface Fa0/4 on Testking3 is down.
E. Testking2 is turned off.
F. Trunking is not enabled on the link between Testking1 and Testking3.

Answer: D
Explanation:
Since all user hosts have access to internet, link to router has to be up. Therefore, router interface (Fa0/1 - believe it is labeled incorrectly on diagram as Fa1/0) must be up. Since all hosts can ping each other, but none can get to VLAN 9 which is through single interface Fa0/4, this interface must be down.

Choice A: incorrect, S0/0 must be up if internet access available.
Choice B: incorrect, Fa0/1 must be up if internet access (through router) available.
Choice C: incorrect, would not prevent access to VLAN9 via other routes (i.e Fa0/7, Fa0/9, Fa0/4)
Choice D: correct
Choice E: incorrect: TestKing2 must be up if internet access (through switch and then router) available
Choice F: incorrect: Disabled trunking on link between TestKing1 and TestKing3 would not prevent access to VLAN9 via other routes

QUESTION NO: 7
Refer to the graphic shown below:

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```
Sw1-2960#show mac-address-table
        Mac Address Table
-------------------------------------------
Vlan   Mac Address      Type       Ports
----   -----------      -------    -----
 All   0014.a8a8.8780   STATIC     CPU
 All   0100.0ccc.cccc   STATIC     CPU
 All   0100.0ccc.cccd   STATIC     CPU
 All   0100.0cdd.dddd   STATIC     CPU
  1    0001.af07.ad76   DYNAMIC    Fa0/7
  1    0001.e640.3b4b   DYNAMIC    Fa0/23
  1    0001.e640.4b2b   DYNAMIC    Fa0/23
  1    0001.e658.63ea   DYNAMIC    Fa0/23
  1    0002.fde1.6acb   DYNAMIC    Fa0/14
  1    0004.0077.7179   DYNAMIC    Fa0/23
  1    0005.32a9.9d97   DYNAMIC    Fa0/23
  1    0006.5b88.dfc4   DYNAMIC    Gi0/2
  1    0006.5bbd.736d   STATIC     Fa0/9
  1    0006.5bdd.6eb5   DYNAMIC    Fa0/5
  1    0006.5bdd.6fee   DYNAMIC    Fa0/23
  1    0006.5bdd.7027   DYNAMIC    Fa0/23
  1    0006.5bdd.72fd   DYNAMIC    Fa0/23
  1    0006.5bdd.7425   DYNAMIC    Fa0/23
  1    0006.5bdd.74b5   DYNAMIC    Fa0/23
  1    000b.db94.40f3   DYNAMIC    Fa0/23
  1    000b.d[illegible]95.2[illegible]   DYNAMIC    Fa0/4
  1    000d.6[illegible]1.4[illegible]   DYNAMIC    Fa0/14
  1    000f.1f[illegible]5.08[illegible]   DYNAMIC    Fa0/23
  1    000f.1f16.be89   DYNAMIC    Fa0/23
  <output continued>
```

```
  1    000f.1f16.bea2   DYNAMIC    Fa0/23
  1    000f.1f16.bfe6   DYNAMIC    Fa0/23
  1    000f.8f28.b7b5   DYNAMIC    Fa0/18
  1    0010.22fe.466b   DYNAMIC    Fa0/6
  1    0010.22fe.4ad8   DYNAMIC    Fa0/23
  1    0010.4b08.194b   DYNAMIC    Fa0/23
  1    0010.4bca.7ee4   DYNAMIC    Fa0/23
  1    0010.5a04.3faa   DYNAMIC    Fa0/3
  1    0010.5a0a.8567   DYNAMIC    Fa0/14
  1    0010.7be7.faef   DYNAMIC    Fa0/14
  1    0011.1165.8acf   DYNAMIC    Fa0/23
  1    0013.720b.40c3   DYNAMIC    Fa0/19
  1    0014.f26e.ed8e   DYNAMIC    Fa0/23
  1    0014.f26e.edb5   DYNAMIC    Fa0/23
  1    0020.afe8.b95c   DYNAMIC    Fa0/23
  1    0040.9654.49bb   DYNAMIC    Fa0/2
  1    0050.049b.371b   DYNAMIC    Fa0/23
  1    0060.088d.5551   DYNAMIC    Fa0/2
  1    0080.9120.1766   DYNAMIC    Fa0/8
  1    0090.96ae.4f94   DYNAMIC    Fa0/18
  1    0090.96ae.6151   DYNAMIC    Fa0/18
  1    00a0.c949.702a   DYNAMIC    Fa0/15
  1    00b0.d020.d4fb   DYNAMIC    Fa0/23
  1    00c0.4f79.72b8   DYNAMIC    Fa0/23
  1    00c0.b770.6c19   DYNAMIC    Fa0/22
  1    00c0.b770.6c8e   DYNAMIC    Fa0/21
  1    00c0.b77[illegible].6c8f   DYNAMIC    Fa0/20
  1    [illegible]   DYNAMIC    Fa0/17
Total Mac Addresses for this criterion: 55
Sw1-2960#
```

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A.

B.

C.

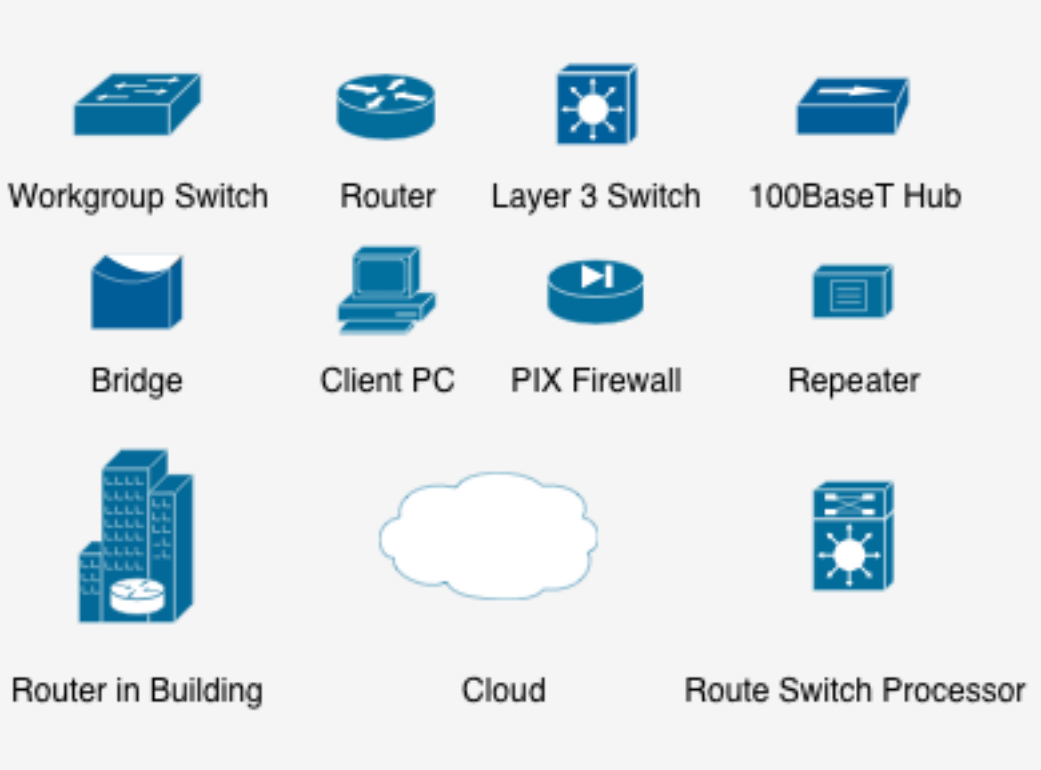
D.

What symbol represents a type of device that is connected to interface FastEthemet 0/23 of the 2960 switch Sw1-2960?

A. Picture A
B. Picture B
C. Picture C
D. Picture D

Answer: D
Explanation:

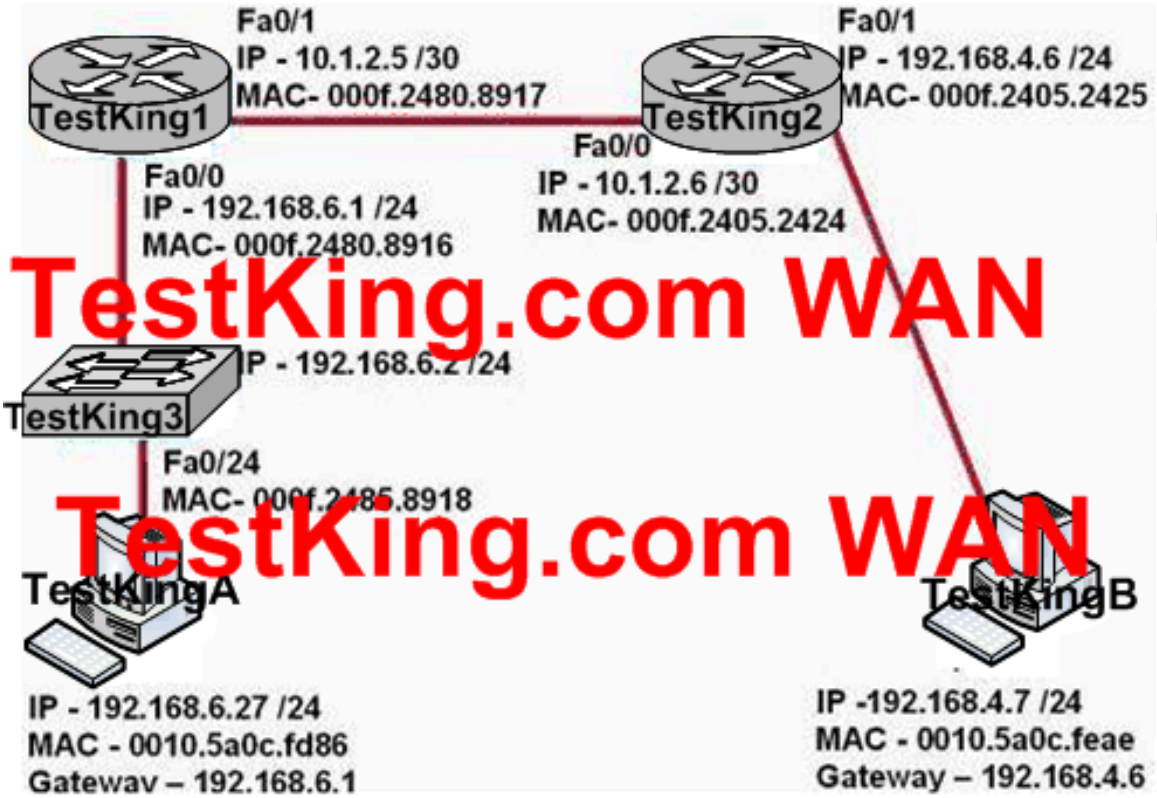
Some of the common Cisco symbols are shown below:



Note: Choice B in this question represents an ATM switch, which is not pictured above. From the output shown in this question, we can see that there a numerous different MAC addresses associated with port Fa 0/23. This can only mean that a device with multiple hosts attached to it is plugged into this port, such as a hub or another switch.

Section 8: Determine the path between two hosts across a network (17 questions)

QUESTION NO: 1
Part of the TestKing network topology is shown below:



Entry exhibit:

A.

Interface Address	Physical Address	Type
192.168.6.2	0010.5a0c.feae	dynamic

B.

Interface Address	Physical Address	Type
192.168.4.7	000f.2480.8916	dynamic

C.

Interface Address	Physical Address	Type
192.168.6.1	000f.2480.8916	dynamic

D.

Interface Address	Physical Address	Type
192.168.4.7	0010.5a0c.feae	dynamic

E.

Interface Address	Physical Address	Type
192.168.6.1	0010.5a0c.feae	dynamic

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Host TestKingA pings Host TestKingB, which entry will be in the ARP cache of Host TestKingA to support this transmission?

A. A
B. B

C. C
D. D
E. E

Answer: C

QUESTION NO: 2
The TestKing network is shown in the following exhibit:

```
TestKing3#show ip route
Gateway of last resort is not set
    192.168.10.0/24 is variably subnetted, 6 subnets, 2 masks
D       192.168.10.64/26 [90/2195456] via 192.168.10.9, 00:03:31, Serial0/0
D       192.168.10.0/30 [90/2681856] via 192.168.10.9, 00:03:31, Serial0/0
C       192.168.10.4/30 is directly connected, Serial 0/1
C       192.168.10.8/30 is directly connected, Serial 0/0
C       192.168.10.192/26 is directly connected, FastEthernet0/0
D       192.168.10.128/26 [90/2195456] via 192.168.10.5, 00:03:31, Serial 0/1
```

TestKing uses EIGRP as the routing protocol. Based on the info shown above, what path will packets take from a host on the 192.168.10.192/26 network to a host on the LAN attached to routerTESTKING1?

A. The path of the packets will be TESTKING3 to TESTKING2 to TESTKING1
B. The path of the packets will be TESTKING3 to TESTKING1 to TESTKING2
C. The path of the packets will be both TESTKING3 to TESTKING2 to TESTKING1 AND TESTKING3 to TESTKING1
D. The path of the packets will be TESTKING3 to TESTKING1
E. None of the above

Answer: D
Explanation:
Based on the routing table of TestKing3, the best path to the TestKing1 LAN is shown on the first routing entry (192.168.10.64). TestKing 3 will use the Serial 0/0 interface to route traffic to this destination, with the next hop IP address of 192.168.10.9, which is the network used between TestKing3 and TestKing1, making choice D correct. Note that there is only one routing entry for this destination. If traffic were load balancing over both paths, then both would be displayed in the routing table.

QUESTION NO: 3
Refer to the following exhibit:

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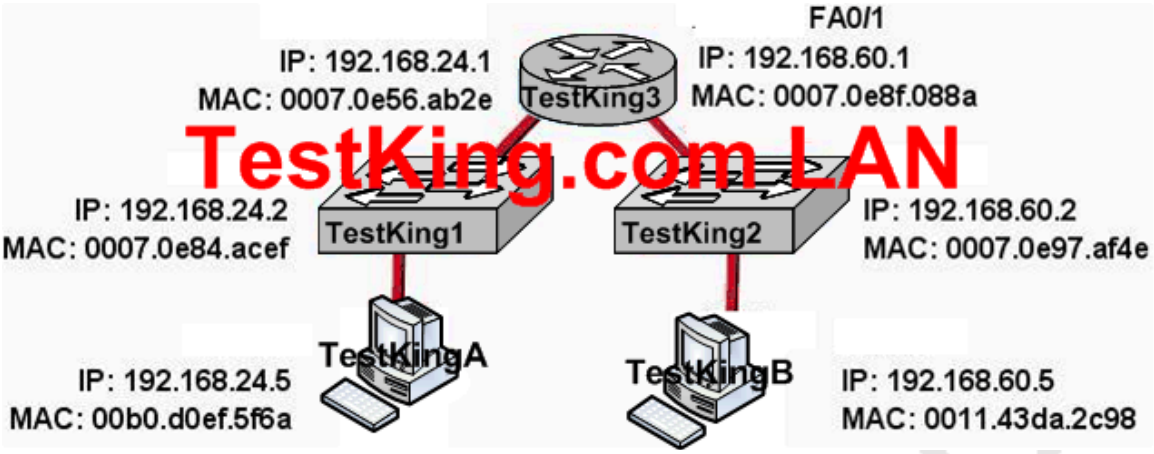

Based on the diagram shown above, what is the correct addressing for a frame and packet received by Host TestKingB from Host TestKingA?

A. Destination MAC: 0011.43da.2c98
Source MAC: 0070.0e8f.088a
Destination IP: 192.168.60.5
Source IP: 192.168.60.1
B. Destination MAC: 0011.43da.2c98
Source MAC: 0070.0e8f.088a
Destination IP: 192.168.60.5
Source IP: 192.168.24.5
C. Destination MAC: 0011.43da.2c98
Source MAC: 00b0.d0ef.5f6a
Destination IP: 192.168.60.5
Source IP: 192.168.24.5
D. Destination MAC: 0011.43da.2c98
Source MAC: 0070.0e97.af4e
Destination IP: 192.168.60.5
Source IP: 192.168.60.2
E. None of the above

Answer: B

Explanation:
When packets leave from the host, the packets contains the source MAC and IP of the host address. The source and destination IP address will not change. Because the host knows that the destination is on another subnet, it will forward the packet to the default gateway device, so the destination MAC address will be of the default gateway, which is the FA0/0 interface of router TestKing3.

QUESTION NO: 4
Exhibit #1:

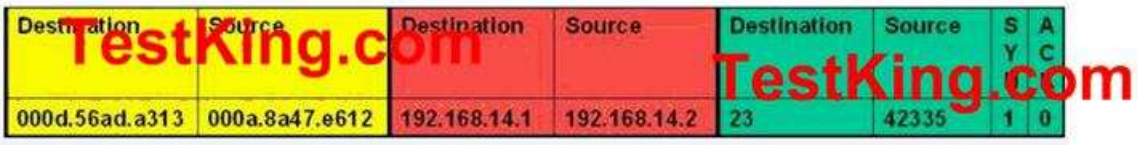

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Exhibit #2:

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A.

Destination	Source	Destination	Source	Destination	Source	SYN	ACK
000a.8a47.e612	000d.56ad.a313	192.168.14.2	192.168.14.1	42335	23	1	1

B.

Destination	Source	Destination	Source	Destination	Source	SYN	ACK
000d.56ad.a313	000a.8a47.e612	192.168.14.1	192.168.14.2	42335	23	0	1

C.

Destination	Source	Destination	Source	Destination	Source	SYN	ACK
000a.8a47.e612	000d.56ad.a313	192.168.14.2	192.168.14.1	23	42335	0	1

D.

Destination	Source	Destination	Source	Destination	Source	S	ACK
000d.56ad.a313	000a.8a47.e612	192.168.14.2	192.168.14.1	42336	23	0	0

E.

Destination	Source	Destination	Source	Destination	Source	S	A
000a.8a47.e612	000d.56ad.a313	192.168.14.2	192.168.14.1	23	42336	1	1

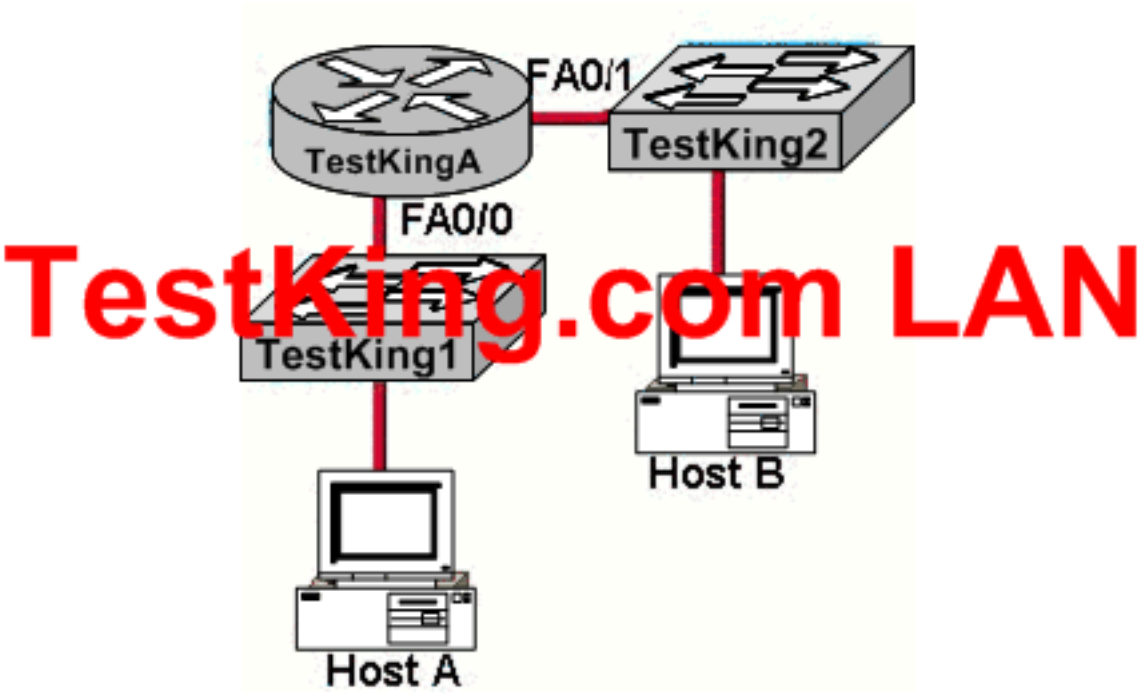
Please study the two exhibits carefully.

The partial frame shown above displays select header information as it arrives at the destination host. Of the following choices shown below, which one represents the correct header information in the responding frame returned to the remote host?

A. A
B. B
C. C
D. D
E. E

Answer: A

QUESTION NO: 5
The TestKing network is shown below:



TestKing.com LAN

Based on the diagram above, which destination addresses will Host A use to send data to Host B? (Choose two.)

A. The IP address of TestKing1
B. The IP address of TestKingA Fa0/0

C. The IP address of Host B
D. The MAC address of TestKing1
E. The MAC address of TestKingA Fa0/0
F. The MAC address of Host B

Answer: C, E
Explanation:
When sending data from one host to another, destination information will be added to every packet's header. The destination information will be the IP and MAC Address of destination host. If the destination is found outside the subnet the MAC address of the router is used. Note: The destination IP address will never change, unless NAT is involved.

QUESTION NO: 6
Which IOS user EXEC command will allow a network technician to determine which router in the path to an unreachable network host should be examined more closely for the cause of the network failure?

A. TestKingB> telnet
B. TestKingB > ping
C. TestKingB > trace
D. TestKingB > show ip route
E. TestKingB > show interface
F. TestKingB > show cdp neighbors

Answer: C
Explanation:
This can perform the trace command. It sends the ping packets to each of the routers on the way to the receiver. The router which doesn't respond will be a potential failure place in this network.

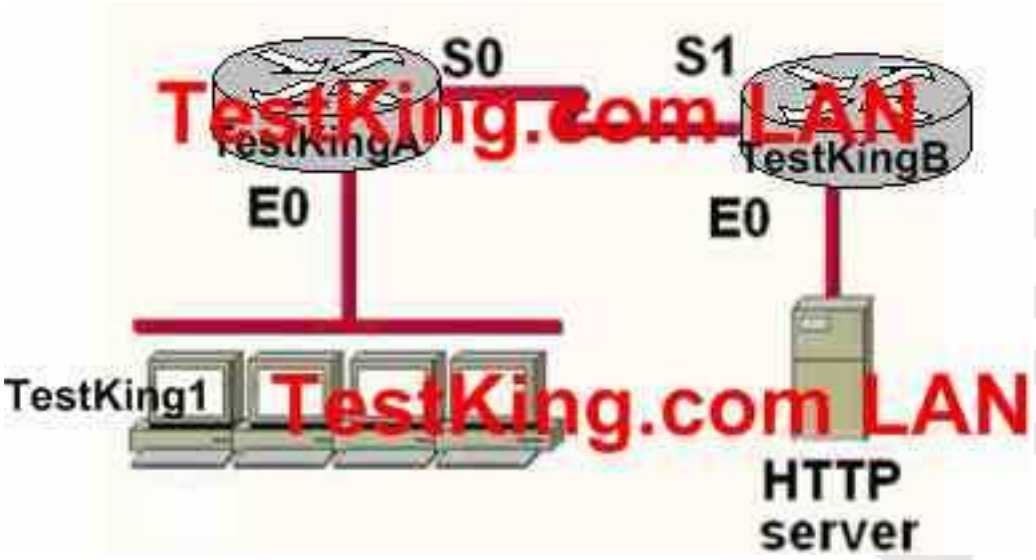
QUESTION NO: 7
A TestKing office's network topology is shown in the diagram below:

Host TestKingA needs to communications with the e-mail server shown above. What address will be placed on the destination address field of the frame when it leaves host TestKingA?

A. The MAC address of TestKingA
B. The MAC address of switch TestKing1
C. The MAC address of the E0 interface of the TestKing3 router.
D. The MAC address of the E1 interface of the TestKing3 router.
E. The MAC address of switch TestKing2
F. The MAC address of the email server

Answer: C
Explanation:
If the destination host is in the remote segment than the router will change the MAC address of the source to its own. The inverse ARP protocol is by default on. Remember that IP address is not changed after forwarding. The MAC address is changed after crossing each broadcast domain.

QUESTION NO: 8
The TestKing network topology is shown below:



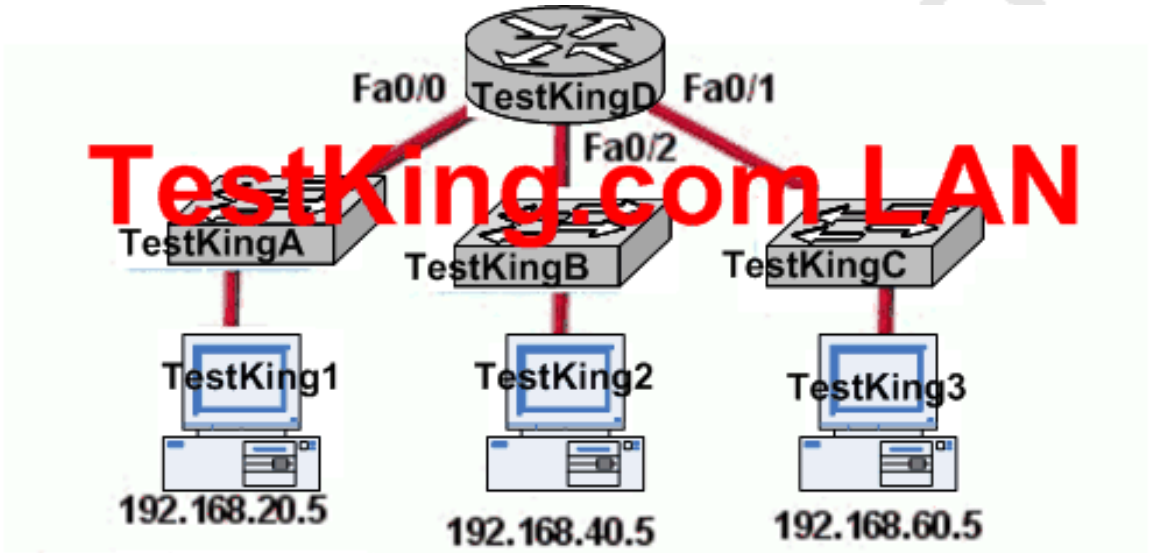
You work as a network engineer at TestKing.com. The topology of the TestKing.com network is displayed in the exhibit. Host TestKing1 has established a connection with the HTTP server attached to interface E0 of the TestKingB router. Which of the following statements describe the information contained in protocol data units sent from host TestKing1 to this server? (Select three)

A. The destination port number in a segment header will have a value of 80.
B. The destination port number in a segment header will have a unique value greater than or equal to 1023.
C. The destination address of a frame will be the MAC address of the HTTP server interface.
D. The destination address of a frame will be the MAC address of the E0 interface of the TestKingA router.
E. The destination IP address of a packet will be the IP address of the E0 interface of the TestKingA router.
F. The destination address of a packet will be the IP address of the HTTP-Server

Answer: A, D, F
Explanation:

HTTP uses TCP port 80, making choice A correct. The source port will be chosen randomly, but not the destination TCP port. The destination IP address will be left unchanged, and since HTTP server is on a remote network, the destination MAC address will be the MAC address of the default gateway (E0 on TestKingA).

QUESTION NO: 9
The TestKing network is shown below:



TestKing.com LAN

TestKingD# show ip arp

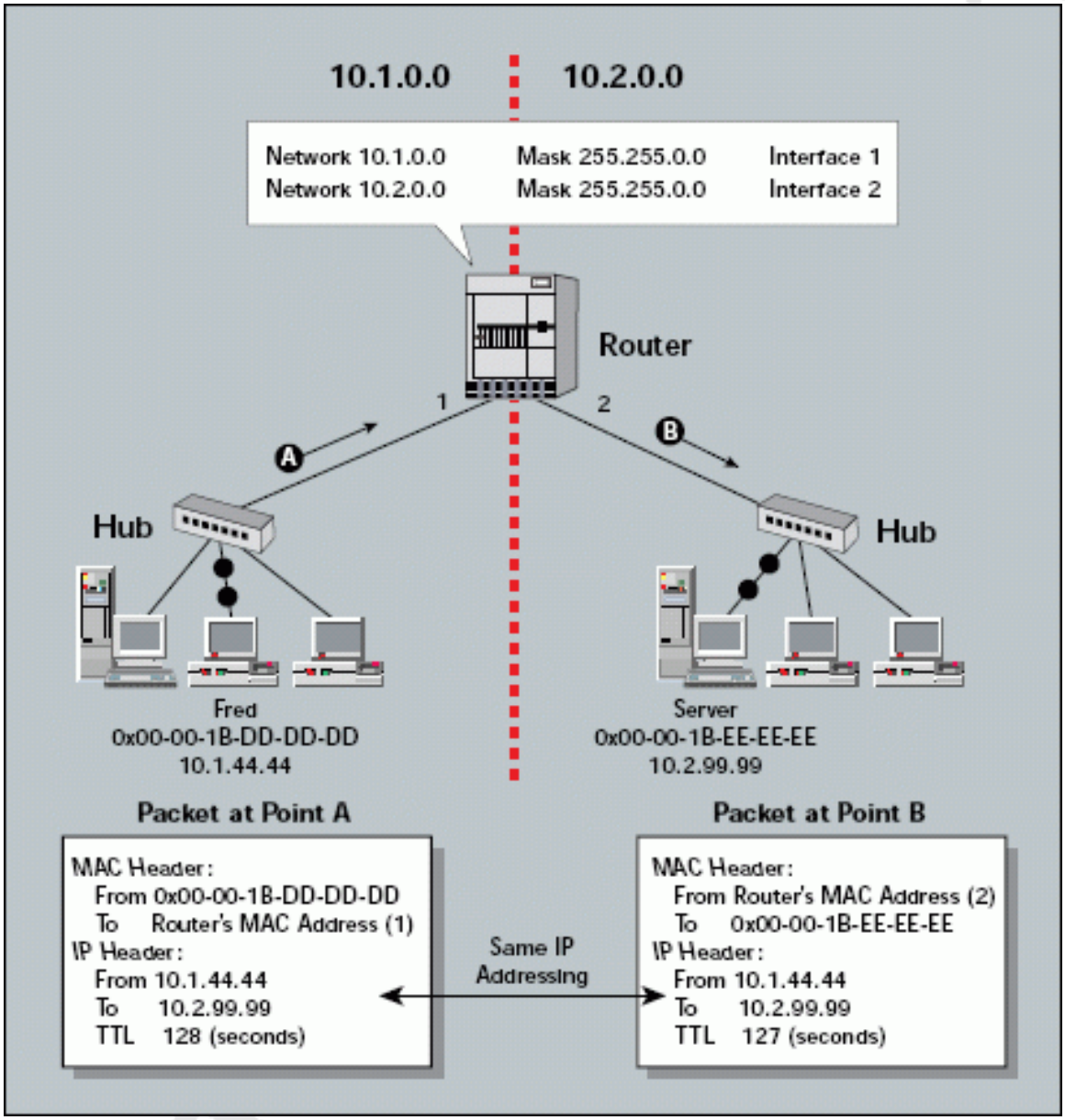
Protocol	Address	Age(min)	Hardware Addr	Type	Interface
Internet	192.168.20.5	9	0000.0c07.f892	ARPA	FastEthernet0/0
Internet	192.168.60.5	8	0000.0c07.ac00	ARPA	FastEthernet0/1
Internet	192.168.20.1	-	0000.0c07.ae45	ARPA	FastEthernet0/0
Internet	192.168.40.5	9	0000.0c07.4320	ARPA	FastEthernet0/2
Internet	192.168.60.1	-	0000.0c63.1300	ARPA	FastEthernet0/1
Internet	192.168.40.1	-	0000.0c63.6965	ARPA	FastEthernet0/2

In this network, host TestKing1 is able to send data to Host TestKing2. How will Router TestKingD handle the data frame received from Host TestKing1? (Choose three)

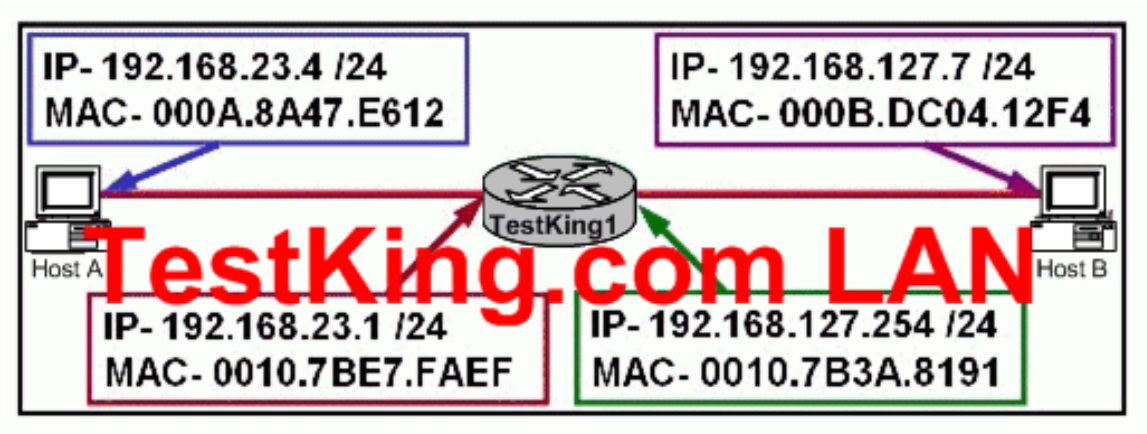
A. Router TestKingD will strip off the source MAC address and replace it with the MAC address on the forwarding Fast Ethernet interface
B. Router TestKingD will strip off the source IP address and replace it with the IP address on the forwarding Fast Ethernet interface
C. Router TestKingD will strip off the destination MAC address and replace it with the MAC address of Host TestKing2
D. Router TestKingD will strip off the destination IP address and replace it with the IP address of Host B
E. Router TestKingD will forward the data frame out interface Fast Ethernet0/1
F. Router TestKingD will forward the data frame out interface FastEthernet0/2

Answer: A, C, F
Explanation:
Whereas switches can only examine and forward packets based on the contents of the MAC header, routers can look further into the packet to discover the network for which a packet is destined. Routers make forwarding decisions based on the packet's network-layer header (such as an IPX header or IP header). These network-layer headers contain source and destination network addresses.
Local devices address packets to the router's MAC address in the MAC header. After receiving the packets, the router must perform the following steps:
1. Check the incoming packet for corruption, and remove the MAC header . The router checks the packet for MAC-layer errors. The router then strips off the MAC header and examines the network-layer header to determine what to do with the packet.
2. Examine the age of the packet. The router must ensure that the packet has not come too far to be forwarded. For example, IPX headers contain a hop count. By default, 15 hops is the maximum number of hops (or routers) that a packet can cross. If a packet has a hop count of 15, the router discards the packet.
IP headers contain a Time to Live (TTL) value. Unlike the IPX hop count, which increments as the packet is forwarded through each router, the IP TTL value decrements as the IP packet is forwarded through each router. If an IP packet has a TTL value of 1, the router discards the packet. A router cannot decrement the TTL value to 1 and then forward the packet.
3. Determine the route to the destination. Routers maintain a routing table that lists available networks, the direction to the desired network (the outgoing interface number), and the distance to those networks. After determining which direction to forward the packet, the router must build a new header. (If you want to read the IP routing tables on a Windows 95/98 workstation, type ROUTE PRINT in the DOS box.)
4. Build the new MAC header and forward the packet.

Finally, the router builds a new MAC header for the packet. The MAC header includes the router's MAC address and the final destination's MAC address or the MAC address of the next router in the path.
Figure 5 shows the contents of a packet before and after it has been forwarded by a router. Figure 5 also shows the contents of the router's routing tables.
Figure 5: Routers forward packets based on the network address.



QUESTION NO: 10
Two TestKing hosts are shown below:



Refer to the exhibit above. Host A is communicating with host B. How will the data be addressed when it leaves host A?

A. Source MAC=000A.8A47.E612
Destination MAC=000B.DC04.12F4
Source IP=192.168.23.4
Destination IP=192.168.23.1
B. Source MAC=000A.8A47.E612
Destination MAC=0010.7BE7.FAEF
Source IP=192.168.23.4
Destination IP=192.168.127.7
C. Source MAC=000A.8A47.E612
Destination MAC=000B.DC04.12F4
Source IP=192.168.23.4
Destination IP=192.168.127.7
D. Source MAC=000A.8A47.E612
Destination MAC=0010.7BE7.FAEF
Source IP=192.168.23.4
Destination IP=192.168.23.1
E. None of the above

Answer: B
Explanation:

When packets leave from the host, the packets contains the source MAC and IP of the host address. The source and destination IP address will not change (if it did, the router devices would not know where to send the data). Because the host knows that the destination is on another subnet, it will forward the packet to the default gateway device, so the destination MAC address will be of the default gateway, which is the LAN interface of router TestKing1.

QUESTION NO: 11
Exhibit:

TestKing.com WAN

Please study the exhibit above carefully. If host TestKingA sends an IP packet to host TestKingB, what will the OSI Layer 3 source address be in the packet when it reaches host B?

A. B2:B2:B2:B2:B2:B2
B. A1:A1:A1:A1:A1:A1
C. 10.168.10.99
D. 10.168.11.65
E. C3:C3:C3:C3:C3:C3
F. 10.168.11.88
G. None of the above

Answer: C
Explanation:

When packets transfer from one host to another across a routed segment, the source IP address always remains the same source IP address, and the physical (MAC) address will be the existing router's interface address. Similarly, the destination IP address always remains the same and the destination physical (MAC) address is the destination router's interface address.

QUESTION NO: 12
Exhibit:

TestKing.com WAN

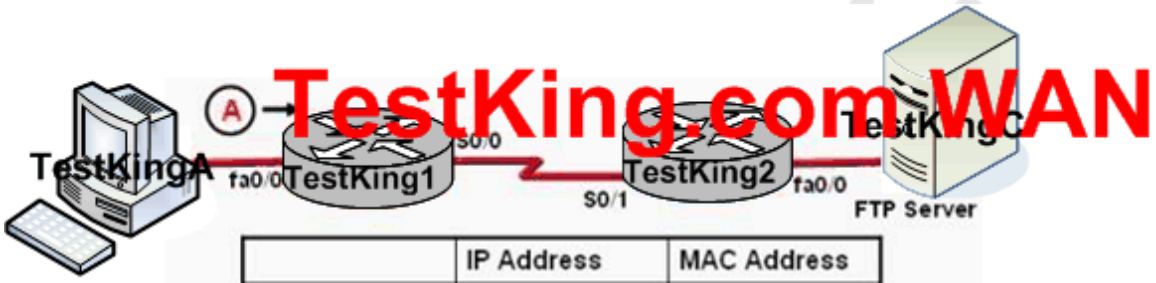
Please study the exhibit carefully. If host TestKingA sends an IP packet to host TestKingB, what will the source physical (MAC) address be in the frame when it reaches host TestKingB?

A. A1:A1:A1:A1:A1:A1
B. D4:D4:D4:D4:D4:D4
C. B2:B2:B2:B2:B2:B2
D. 10.168.11.88
E. 10.168.10.99
F. C3:C3:C3:C3:C3:C3

Answer: F
Explanation:

When packets transfer from one host to another across a routed segment, the source IP address always remains the same source IP address, and the source physical (MAC) address will be the existing router's interface address. Similarly, the destination IP address always remains the same and the destination physical (MAC) address is the destination router's interface address.

QUESTION NO: 13
In the network below, host TestKingA is transferring a file to the FTP server. Point A represents the frame as it goes toward the TestKing1 router. What will the Layer 2 destination address be at this point?



TestKing.com WAN

	IP Address	MAC Address
TestKingA	192.168.1.5	abcd.1123.0045
fa0/0 (TestKing1)	192.168.1.1	abcd.2246.0035
fa0/0 (TestKing2)	192.168.7.1	aabb.7777.3333
FTP Server	192.168.7.17	aabb.5555.2222

A. 192.168.7.17
B. abcd.1123.0045
C. aabb.555.2222
D. 192.168.1.1
E. abcd.2246.0035

Answer: E
Explanation:

For packets destined to a host on another IP network, the destination MAC address will be the LAN interface of the router. Since the FTP server lies on a different network, the host will know to send the frame to it's default gateway, which is TestKing1.

QUESTION NO: 14
Part of the TestKing network is shown below:

TestKing.com LAN
TestKing.com LAN

Host TestKing1 needs to communicate with the email server shown above. What address will be placed in the destination address field of the frame when it leaves Host TestKing1?

A. The MAC address of Host TestKing1
B. The MAC address of E0 of the router TestKingC
C. The MAC address of Switch TestKingB
D. The MAC address of E1 of the router TestKingC
E. The MAC address of Switch TestKingA
F. The MAC address of the email server TestKingD
G. None of the above

Answer: B
Explanation:

Since the email server resides on a different IP subnet than the host TestKing1, the host will send the frame to its default gateway. In this case, the router TestKingC is acting as the default gateway for all hosts on the LAN, so the frame will be sent to its Ethernet interface so that it can be routed to the email server.

QUESTION NO: 15
Part of the TestKing network is shown below:

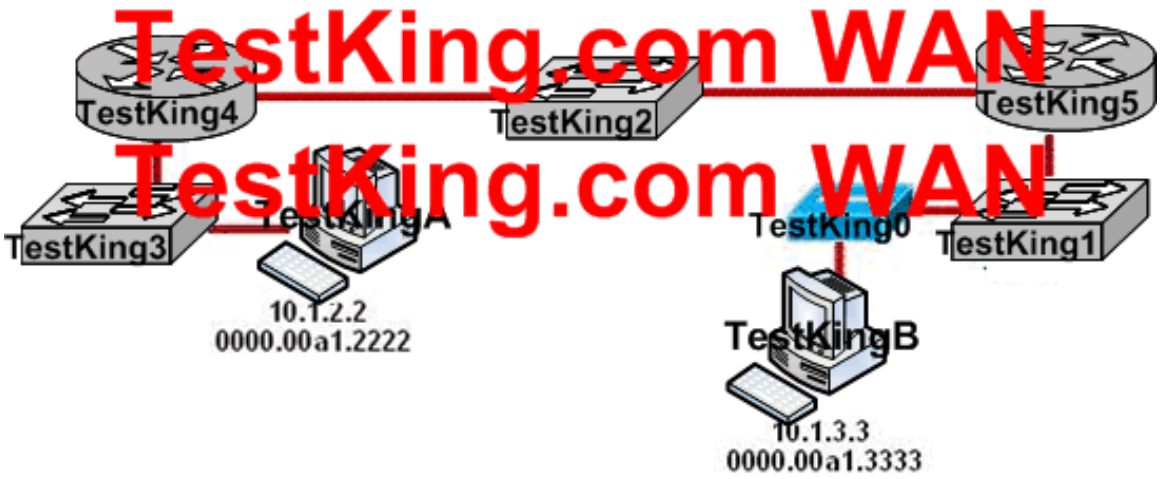
In this TestKing network segment, host TestKingA needs to send data to Host TestKingB. Which Layer 2 and Layer 3 destination addresses will be used in this session to send the data from Host TestKingA to Host TestKingB?

A. 192.168.60.5 and 0007.0e56.ab2e
B. 192.168.24.2 and 0007.0e84.acef
C. 192.168.24.1 and 0007.0e56.ab2e
D. 192.168.60.5 and 0011.43da.2c98
E. None of the above

Answer: A
Explanation:

When packets leave from the host, the packets contains the source MAC and IP of the host address. The source and destination IP address will not change. Because the host knows that the destination is on another subnet, it will forward the packet to the default gateway device, so the destination MAC address will be of the default gateway, which is the FA0/0 interface of router TestKing2.

QUESTION NO: 16
Part of the TestKing network is shown below:



TestKing.com WAN
TestKing.com WAN

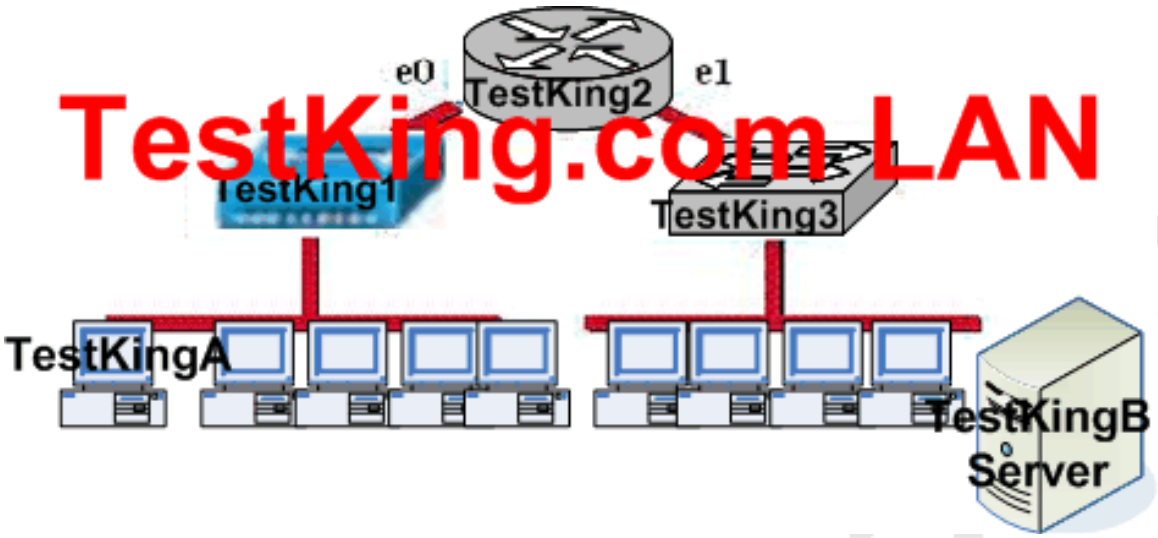
In this network segment, host TestKingA sends data to Host TestKingB. As packets travel from host TestKingA to host TestKingB, which three devices will use the destination MAC address of the packet to determine a forwarding path? (Choose three)

A. Hub TestKing0
B. Switch TestKing1
C. Router TestKing5
D. Router TestKing4
E. Switch TestKing2
F. Switch TestKing3

Answer: B, E, F
Explanation:
Switches use the destination MAC address information for forwarding traffic, while routers use the destination IP address information.
Local Area Networks employ Layer 2 Switches and Bridges to forward and filter network traffic. Switches and Bridges operate at the Data Link Layer of the Open System Interconnect Model (OSI). Since Switches and Bridges operate at the Layer 2 they operate more intelligently than hubs, which work at Layer 1 (Physical Layer) of the OSI. Because the switches and bridges are able to listen to the traffic on the wire to examine the source and destination MAC address. Being able to listen to the traffic also allows the switches and bridges to compile a MAC address table to better filter and forward network traffic.
To accomplish the above functions switches and bridges carry out the following tasks:
1. MAC address learning by a switch or a bridge is accomplished by the same method. The switch or bridge listens to each device connected to each of its ports and scan the incoming frame for the source MAC address. This creates a MAC address to port map that is cataloged in the switches/bridge MAC database. Another name for the MAC address table is content addressable memory or
   CAM table.
2. When a switch or bridge is listening o the network traffic, it receives each frame and compares it to the MAC address table. By checking the MAC table the switch/ bridge are able o determine which port the frame came in on. If the frame is on the MAC table the frame is filtered or transmitted on only that port. If the switch determines that the frame is not on the MAC table, the frame is forwarded out to all ports except the incoming port.

QUESTION NO: 17
Exhibit:

TestKing.com



You work as a network technician at TestKing.com. Please study the exhibit carefully. Host TestKingA is communicating with the server. What will be the source MAC address of the frames received by Host TestKingA from the TestKingB server?

A. The MAC address of TestKing2 router interface e1
B. The MAC address of TestKing2 router interface e0
C. The MAC address of the TestKingB server network interface
D. The MAC address of host TestKingA
E. None of the above

Answer: B
Explanation:
Whereas switches can only examine and forward packets based on the contents of the MAC header, routers can look further into the packet to discover the network for which a packet is destined. Routers make forwarding decisions based on the packet's network-layer header (such as an IPX header or IP header). These network-layer headers contain source and destination network addresses.
Local devices address packets to the router's MAC address in the MAC header. After receiving the packets, the router must perform the following steps:
1. Check the incoming packet for corruption, and remove the MAC header . The router checks the packet for MAC-layer errors. The router then strips off the MAC header and examines the network-layer header to determine what to do with the packet.
2. Examine the age of the packet.

The router must ensure that the packet has not come too far to be forwarded. For example, IPX headers contain a hop count. By default, 15 hops is the maximum number of hops (or routers) that a packet can cross. If a packet has a hop count of 15, the router discards the packet.
IP headers contain a Time to Live (TTL) value. Unlike the IPX hop count, which increments as the packet is forwarded through each router, the IP TTL value decrements as the IP packet is forwarded through each router. If an IP packet has a TTL value of 1, the router discards the packet. A router cannot decrement the TTL value to 1 and then forward the packet.
3. Determine the route to the destination. Routers maintain a routing table that lists available networks, the direction to the desired network (the outgoing interface number), and the distance to those networks. After determining which direction to forward the packet, the router must build a new header. (If you want to read the IP routing tables on a Windows 95/98 workstation, type ROUTE PRINT in the DOS box.)
4. Build the new MAC header and forward the packet. Finally, the router builds a new MAC header for the packet. The MAC header includes the router's MAC address and the final destination's MAC address or the MAC address of the next router in the path.
Figure 5 shows the contents of a packet before and after it has been forwarded by a router. Figure 5 also shows the contents of the router's routing tables.
Figure 5: Routers forward packets based on the network address.

Section 9: Describe the components required for network and Internet communications (5 questions)

QUESTION NO: 1
The TestKing network is displayed in the diagram shown below:

Testking.com

The TestKing network consists of a small office with twenty-five employees that has one connection to the Internet through the TK1 router. What routing configurations are recommended on the TK1 and ISP routers?

A. BGP on both the routers.
B. RIP on both the routers.
C. Default routes on both routers.
D. BGP on the ISP router and a static route on TK1.
E. A default route on TK1 and a static route on the ISP router.
F. None of the above

Answer: E
Explanation:
Since private network use RFC 1918 IP address ranges internally, and because of security reasons, it is generally not possible to use an interior routing protocol with the ISP. This eliminates choice B. When connecting to an ISP, usually only BGP or static routes are supported. In this case, since there is only one connection to the Internet, BGP is not needed so choices A and D can be eliminated. A static default route would be needed on router TK1 to route to the Internet. In turn, the ISP only needs a specific static route to reach the LAN of the TestKing network.
Incorrect Answers:
A, D: BGP is not needed on networks that contain only a single link to the Internet.
B. Interior routing protocols are generally not supported with an ISP.
C. A default route on the ISP router would send all of their customers Internet traffic to the TestKing network, and not the Internet.

QUESTION NO: 2
A new point to point circuit is installed, connecting Testking 1 to Testking 2 as shown below:

Users at Testking 1 wish to utilize the existing Internet connection at Testking 2. To do this, a gateway of last resort needs to be set. What is the command to do this?

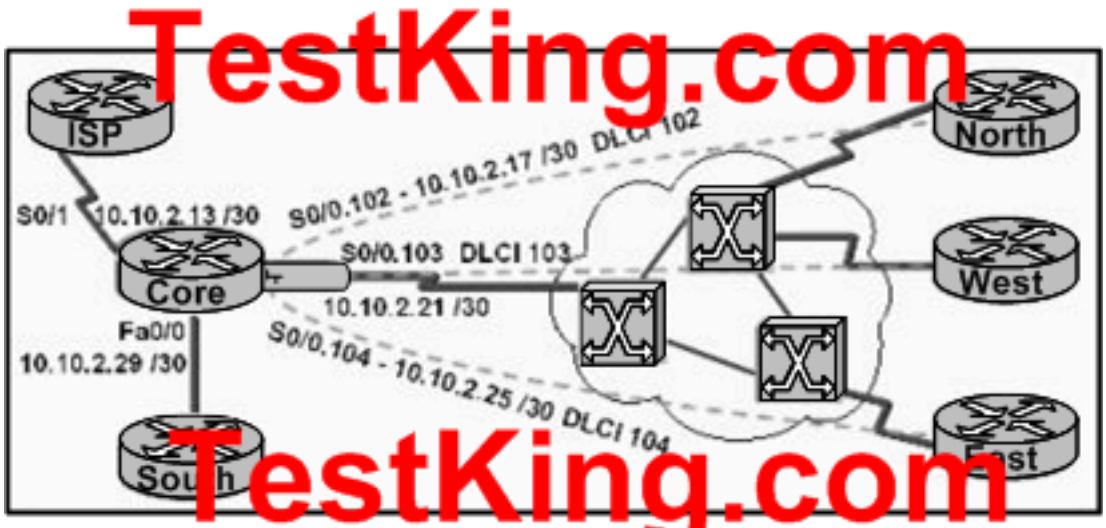
A. TestKing1(config)# ip route 172.16.4.2 0.0.0.0 0.0.0.0
B. TestKing1(config)# ip route 0.0.0.0 0.0.0.0 S1
C. TestKing1(config)# ip route 172.16.4.1 0.0.0.0 0.0.0.0
D. TestKing1(config)# ip route S0 0.0.0.0 0.0.0.0
E. TestKing1(config)# ip route 0.0.0.0 0.0.0.0 172.16.4.2
F. None of the above

Answer: E
Explanation:
Setting the default gateway is done by issuing either the "ip route 0.0.0.0 0.0.0.0 serial 0" or the "ip route 0.0.0.0 0.0.0.0 172.16.4.2" command. The following excerpt provides some additional information:

The ip default-network command and the ip route 0.0.0.0 0.0.0.0 commands accomplish the goal of having the router use a known route as the default for packets that are not matched in the routing table. The ip route 0.0.0.0 0.0.0.0 command uses the fact that network 0.0.0.0 is used by Cisco IOS software to represent the default network.

Incorrect Answers:
A, C. The IP address of the next hop needs to go after the route, not before.
B. This would have been acceptable if the interface specified was S0, not S1.
C. The interface used to forward packets for the route should be placed after the route, not before.

QUESTION NO: 3
The network associate is configuring OSPF on the Core router shown below. All the connections to the branches should be participating in OSPF. The link to the ISP should NOT participate in OSPF and should only be advertised as the default route. What set of commands will properly configure the Core router?



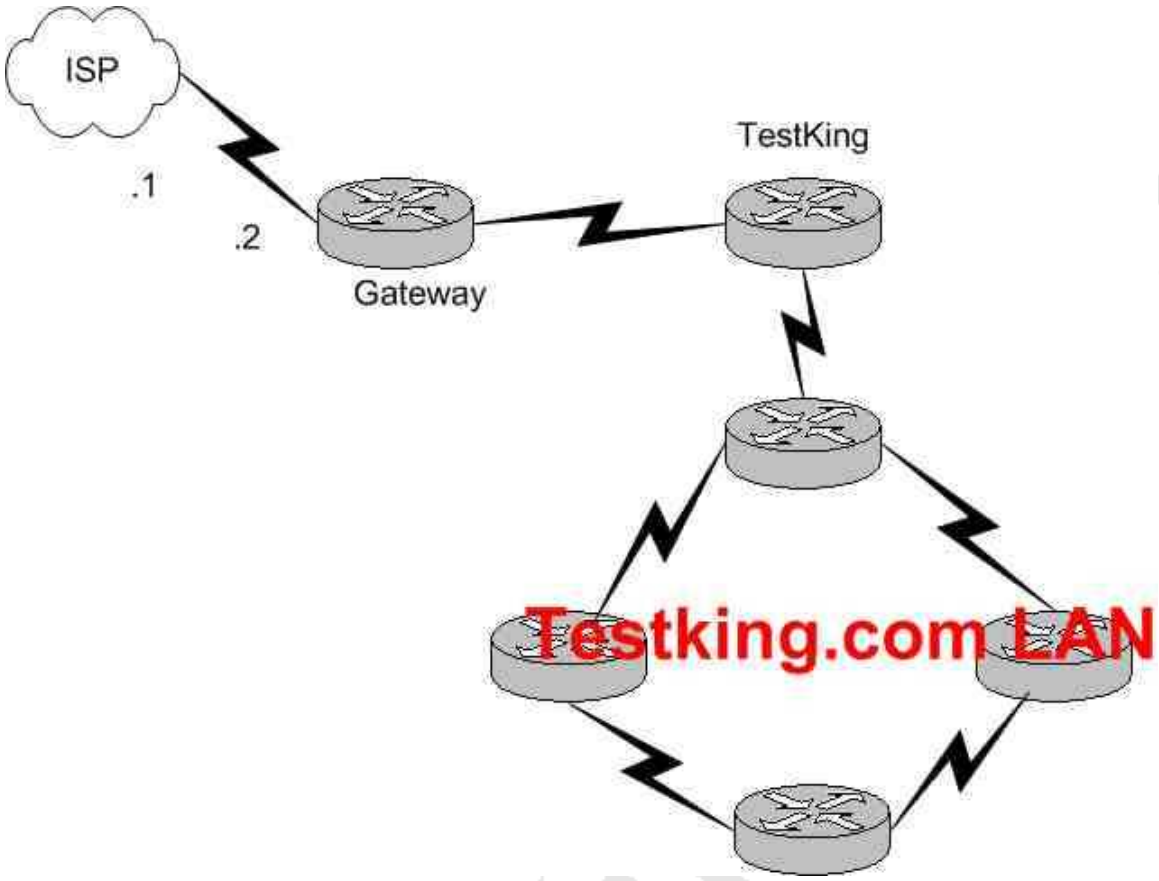
A. Core(config-router)# default-information originate
Core(config-router)# network 10.0.0.0 0.255.255.255 area 0
Core(config-router)# exit

Core(config)# ip route 0.0.0.00.0.0.010.10.2.14
B. Core(config-router)# default-information originate
Core(config-router)# network 10.10.2.32 0.0.0.31 area 0
Core(config-router)# exit
Core(config)# ip route 0.0.0.00.0.0.0 10.10.2.14
C. Core(config-router)# default-information originate
Core(config-router)# network 10.10.2.13 0.0.0.242 area 0
Core(config-router)# exit
Core(config)# ip route 0.0.0.00.0.0.010.10.2.14
D. Core(config-router)# default-information originate
Core(config-router)# network 10.10.2.16 0.0.0.15 area 0
Core(config-router)# exit
Core(config)# ip route 0.0.0.00.0.0.010.10.2.14

Answer: D
Explanation:
There are two ways to inject a default route into a normal area.
1. If the ASBR already has the default route in its routing table, you can advertise the existing 0.0.0.0/0 into the OSPF domain with the default-information originate router configuration command.
2. If the ASBR doesn't have a default route, you can add the keyword always to the default-information originate command (default-information originate always).

This command will advertise a default route into the OSPF domain, regardless of whether it has a route to 0.0.0.0. Another benefit of adding always keyword is that it can add stability to the internetwork. For example, if the ASBR is learning a default route from another routing domain such as RIP and this route is flapping, then without the always keyword, each time the route flaps, the ASBR will send a new Type 5 LSA into the OSPF domain causing some instability inside the OSPF domain. With the always keyword, the ASBR will advertise the default inside the OSPF domain always, and thus the flapping of the default route from the RIP domain will not cause any instability inside the OSPF domain.
In the example shown here, only choice D is correct as the wildcard mask correctly specifies the 10.10.2.16 0.0.0.15 networks, which include all IP addresses in the 10.10.2.16-10.10.2.31 range. In this question we were told that the ISP link should NOT be configured for OSPF, making choice A incorrect.
Reference: http://www.cisco.com/warp/public/104/21.html

QUESTION NO: 4
A new Internet T1 is being added to the TestKing network as shown:



The ISP assigned you the class CIP address 207.134.6.0/30 for this Internet connection. A default route to the Internet should be set up. Which of the following are acceptable ways to configure this on the Gateway router? (Select all that apply)

A. Gateway(config)# ip route 0.0.0.0 0.0.0.0 207.134.6.1.
B. Gateway(config)# router rip
Gateway(config-router)# network 207.134.6.0 default
C. Gateway(config)# ip route 207.134.6.0 255.255.255.0 Serial0/0
D. Gateway(config)# router OSPF
Gateway(config-router)# network 207.134.6.0
E. Gateway(config)# ip default-network 207.134.6.0

Answer: A, E
Explanation:
This question only involves the configuration of the gateway router to the ISP, nothing else. You have two choices to accomplish this: the command "ip route" or the command "ip default-network". Both of these methods will configure a default route to the ISP as desired.
Incorrect Answers:
B, D: RIP and OSPF are interior routing protocols. The T1 Internet connection that is being set up here is between two different Autonomous Systems. The only routing protocol that could be potentially used is BGP, but that is not an option.
C: This command will only set up a static route to the 207.134.6.0/24 network. We wish to set up a static default route.

QUESTION NO: 5
Router TestKing2 is connected to an ISP as shown below:

In the ISP link to the WAN shown above, you must complete the connection between the TestKing2 router to the service provider. To accomplish this task, which two devices could be installed at the TestKing site to provide a connection through the local loop to the CO of the provider? (Choose two)

A. Multiplexer
B. WAN switch

C. ATM switch
D. CSU/DSU
E. PVC
F. Modem
G. LMI

Answer: D, F

Section 10: Identify and correct common network problems at layers 1, 2, 3 and 7 using a layered model approach (9 questions)

QUESTION NO: 1
Part of the TestKing network is shown below:

Study the exhibit shown above. A problem with network connectivity has been observed. It is suspected that the cable connected to switch port Fa0/9 on Switch TestKing1 is disconnected. What would be an effect of this cable being disconnected?

A. Communication between VLAN3 and the other VLANs would be disabled
B. Host TestKingB would not be able to access the server in VLAN9 until the cable is reconnected
C. For less than a minute, Host TestKingB would not be able to access the server in VLAN9. Then normal network function would resume
D. The transfer of files from Host TestKingB to the server in VLAN9 would be significantly slower
E. None of the above

Answer: C
Explanation:
Spanning-Tree Protocol (STP) is a Layer 2 protocol that utilizes a special-purpose algorithm to discover physical loops in a network and effect a logical loop-free topology. STP creates a loop-free tree structure consisting of leaves and branches that span the entire Layer 2 network. The actual mechanics of how bridges communicate and how the STP algorithm works will be discussed at length in the following topics. Note that the terms bridge and switch are used interchangeably when discussing STP. In addition, unless otherwise indicated, connections between switches are assumed to be trunks.

STP keeps the port either in block or in forward states, when forward port disconnect then within the less then a minute blocked port comes into forward state so packets starts to go through new forward port.

The Spanning Tree Protocol (STP) would identify the best path as well as alternate path to reach in proper destination. In a redundant link, if the primary link fails then the secondary links will automatically start after few minutes. If port Fa0/9 became disconnected, then the packets would be re-routed automatically using the TestkingA-Testking2-TestKing3 path.

QUESTION NO: 2
You are logged into a router and wish to view the layer 3 information about your neighboring Cisco routers. What IOS command gives layer 3 information for of the directly connected router interfaces?

A. show ip links
B. show cdp neighbor
C. show cdp neighbor detail
D. show ip clients
E. show ip route

F. None of the above

Answer: C
Explanation:
To display detailed information about neighboring devices discovered using Cisco Discovery Protocol (CDP), use the show cdp neighbors privileged EXEC command.
Detail - (Optional) Displays detailed information about a neighbor (or neighbors) including network address, enabled protocols, hold time, and software version.
Incorrect Answers:
A, D. These are invalid commands.
B. The "show cdp neighbor" command, without the "detail" keyword will not display the additional layer 3 protocol information.
E. This will show all routes from all other routers within the domain. We wish to see information from just the direct interface neighbors.

QUESTION NO: 3
A TestKing technician is troubleshooting connectivity problems between two routers that are directly connected through the serial line. The technician notices that the serial line is up but cannot see any neighbors displayed in the output of the show cdp neighbors command.
In which OSI layer is the problem most likely occurring?

A. Physical
B. Data link
C. Network layer
D. Transport layer
E. Application layer

Answer: B
Explanation:
As the question states that serial line is up, it means the problem is not on the Network layer. The administrator cannot see any output by issuing the show cdp neighbors command. It means that CDP is disabled and CDP is a protocol that runs over Layer2 (the data link layer) on all Cisco routers, bridges, access servers, and switches.

QUESTION NO: 4

While troubleshooting a network connectivity problem, a TestKing technician observes steady link lights on both the workstation NIC and the switch port to which the workstation is connected. However, when the ping command is issued from the workstation, the output message "Request timed out." is displayed. At which layer of the 7-layer OSI model does the problem most likely exist?

A. The data link layer
B. The application layer
C. The protocol layer
D. The access layer
E. The session layer
F. The network layer
G. None of the above

Answer: F
Explanation:
Network Layer:

The Network layer (also called layer 3) manages device addressing, tracks the location of devices on the network, and determines the best way to move data, which means that the Network layer must transport traffic between devices that aren't locally attached. Routers (layer 3 devices) are specified at the Network layer and provide the routing services within an internetwork.

Request Time out, Destination Unreachable etc error comes from Network Layer problem.

QUESTION NO: 5
A host is connected to the TestKing network as displayed below:

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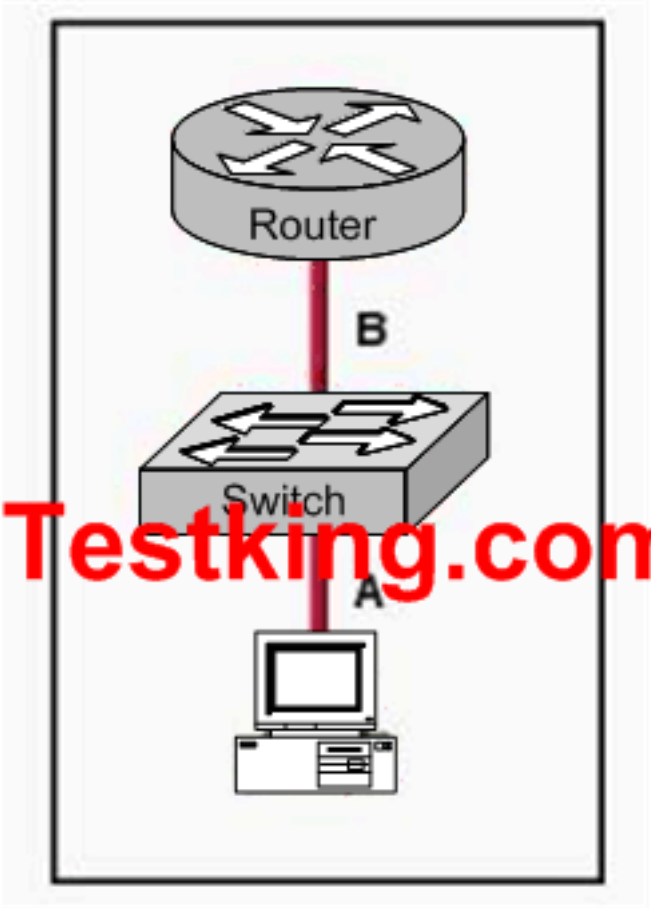

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The two connected ports on the switch are not turning orange or green. What would be the most effective steps to troubleshoot this physical layer problem? (Choose three)

A. Ensure that the Ethernet encapsulations match on the interconnected router and switch ports.
B. Ensure that cables A and B are straight-through cables.
C. Ensure cable A is plugged into a trunk port.
D. Ensure that switch has power.
E. Reboot all of the devices.
F. Reseat all cables.

Answer: B, D, F
Explanation:
Straight-through cables are used to connect hosts to a switch (or hub) and routers to a switch (or hub). See the table below:

	Hub	Switch	Router	Workstation
Hub	Crossover	Crossover	Straight	Straight
Switch	Crossover	Crossover	Straight	Straight
Router	Straight	Straight	Crossover	Crossover
Workstation	Straight	Straight	Crossover	Crossover

Incorrect Answers:
A: This would mean that there was a layer 2 issue, not layer 1. If the problem was related to the encapsulation, the lights on the switch would indicate layer 1 activity.
C: A trunk port is not required, and again if this was the problem the link lights on the switch would be on.
E: This should only be used as a last resort, as this will affect all users on the switch.

QUESTION NO: 6
Which line from the output of the show ip interface command indicates that there is a Layer 1 problem?

A. Serial0/1 is up, line protocol is down
B. Serial0/1 is down, line protocol is down
C. Serial0/1 is up, line protocol is up
D. Serial0/1 is administratively down, line protocol is down
E. None of the above

Answer: B
Explanation:
When the physical interface itself is down, then the problem is related to layer 1. When it is up, but the line protocol is down, then the problem is related to layer 2.

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Status Line Condition	Possible Problem	Solution
Serial *x* is down, line protocol is down (DTE mode)	The router is not sensing a CD signal (that is, the CD is not active). A telephone company problem has occurred—line is down or is not connected to CSU/DSU. Cabling is faulty or incorrect. Hardware failure has occurred (CSU/DSU).	1. Check the LEDs on the CSU/DSU to see whether the CD is active, or insert a breakout box on the line to check for the CD signal. 2. Verify that you are using the proper cable and interface (see your hardware installation documentation). 3. Insert a breakout box and check all control leads. 4. Contact your leased-line or other carrier service to see whether there is a problem. 5. Swap faulty parts. 6. If you suspect faulty router hardware, change the serial line to another port. If the connection comes up, the previously connected interface has a problem.

Reference: http://www.cisco.com/univercd/cc/td/doc/cisintwk/itg_v1/tr1915.htm

QUESTION NO: 7
At which layer of the OSI model does the protocol that provides the information displayed by the "show cdp neighbors" command operate?

A. Transport
B. Physical
C. Application

D. Data link
E. Network

Answer: D
Explanation:
CDP is a device discovery protocol that runs over Layer 2 (the data link layer) on all Cisco-manufactured devices (routers, bridges, access servers, and switches) and allows network management applications to discover Cisco devices that are neighbors of already known devices. With CDP, network management applications can learn the device type and the Simple Network Management Protocol (SNMP) agent address of neighboring devices running lower-layer, transparent protocols.

QUESTION NO: 8
Which three of the protocols below belong to the application layer? (Select three answer choices)

A. ARP
B. HTTPS
C. SMTP
D. CDP
E. TFTP
F. ICMP

Answer: B, C, E
Explanation:
The application layer is the highest OSI layer, and protocols at this layer are end-user oriented. HTTPS so people can get information on the internet, SMTP so people can manage networks, and TFTP so people can download files.
Incorrect Answers:
A, D, F. ARP, CDP, ICMP are protocols that equipment like routers and switches use to communicate with themselves, and belong to lower levels on the model.

QUESTION NO: 9
Exhibit:

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A Cisco router and a Catalyst switch are connected as shown. The TestKing network administrator is working on a computer that is connected to the management console of the switch. In order to configure the default gateway for the switch, the administrator needs to learn the IP address of the attached router interface. Which IOS command will provide this information in the absence of Layer 3 connectivity?

A. ping router_ip_address
B. show ip rarp
C. ping switch_ip_address
D. show cdp neighbors detail
E. show dhcp-config
F. show ip neighbors
G. None of the above

Answer: D
Explanation:
To display detailed information about neighboring devices discovered using Cisco Discovery Protocol (CDP), use the show cdp neighbors privileged EXEC command.
Detail - (Optional) Displays detailed information about a neighbor (or neighbors) including network address, enabled protocols, hold time, and software version.

The following is sample output for the show cdp neighbors detail command.
router#show cdp neighbors detail

Device ID: lab-7206
Entry address(es):
IP address: 172.19.169.83
Platform: cisco 7206VXR, Capabilities: Router
Interface: Ethernet0, Port ID (outgoing port): FastEthernet0/0/0

Holdtime : 123 sec
Version :
Cisco Internetwork Operating System Software
IOS (tm) 5800 Software (C5800-P4-M), Version 12.1(2)
Copyright (c) 1986-2002 by Cisco Systems, Inc.
advertisement version: 2
Duplex: half

Section 11: Differentiate between LAN/WAN operation and features (4 questions)

QUESTION NO: 1
You want to upgrade the TestKing LAN so that all ports operate in full duplex mode. Which statement is true about full-duplex Ethernet when comparing to half-duplex Ethernet?

A. Full-duplex Ethernet consists of a shared cable segment. Half-duplex provides a point-to-point link
B. Full-duplex Ethernet uses two wires to send and receive. Half-duplex Ethernet uses one wire to send and receive
C. Full-duplex Ethernet can provide higher throughput than can half-duplex Ethernet of the same bandwidth
D. Full-duplex Ethernet uses a loopback circuit to detect collisions. Half-duplex Ethernet uses a jam signal
E. None of the above

Answer: C
Explanation:
Full-duplex Ethernet uses two pairs of wires instead of one wire pair like half duplex. And full duplex uses a point-to-point connection between the transmitter of the transmitting device and the receiver of the receiving device. This means that with full-duplex data transfer, you get a faster data transfer compared to half duplex.

QUESTION NO: 2

What are two characteristics of "store and forward" switching? (Select two answer choices)

A. Latency fluctuates regardless of frame size.
B. The switch receives the complete frame before beginning to forward it.
C. Latency through the switch varies with frame length.
D. The switch checks the destination address upon receipt of headers.

Answer: B, C
Explanation:
With store-and-forward, the entire frame is received by the switch before the first bit of the frame is forwarded.
As soon as the incoming switch port receives enough of the frame to see the destination MAC address, the forwarding decision is made and the frame is transmitted out the appropriate outgoing port to the destination device. So, each frame might experience slightly less latency. Store and forward switching may add latency when compared to other switching methods such as cut through, but it can reduce the amount of errors that become forwarded through a network.
Reference:
CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 243
Incorrect Answers:
A. The amount of latency that is introduced with this method of switching is dependent on the size of the frame, as the switch must wait to receive the entire frame before sending it.
D. The switch must wait for the entire frame before forwarding it on, and not just the headers.

QUESTION NO: 3
Split horizon has been enabled within the TestKing routed network. Which one of the following statements best explains the split horizon rule?

A. Only routers can split boundaries (horizons) between networks in separate AS numbers.
B. Each AS must keep routing tables converged to prevent dead routes from being advertised across boundaries.
C. Once a route is received on an interface, advertise that route as unreachable back out the same interface.

D. Information about a route should never be sent back in the direction from which the original update came.
E. None of the above

Answer: D
Explanation:
The split horizon rule states:
* Never advertise a route out of the interface through which you learned it.
For instance, in Figure 4a below, if Router One is connected to Routers Two and Three through a single multipoint interface (such as Frame Relay), and Router One learned about Network A from Router Two, it will not advertise the route to Network A back out the same interface to Router Three. Router one assumes that Router Three would learn about Network A directly from Router Two.

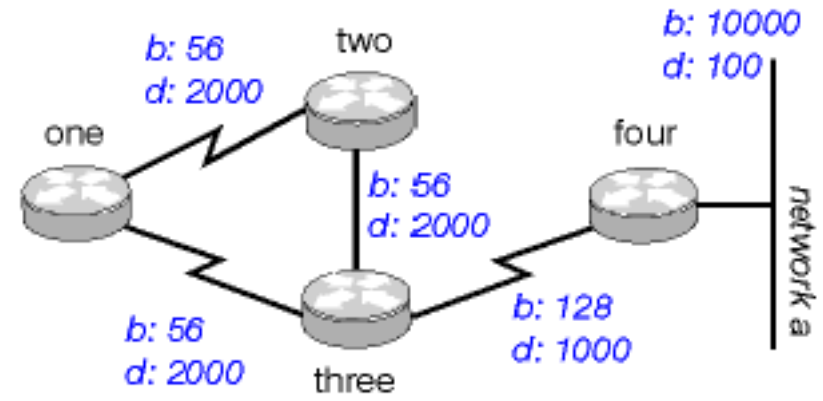

Figure 4a

Incorrect Answers:
A: There is no such requirement
B: Distance vector protocols updates routing table at regular intervals instead of Topology changes
C: This is the definition of the poison reverse rule, not the split horizon rule.
Reference: Wendell Odom. CISCO CCNA Certification Guide (2000 Press) Page 369.

QUESTION NO: 4
Which of the following commands would be applied to a WAN interface, but not on LAN Interface? (Choose all that apply)

A. IP address
B. encapsulation PPP
C. no shutdown
D. authentication CHAP
E. Speed
F. None of the above

Answer: B, D
Explanation:
PPP encapsulation can be used in ISDN interfaces, Asynchronous serial interfaces, and point to point serial WAN connections. PPP is not an option for LAN interfaces. CHAP authentication is a PPP 3 way authentication method. CHAP authentication can only be used on PPP encapsulated interfaces and is not a LAN interface configuration option.
Incorrect Answers:
A, C. This command can be applied to both LAN and WAN interface types.
E. The speed command is used on LAN interfaces, and is not used on WAN interface types.

Topic 2, CONFIGURE, VERIFY, AND TROUBLESHOOT A SWITCH WITH VLANs AND INTERSWITCH COMMUNICATIONS (172 questions)

Section 1: Select the appropriate media, cables, ports, and connectors to connect switches to other network devices and hosts (8 questions)

QUESTION NO: 1
Part of the TestKing network is shown below:

Based on the diagram shown above, what kind of cable should be used to make each connection that is identified by the numbers shown?

A. 1 - Ethernet crossover cable
2 - Ethernet straight-through cable
3 - fiber optic cable
4 - rollover cable
B. 1 - Ethernet rollover cable
2 - Ethernet crossover cable
3 - serial cable
4 - null modem cable
C. 1 - Ethernet straight-through cable
2 - Ethernet straight-through cable
3 - serial cable
4 - rollover cable
D. 1 - Ethernet straight-through cable
2 - Ethernet crossover cable
3 - serial cable
4 - rollover cable
E. 1 - Ethernet straight-through cable
2 - Ethernet crossover cable
3 - serial cable
4 - Ethernet straight-through cable

Answer: C
Explanation:
When connecting other devices to a switch, such as a router or workstations, a straight through cable is used. The only exception to this rule is when you are connecting another switch to a switch, in which case a cross over cable should be used.
For a serial connection to another router or to a WAN, a serial cable should be used.
Finally, when connecting directly to the console port of a Cisco device, a rollover cable should be used. This cable is also commonly referred to as a console cable.

QUESTION NO: 2
What kind of cable should be used to establish a trunked line between two Catalyst switches?

A. A straight-through cable
B. An EIA/TIA-232 serial cable
C. An auxiliary cable
D. A modem cable
E. A cross-over cable

Answer: E
Explanation:
A crossover cable is used to connect two of the same device types, or devices from the same OSI layer.

QUESTION NO: 3
The TestKing network Topology is displayed in the exhibit below:

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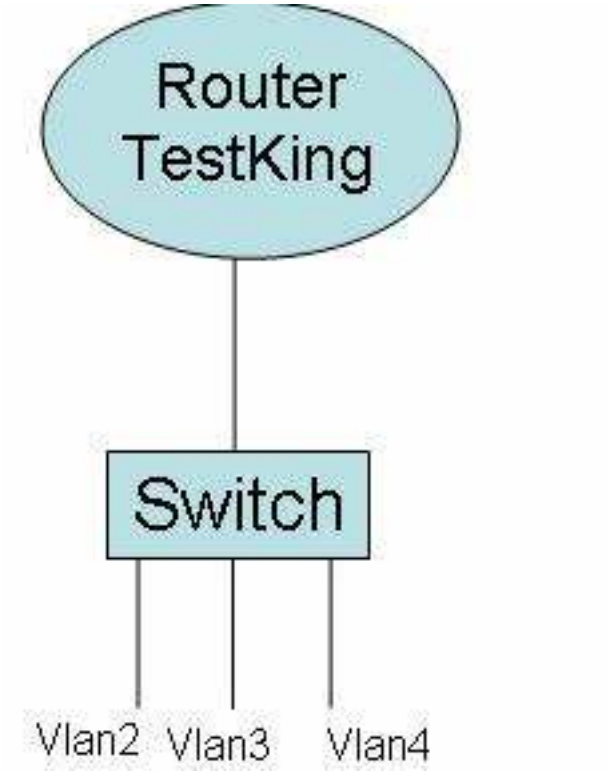

A switch has been configured for three different VLANs: VLAN 2, VLAN 3, and VLAN 4. For the purposes of communication between VLANs a router is to be added. Host from one VLAN should be able to reach the hosts in the other VLANs. Based on this requirement, what type of connection is acceptable between the router and switch?

A. 10 Mbps Ethernet
B. 56 kbps serial
C. 100 Mbps Ethernet
D. 1,544 Mbps serial
E. 1000 Mbps Ethernet

Answer: C, E
Explanation:
For all hosts to be able to reach each other, inter-VLAN routing will need to be configured. In order to provide Inter-VLAN routing between the router and the switch, a trunk will need to be set up. This trunk can be either ISL or 802.1Q. On a router, the interface that is to be used as the trunk can be 100 Mbps Ethernet, Gigabit Ethernet, or 10 Gigabit Ethernet. Therefore, only choices C or E are correct.

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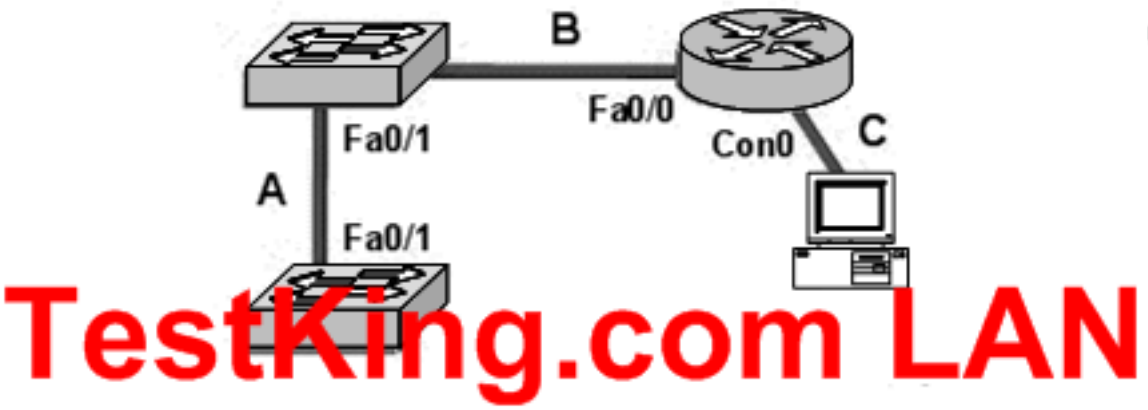
QUESTION NO: 4
Part of the TestKing LAN is shown below:



Based on the diagram shown above, which set of terms correctly identifies the cable types shown in the exhibit? (Assume that none of the switches are set to autoconfigure)

A. A: straight-through
B: straight-through
C: rollover
B. A: crossover
B: crossover
C: rollover
C. A: crossover
B: straight-through
C: straight-through
D. A: crossover
B: straight-through
C: rollover
E. A: straight-through
B: crossover
C: rollover

Answer: D
Explanation:

Crossover Cables are Used to Connect :
Host to Host (Peer to Peer) Networking
Switch to Switch
Hub to Hub
Computer to Router's Ethernet Port
Straight through Cable:
Host to Switch
Host to Hub
Switch to Router
Serial Cable:
Router's Serial Port to Serial Port
Rollover Cable :
To connect Router/Switch Console port.

Here one switch is connected with another switch using a crossover cable. The switch connected with the router uses a straight through cable and the PC Connects to the router's console port using the console rollover cable.

QUESTION NO: 5
The TestKing network administrator is connecting PC hosts TestKingA and TestKingB directly through their Ethernet interfaces as shown in the graphic. Ping attempts between the hosts are unsuccessful. What can be done to provide connectivity between the hosts? (Choose two.)

A. The subnet masks should be set to 255.255.255.0.

B. The hosts must be reconfigured to use private IP addresses for direct connections of this type.
C. A default gateway needs to be set on each host.
D. A rollover cable should be used in place of the straight-through cable
E. A crossover cable should be used in place of the straight-through cable.
F. The subnet masks should be set to 255.255.255.192.

Answer: A, E
Explanation:
This problem is due to the misconfiguration of subnet mask as well as the fact that a straight-through cable is used to connect the two devices. To ensure connectivity, the correct subnet mask needs to be used so that the two devices are in the same subnet and when connecting two PC's back to back a crossover cable should be used.

QUESTION NO: 6
Assuming you build networks to exact specifications, what is the recommended maximum length a 10BaseT cable can be before it has to be segmented or repeated?

A. 100 meters
B. 100 feet
C. 100 yards
D. 200 meters
E. None of the above

Answer: A
Explanation:
The distance standards are in meters and 10BaseT has a distance restriction of 100 meters. If you go further then that, you compromise data integrity. 10BastT is the predominant cable type used in Ethernet networks.

QUESTION NO: 7
Exhibit:

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TestKing.com WAN

You need to connect the network devices in a new TestKing office. What types of cables should you use to make the connections that are shown?

A.
A-rollover
B-straight-through
C-straight-through
D-rollover
E-crossover

B.
A-straight-through
B-straight-through
C-rollover
D-straight-through
E-straight-through

C.
A-straight-through
B-crossover
C-rollover
D-straight-through
E-straight-through

TestKing

D.
A-crossover
B-straight-through
C-crossover
D-straight-through
E-crossover

E.
A-crossover
B-straight-through
C-rollover
D-straight-through
E-straight-through

Answer: E
Explanation:
Crossover Cables are Used to Connect :
Host to Host (Peer to Peer) Networking
Switch to Switch
Hub to Hub
Computer to Router's Ethernet Port
Straight through Cable:
Host to Switch
Host to Hub
Switch to Router
Serial Cable:
Router's Serial Port to Serial Port
Rollover Cable :
To connect Router/Switch Console port.

QUESTION NO: 8
Exhibit:

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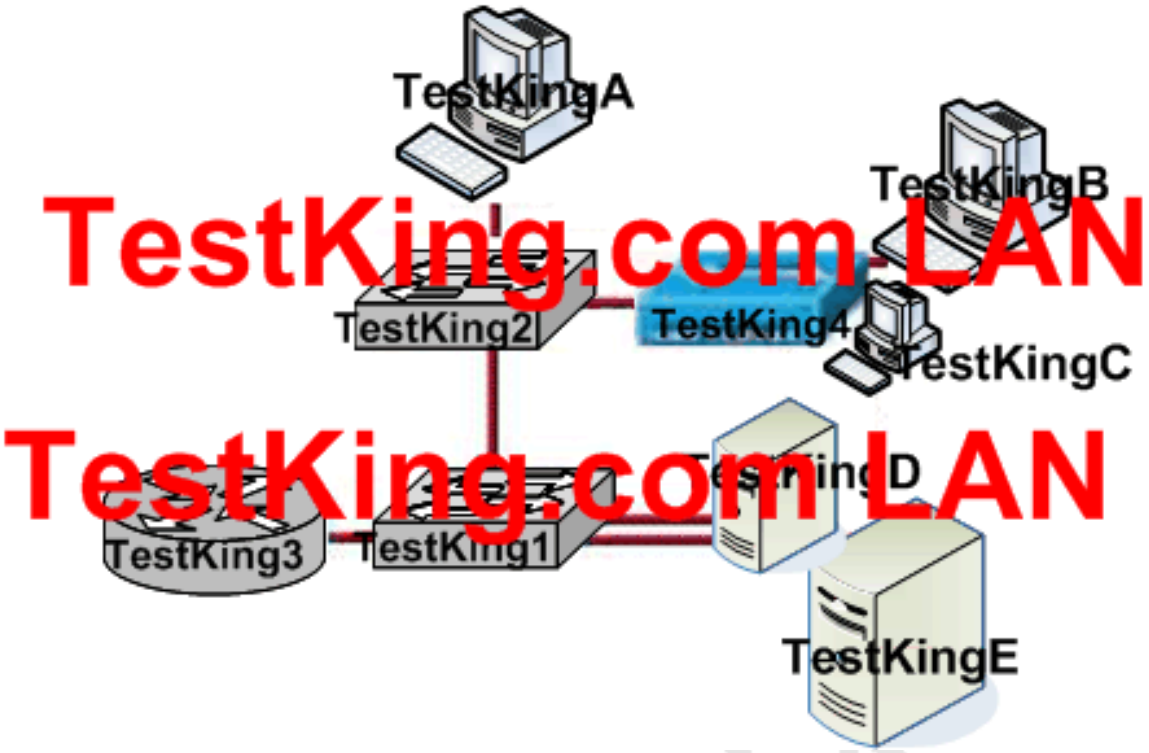

TestKing.com LAN
TestKing.com LAN

Host TestKingA has just been added to the network. Which type of cable should be used between Switch TestKing2 and host TestKingA?

A. Crossover cable
B. Rollover cable
C. Straight-through cable
D. Console cable
E. Fiber optic cable
F. None of the above

Answer: C
Explanation:
Straight-through cables are used to connect hosts to a switch (or hub) and routers to a switch (or hub). See the table below:

	Hub	Switch	Router	Workstation
Hub	Crossover	Crossover	Straight	Straight
Switch	Crossover	Crossover	Straight	Straight
Router	Straight	Straight	Crossover	Crossover
Workstation	Straight	Straight	Crossover	Crossover

Section 2: Explain the technology and media access control method for Ethernet networks (15 questions)

QUESTION NO: 1
The TestKing LAN is upgrading all devices to operate in full duplex. Which statement is true about full-duplex Ethernet in comparison to half-duplex Ethernet?

A. Full-duplex Ethernet uses two wires to send and receive. Half-duplex Ethernet uses one wire to send and receive
B. Full-duplex Ethernet consists of a shared cable segment. Half-duplex Ethernet provides a point-to-point link
C. Full-duplex Ethernet can provide higher throughout than can half-duplex Ethernet of the same bandwidth
D. Full-duplex Ethernet uses a loopback circuit to detect collisions. Half-duplex ethernet uses a jam signal
E. None of the above

Answer: C

QUESTION NO: 2

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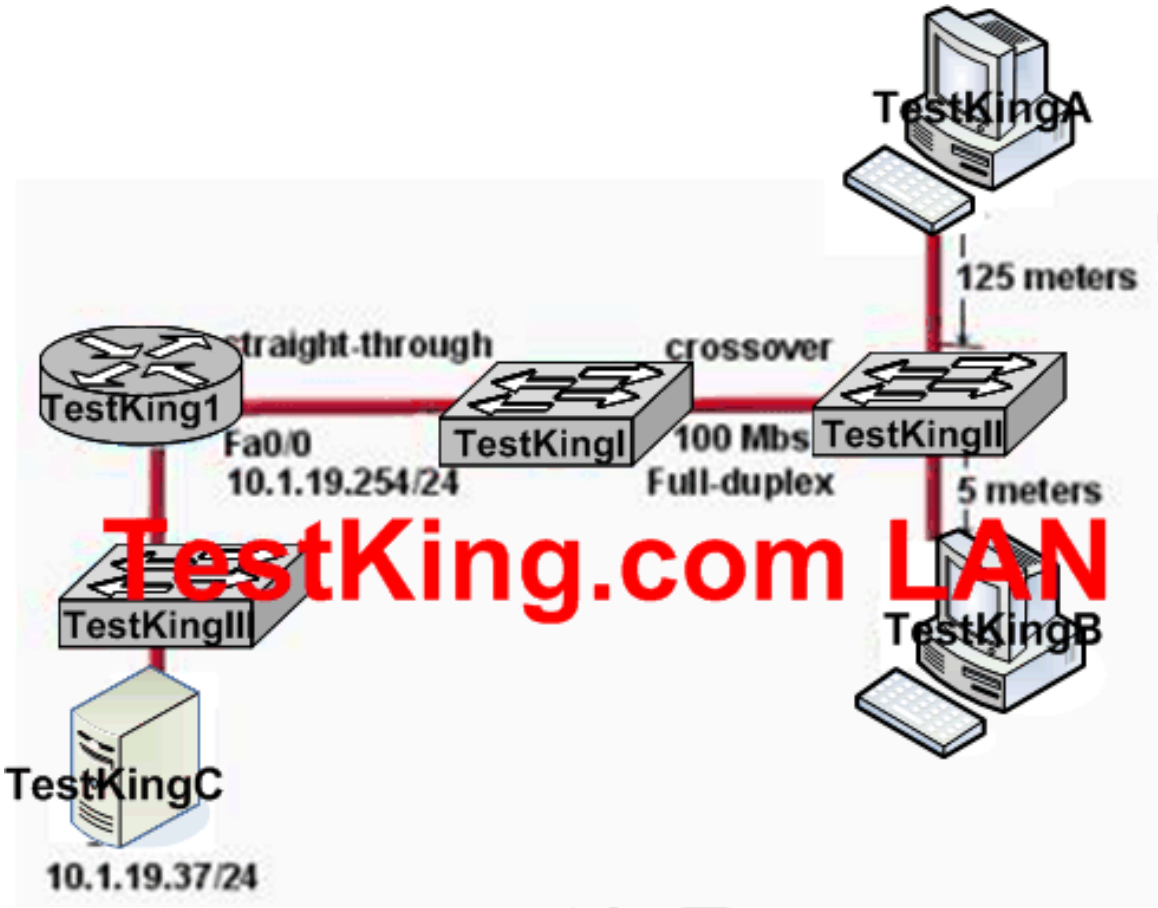
A network administrator wants to control which user hosts can access the network based on their MAC address. What will prevent workstations with unauthorized MAC addresses from connecting to the network through a switch?

A. BPDU
B. Port security
C. RSTP
D. STP
E. VTP
F. Blocking mode

Answer: B
Explanation:
UnderstandingHow PortSecurity Works:
You can use port security to block input to an Ethernet, Fast Ethernet, or Gigabit Ethernet port when the MAC address of the station attempting to access the port is different from any of the MAC addresses specified for that port. Alternatively, you can use port security to filter traffic destined to or received from a specific host based on the host MAC address.
When a secure port receives a packet, the source MAC address of the packet is compared to the list of secure source addresses that were manually configured or autoconfigured (learned) on the port. If a MAC address of a device attached to the port differs from the list of secure addresses, the port either shuts down permanently (default mode), shuts down for the time you have specified, or drops incoming packets from the insecure host. The port's behavior depends on how you configure it to respond to a security violation.
If a security violation occurs, the Link LED for that port turns orange, and a link-down trap is sent to the Simple Network Management Protocol (SNMP) manager. An SNMP trap is not sent if you configure the port for restrictive violation mode. A trap is sent only if you configure the port to shut down during a security violation.
Reference:
http://www.cisco.com/en/US/products/hw/switches/ps700/products_configuration_guide_chapter09186a0(

QUESTION NO: 3
The TestKing internetwork shown in the diagram is experiencing network delays.



On the basis of the information provided in the exhibit above, what is the problem?

A. The connection between Switch1 and Switch2 should be half-duplex.
B. The cable between Router1 and Switch1 should be a crossover.
C. The cable connecting Host A to Switch2 is too long.
D. The server is on a different subnet than router interface Fa0/0.
E. The cable between Switch1 and Switch2 should be straight-through.
F. None of the above

Answer: C
Explanation:

According to IEEE specifications, the maximum segment length of an Ethernet cable should not exceed 100 meters. The total distance between an Ethernet Transmitter and Receiver at the absolute end points of the network (maximum diameter from origin to final destination, if the wires were stretched out to form a straight line) should be no more than100 Meters (328 ft., 109 yards, or about the length of a football field). This limitation results from the timing of the Ethernet signals on the cable and not necessarily the cable characteristics, and is, therefore, a "hard" number.

QUESTION NO: 4
What is the IEEE standard associated with Gigabit Ethernet? (Select two answer choices)

A. 802.11
B. 802.5
C. 802.3ab
D. 802.3ae
E. 802.3z
F. 802.3u

Answer: C, E
Explanation:
The IEEE 802.3z standard describes 1000BASE-SX.
The 1000BaseT standard was released in June 1999, defined by IEEE 802.3ab.
Incorrect Answers:
A. This describes the standard used for wireless networks.
B. This is the standard for token ring networks.
D. On June 17, 2002 the IEEE 802.3ae specification for 10 Gigabit Ethernet was approved as an IEEE standard by the IEEE Standards Association (IEEE-SA) Standards Board.
F. IEEE 802.3u describes the standard for 100BASE-TX.

QUESTION NO: 5
Which of the following can lead to the contribution of LAN traffic congestion? (Select all that apply)

A. Too many hosts in a broadcast domain
B. Full duplex operation

C. Broadcast storms
D. Multicasting
E. Segmentation
F. Low bandwidth

Answer: A, C, F
Explanation:
Choice A is correct because the more hosts on a broadcast domain, the more traffic that is created. Choice Ccontributes to congestion because broadcast storms can become very problematic, and lead to complete network saturation. Multicasts are similar to broadcasts in their use on a LAN. Finally, if there is not enough bandwidth, traffic sessions can time out. This leads to new transmissions and the re-sending of data, which can lead to more congestion.
Incorrect Answers:
B, E. These are incorrect because full duplex operation and segmented networks actually result in less congestion.
D. Multicasting can actually alleviate congestion issues, as single streams of information can reach multiple hosts at the same time, instead of using a series of point to point connections.

QUESTION NO: 6
On a half-duplex Ethernet LAN, two hosts attempt to send data simultaneously, resulting in a collision. Following this collision, what will the hosts do? (Select all valid answers)

A. The destination host sends a request to the source for retransmission.
B. The jam signal indicates that the collision has been cleared.
C. The hosts will attempt to resume transmission after a time delay has expired.
D. An electrical pulse indicates that the collision has cleared.
E. The router on the segment will signal that the collision has cleared.
F. The hosts will do nothing, as the higher layers are responsible for data error correction and re-transmission.

Answer: C
Explanation:
When a host on an Ethernet LAN has information to send, the following steps are taken:
1. A device with a frame to send listens until Ethernet is not busy.
2. When the Ethernet is not busy, the sender begins sending the frame.

3. The sender listens to make sure that no collision occurred.
4. Once the senders hear the collision, they each send a jamming signal, to ensure that all stations recognize the collision.
5. After the jamming is complete, each sender randomizes a timer and waits that long.
6. When each timer expires, the process starts over with step 1.

QUESTION NO: 7
Which of the following statements correctly describe the differences between half-duplex and full-duplex Ethernet? (Select two answer choices.)

A. Full-duplex Ethernet uses CSMA/CD to prevent collisions.
B. Half-duplex Ethernet uses a loopback circuit to detect collisions.
C. A full-duplex Ethernet card allows 20Mbps for data transmission.
D. Full-duplex Ethernet makes use of two pairs of wires for data.
E. An Ethernet hub can operate both half and full duplex simultaneously.

Answer: B, D
Explanation:
Half-duplex Ethernet send and receives on the same line, so a loopback needs to be set to detect collisions. Alternatively, full-duple Ethernet doesn't have to because it uses two pairs of wire, one to send and the other to receive. Collisions are not possible on full duplex Ethernet networks.
Incorrect Answers:
A. Full duplex uses both pairs of wires, so transmissions are sent on the first pair, and data that is received come in on the other pair. This prevents collisions.
C. Full duplex allows for data to be sent and received at the same time. It will not double the amount of bandwidth at any given time. The speed of the Ethernet link will remain at 10/100.
E. Hubs are shared devices and can only support one mode, unlike switches.

QUESTION NO: 8
Why is full-duplex Ethernet superior to its single-duplex counterpart? (Select two answer choices.)

A. It uses inexpensive hubs
B. It operates without collisions
C. It operates on switches

D. It provides faster data transfer
E. It utilizes fewer wiring pairs

Answer: B, D
Explanation:
Full duplex Ethernet allows concurrent sending and receiving, which allows the full bandwidth to be used for both sending and receiving. The result is a collision free network with increased throughput.
Incorrect Answers:
A, C. These are incorrect because full duplex doesn't require hubs or switches. Full duplex operation can be used on switch and router ports, as well as PC hosts.
E. This is incorrect because full duplex actually uses more wiring pairs. In full duplex, both wire pairs are used. Half duplex uses only a single pair.

QUESTION NO: 9
When you compare the differences between half-duplex and full-duplex Ethernet, which of the following characteristics are exclusive to half-duplex? (Select two answer choices)

A. Half-duplex Ethernet operates in a shared collision domain.
B. Half-duplex Ethernet operates in an exclusive broadcast domain.
C. Half-duplex Ethernet has efficient throughput.
D. Half-duplex Ethernet has lower effective throughput.
E. Half-duplex Ethernet operates in an exclusive collision domain.

Answer: A, D
Explanation:
A single device could not be sending a frame and receiving a frame at the same time because it would mean that a collision was occurring. So, devices simply chose not to send a frame while receiving a frame. That logic is called half-duplex logic.
Ethernet switches allow multiple frames to be sent over different ports at the same time. Additionally, if only one device is connected to a switch port, there is never a possibility that a collision could occur. So, LAN switches with only one device cabled to each port of the switch allow the use of full-duplex operation. Full duplex means that an Ethernet card can send and receive concurrently.
Incorrect Answers:
B. Full duplex effectively doubles the throughput of half-duplex operation, because data can be both sent and received at the full 10/100 speed.

C, E. In half duplex operation, the network is shared between all devices in the collision domain.
Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 62-63.

QUESTION NO: 10
Two stations on the TestKing LAN transmit at the same time, resulting in a collision. What happens when a collision occurs on the network? (Choose all that apply)

A. Each device on the Ethernet segment stops transmitting for a short time.
B. A jam signal informs all devices that a collision occurred.
C. When data transmission resumes, the devices that were involved in the collision have priority to transmit.
D. The devices that are involved in the collision stops transmitting for a short time.
E. The collision invokes a random back-off algorithm.

Answer: B, D, E
Explanation:
When a host on an Ethernet LAN has information to send, the following steps are taken:
1. A device with a frame to send listens until Ethernet is not busy.
2. When the Ethernet is not busy, the sender begins sending the frame.
3. The sender listens to make sure that no collision occurred.
4. Once the senders hear the collision, they each send a jamming signal, to ensure that all stations recognize the collision.
5. After the jamming is complete, each sender randomizes a timer and waits that long.
6. When each timer expires, the process starts over with step 1.
Incorrect Answers:
A. Only the stations involved in the collision stop transmitting for a short time, not all stations on the LAN.
C. No priority is given to any stations once a collision has occurred.

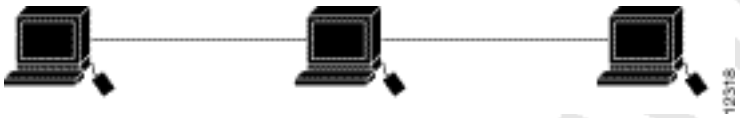
QUESTION NO: 11
Which of the following are true of Ethernet technology?

A. Hosts use a logical ring topology.
B. Hosts use a logical bus topology

C. Hosts must wait for an electronic signal to transfer data.
D. Hosts are directly connected to a wiring concentrator called a MSAU.
E. None of the above

Answer: B
Explanation:
LAN topologies define the manner in which network devices are organized. Four common LAN topologies exist: bus, ring, star, and tree. These topologies are logical architectures, but the actual devices need not be physically organized in these configurations. Logical bus and ring topologies, for example, are commonly organized physically as a star. A bus topology is a linear LAN architecture in which transmissions from network stations propagate the length of the medium and are received by all other stations. Of the three most widely used LAN implementations, Ethernet/IEEE 802.3 networks, including 100BaseT, implement a bus topology, which is illustrated in Figure 2-3.

Figure2-3: Some networks implement a local bus topology.



Reference: http://www.pulsewan.com/lanintro.htm

QUESTION NO: 12
With regard to Ethernet media access methods, which of the following are true? (Choose all that apply.)

A. A device waits for an electronic signal before transmitting.
B. A device listens and waits until the media is not busy before transmitting.
C. All devices on an Ethernet segment see data that passes on the network medium.
D. Only the sender and the receiver devices see data that passes on the network medium.
E. Ethernet networks allow you to configured devises with higher transmission priority.

Answer: B, C
Explanation:
Ethernet uses the CSMA/CD access method.

CSMA/CD logic helps prevent collisions and also defines how to act when a collision does occur. The CSMA/CD algorithm words like this:
1. A device with a frame to send listens until the Ethernet is not busy.
2. When the Ethernet is not busy, the sender begins sending the frame.
3. The sender listens to make sure that no collision occurred.
4. Once the senders hear the collision, they each send a jamming signal, to ensure that all stations recognize the collision.
5. After the jamming is complete, each sender randomizes a timer and waits that long.
6 When each timer expires, the process starts over with Step 1.
So, all devices on the Ethernet need to use CSMA/CD to avoid collisions and to recover when inadvertent collisions occur.
Reference: Cisco CCNA intro 640-821 p.55

QUESTION NO: 13
Which two statements describe the operation of the CSMA/CD access method, which is in use on the TestKing network? (Choose two)

A. After a collision, the station that detected the collision has first priority to resend the lost data.
B. In a CSMA/CD collision domain, stations must wait until the media is not in use before transmitting.
C. In a CSMA/CD collision domain, multiple stations can successfully transmit data simultaneously.
D. The use of hubs to enlarge the size of collision domains is one way to improve the operation of the CSMA/CD access method.
E. After a collision, all stations run a random backoff algorithm. When the backoff delay period has expired, all stations have equal priority to transmit data.
F. After a collision, all stations involved run an identical backoff algorithm and then synchronize with each other prior to transmitting data.

Answer: B, E
Explanation:

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Ethernet networking uses Carrier Sense Multiple Access with Collision Detect (CSMA/CD), a protocol that helps devices share the bandwidth evenly without having two devices transmit at the same time on the network medium. CSMA/CD was created to overcome the problem of those collisions that occur when packets are transmitted simultaneously from different nodes. And trust me, good collision management is crucial, because when a node transmits in a CSMA/CD network, all the other nodes on the network receive and examine that transmission. Only bridges and routers can effectively prevent a transmission from propagating throughout the entire network! So, how does the CSMA/CD protocol work? Like this: when a host wants to transmit over the network, it first checks for the presence of a digital signal on the wire. If all is clear (no other host is transmitting), the host will then proceed with its transmission. But it doesn't stop there. The transmitting host constantly monitors the wire to make sure no other hosts begin transmitting. If the host detects another signal on the wire, it sends out an extended jam signal that causes all nodes on the segment to stop sending data (think, busy signal). The nodes respond to that jam signal by waiting a while before attempting to transmit again. Backoff algorithms determine when the colliding stations can retransmit. If collisions keep occurring after 15 tries, the nodes attempting to transmit will then time out.

QUESTION NO: 14
Which three statements are true about the operation of a full-duplex Ethernet network, which is being used in the TestKing LAN? (Choose three)

A. Ethernet hub ports are preconfigured for full-duplex mode.
B. The host network card and the switch port must be capable of operating in full-duplex mode.
C. There are no collisions in full-duplex mode.
D. In a full-duplex environment, the host network card must check for the availability of the network media before transmitting.
E. A dedicated switch port is required for each full-duplex node.

Answer: B, C, E
Explanation:

Half-duplex Ethernet is defined in the original 802.3 Ethernet and Cisco says you only use one wire pair with a digital signal running in both directions on the wire. It also uses the CSMA/CD protocol to help prevent collisions and to permit retransmitting if a collision does occur. If a hub is attached to a switch, it must operate in half-duplex mode because the end stations must be able to detect collisions. Half-duplex Ethernet-typically 10BaseT-is only about 30 to 40 percent efficient as Cisco sees it, because a large 10BaseT network will usually only give you 3- to 4Mbps-at most.
Full-duplex Ethernet uses two pairs of wires, instead of one wire pair like half duplex. Also, full duplex uses a point-to-point connection between the transmitter of the transmitting device and the receiver of the receiving device, which means that with full-duplex data transfer, you get a faster data transfer compared to half duplex. And because the transmitted data is sent on a different set of wires than the received data, no collisions occur. The reason you don't need to worry about collisions is because now Full-duplex Ethernet is like a freeway with multiple lanes instead of the single-lane road provided by half duplex. Full-duplex Ethernet is supposed to offer 100 percent efficiency in both directions; this means you can get 20Mbps with a 10Mbps Ethernet running full duplex, or 200Mbps for FastEthernet.

QUESTION NO: 15
Exhibit:

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```
TestKing2# show interfaces FastEthernet 0/0
FastEthernet0/0 is up, line protocol is up
Hardware is PQUICC_FEC, address is 000d.bd64.98f1 (bia 000d.bd64.98f1)
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec, reliability 253/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set  Keepalive set (10 sec)
  Half-duplex, 100Mb/s, 100BaseTX/FX  Internet address is 192.168.88.254/25
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:00, output 00:00:00, output hang never
  Last clearing of "show interface" counters never
  Queueing strategy: fifo
  Output queue 0/40, 1105 drops; input queue 27/75, 10274 drops
  5 minute input rate 1530000 bits/sec, 201 packets/sec
  5 minute output rate 673000 bits/sec, 173 packets/sec
    404737363 packets input, 2387517953 bytes, 11 no buffer
    Received 12083011 broadcasts, 0 runts, 0 giants
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
    0 input packets with dribble condition detected
    401877661 packets output, 2769220540 bytes, 0 underruns
    0 output errors, 5768297 collisions, 0 interface resets
    0 babbles, 0 late collision, 2174742 deferred
    0 lost carrier, 0 no carrier
    0 output buffer failures, 0 output buffers swapped out
```

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You work as a network technician at TestKing.com. Please study the exhibit carefully. Which statement describes the operational state of the TestKing2 FastEthernet 0/0 interface?

A. The interface is operational and currently handling traffic.
B. The interface has failed because of a media error.
C. The interface requires a no shutdown command to be issued.
D. The interface is generating protocol errors.
E. None of the above.

Answer: A
Explanation:
The interface is up indicates whether the interface hardware is currently active and whether it has been taken down by an administrator. "Disabled" indicates that the router has received more than 5,000 errors in a keepalive interval, which is 10 seconds, by default.

The line protocol indicates whether the software processes that handle the line protocol believe that the interface is usable (that is, whether keepalives are successful) or if it has been taken down by an administrator.
For a complete list of the field descriptions of this command as well as troubleshooting information for Ethernet interfaces refer to the reference link listed below.
Reference: "Troubleshooting Ethernet"
http://www.cisco.com/en/US/docs/internetworking/troubleshooting/guide/tr1904.html

Section 3: Explain network segmentation and basic traffic management concepts (4 questions)

QUESTION NO: 1
The TestKing network administrator wants to use a router named TK1 to segment the local network. What are some of the advantages of using TK1 to segment the network? (Choose two)

A. Routers generally cost less than switches
B. Filtering can occur based on Layer 3 information
C. Broadcasts are not forwarded across the router
D. Broadcasts are eliminated
E. Adding a router to the network decreases latency
F. Routers can generally support more LAN ports than switches

Answer: B, C
Explanation:
When the router's interface receives the broadcast, it discard the broadcast without forwarding it on to other networks. Even though routers are known for breaking up broadcast domains by default, it's important to remember that they break up collision domains as well.
There are two advantages of using routers in your network:
* They don't forward broadcasts by default.
* They can filter the network based on layer 3 (Network layer) information (e.g., IP address) by using IOS based firewall ie. ACL
Four router functions in your network can be listed as follows:
* Packet switching
* Packet filtering

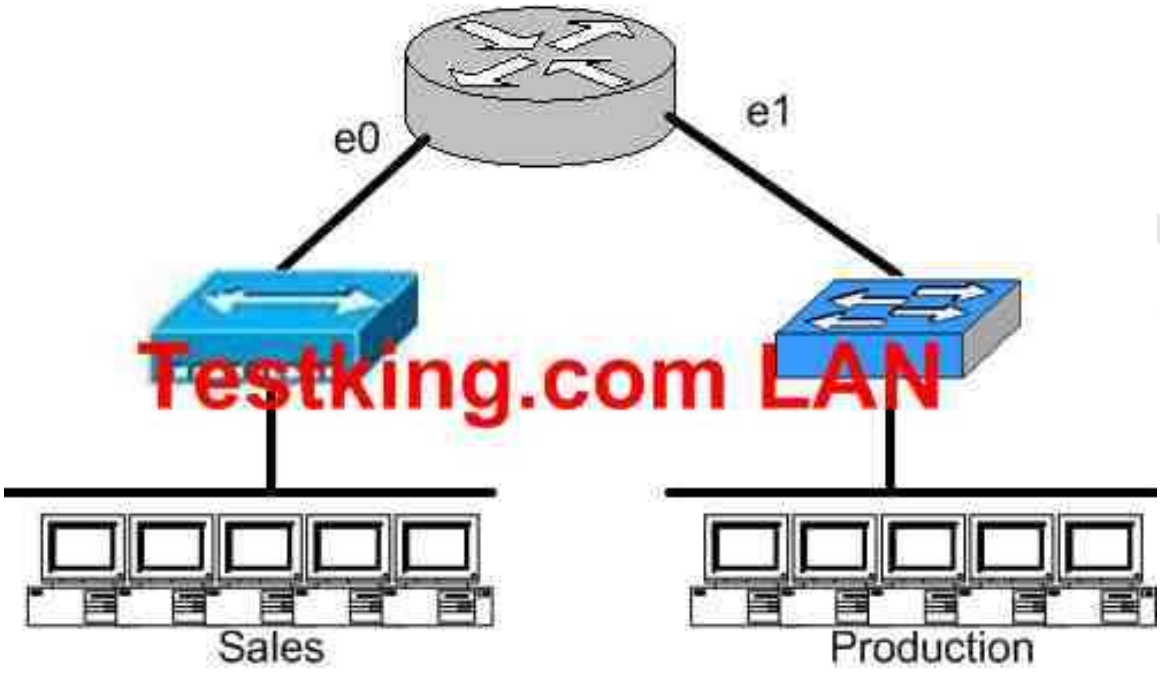
* Internetwork communication
* Path selection

QUESTION NO: 2
Which of the following devices can the TestKing network administrator use to segment the LAN? (Choose all that apply)

A. Hubs
B. Repeaters
C. Switches
D. Bridges
E. Routers
F. Media Converters
G. All of the above

Answer: C, D, E
Explanation:
Switches and bridges forward broadcast but routers do not forward broadcasts by default (they can via the "ip helper-address" command).
Switches, bridges and routers can segment an Ethernet collision domain via the use of VLAN's
Incorrect Answers:
A. Hubs is incorrect because a hub doesn't segment a network, it only allows more hosts on one. Hubs operate at layer one, and is used primarily to physically add more stations to the LAN.
B. This also incorrect because the job of a repeater is to repeat a signal so it can exceed distance limitations. It also operates at layer one and provides no means for logical LAN segmentation.
F. This is incorrect because media converters work by converting data from a different media type to work with the media of a LAN. It also operates at layer one and provides no means for logical LAN segmentation.

QUESTION NO: 3
Within the TestKing office, The Sales and Production networks are separated by a router as shown in the diagram below:



Which of the following statements most accurately describes the characteristics of the above networks broadcast and collision domains? (Select the two best answer choices)

A. There are two broadcast domains in the network.
B. There are four broadcast domains in the network.
C. There are six broadcast domains in the network.
D. There are four collision domains in the network.
E. There are five collision domains in the network.
F. There are seven collision domains in the network.

Answer: A, F
Explanation:
In this network we have a hub being used in the Sales department, and a switch being used in the Production department. Based on this, we have two broadcast domains: one for each network being separated by a router. For the collision domains, we have 5 computers and one port for E1 so we have 6 collision domains total because we use a switch in the Production Department so 5 are created there, plus one collision domain for the entire Sales department because a hub is being used.

QUESTION NO: 4
The TestKing corporate LAN consists of one large flat network. You decide to segment this LAN into two separate networks with a router. What will be the affect of this change?

A. The number of broadcast domains will be decreased.
B. It will make the broadcasting of traffic between domains more efficient between segments.
C. It will increase the number of collisions.
D. It will prevent segment 1's broadcasts from getting to segment 2.
E. It will connect segment 1's broadcasts to segment 2.

Answer: D
Explanation
A router does not forward broadcast traffic. It therefore breaks up a broadcast domain, reducing unnecessary network traffic. Broadcasts from one segment will not be seen on the other segment.
Incorrect Answers:
A. This will actually increase the number of broadcast domains from one to two.
B. All link level traffic from segment one to segment two will now need to be routed between the two interfaces of the router. Although this will reduce the traffic on the LAN links, it does also provide a less efficient transport between the segments.
C. Since the network size is effectively cut into half, the number of collisions should decrease dramatically.
E. Broadcasts from one segment will be completely hidden from the other segment.

Section 4: Explain basic switching concepts and the operation of Cisco switches (15 questions)

QUESTION NO: 1
You want to influence the root bridge selection within the TestKing LAN. Which two values are used by spanning tree protocol to elect a root bridge? (Choose two.)

A. Amount of RAM
B. Speed of the links
C. IOS Version
D. MAC Address
E. Bridge Priority
F. IP Address
G. Router ID

Answer: D, E
Explanation:
Switch having lowest bridge ID will become the root bridge. The bridge ID is how STP keeps track of all the switches in the network. It is determined by a combination of the bridge priority (32,768 by default on all Cisco switches) and the base MAC address. The bridge with the lowest bridge ID becomes the root bridge in the network.

QUESTION NO: 2
A TestKing Ethernet switch receives a unicast frame with a destination MAC that IS listed in the switch table. What will this switch do with the frame?

A. The switch will forward the frame to a specific port
B. The switch will forward the frame to all ports except the port on which it was received
C. The switch will return a copy of the frame out the source port
D. The switch will not forward unicast frames
E. The switch will remove the destination MAC from the switch table
F. None of the above.

Answer: A
Explanation:
How Does the Switch Find Host MACs?
Let's use the diagram below to help us understand how address learning process takes place.

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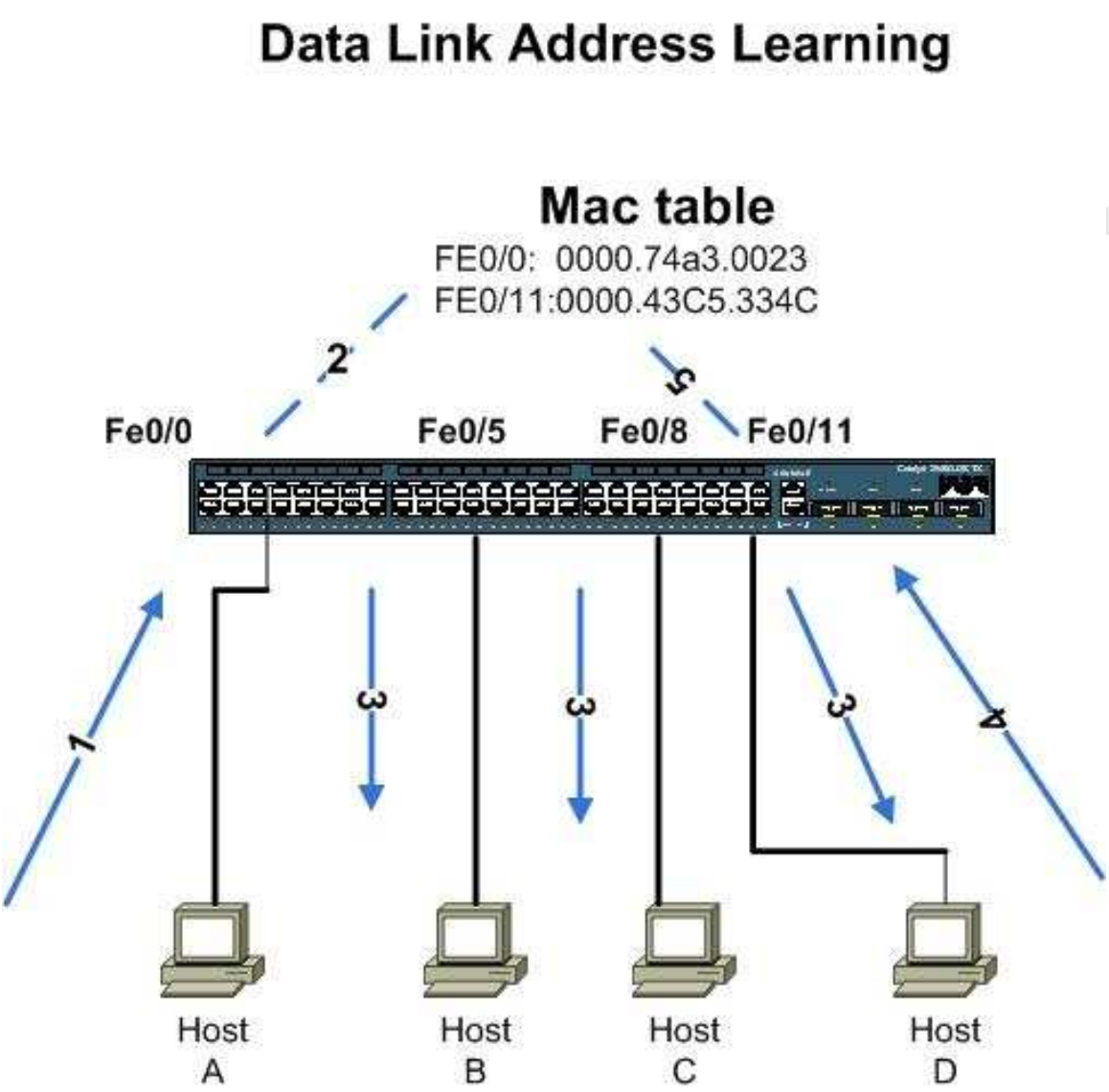


Let's assume that we have just powered on the switch. It has nothing in its MAC table. We connect the cables from the hosts on the switch interfaces as shown in the diagram. Host A initiates a connection towards Host D, and the following takes place:

1. Host A (interface fe0/0) sends a frame to Host D (MAC address:0000.43c5.334c).
2. The switch inspects the Source Address in the frame and notes in its table the MAC address of Host A along with the Interface number from which the frame originated.
3.

The switch inspects the Destination Address in the frame. Since it does not have Hosts D MAC address in its table, it constructs a broadcast frame and forwards out all interfaces except the interface from where the original frame arrived.

4. Host D identifies itself as the expected recipient and responds back to Host A. The switch receives the respond frame on interface fe0/11 and places the SA in its table along with the interface number where the frame came from.
5. **From now on, further communication between the two hosts will be switched to the appropriate interfaces based on the MAC tables entries.**

This process takes place every time a new host is attached on the switch and initiates traffic. The switch tries to keep its MAC table up-to-date, therefore if some hosts do not initiate traffic for a certain amount of time, the switch removes them from its table and reinserts them when they begin sending traffic.

Reference:

http://www.trainsignaltraining.com/studying-for-your-ccent-learn-all-about-switching-and-stp/2007-11-01/

QUESTION NO: 3

In which circumstance are multiple copies of the same unicast frame likely to be transmitted in the TestKing Switched LAN?

A. During high traffic periods
B. In an improperly implemented redundant topology
C. After broken links are re-established
D. When upper-layer protocols require high reliability
E. When a dual ring topology is in use
F. None of the above

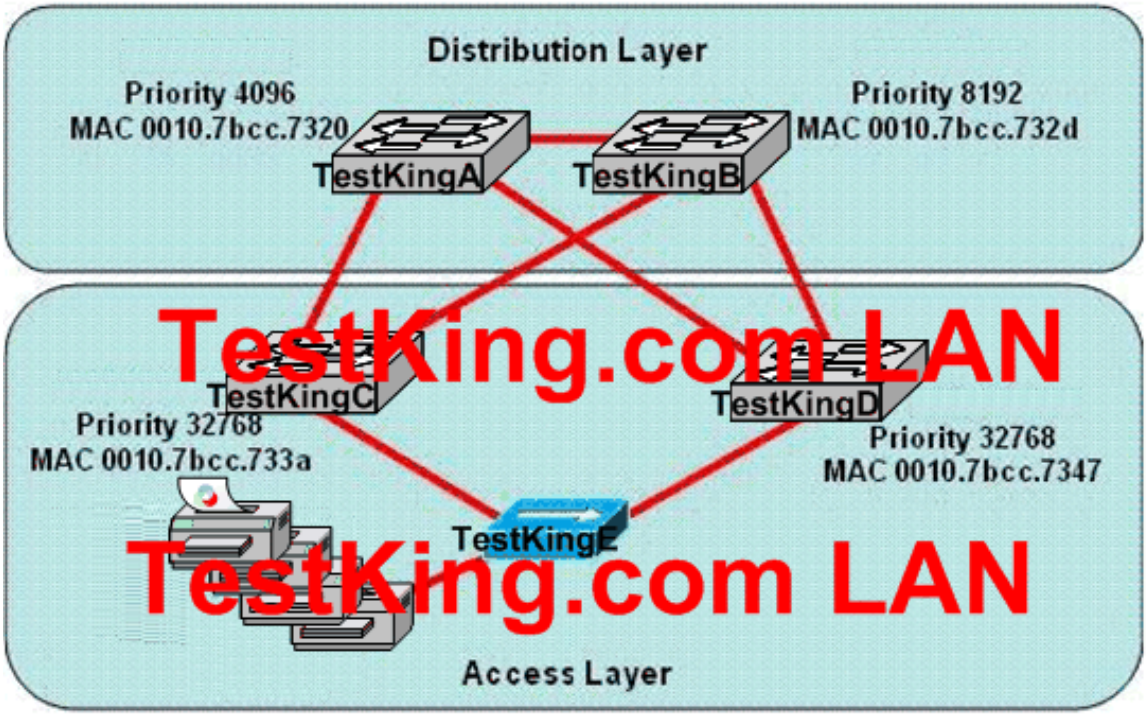
Answer: B

Explanation:

A redundant topology eliminates single points of failure, but it also causes broadcast storms, multiple frame copies, and MAC address table instability problems. Multiple Frame Copies--when a new switch is added, the other switches may not have learned its correct MAC address. The host may send a unicast frame to the new switch. The frame is sent through several paths at the same time. The new switch will receive several copies of the frame. This causes MAC database instability. MAC database instability results when multiple copies of a frame arrive on different ports of a switch. Layer 2 has no mechanism to stop the loop. This is the main reason for the Spanning Tree Protocol(STP) IEEE 802.1d which was developed to prevent routing loops.

If multiple connections between switches are created for redundancy purposes, network loops can occur in an improperly designed topology. Spanning Tree Protocol (STP) is used to stop network loops while still permitting redundancy.

QUESTION NO: 4
Part of the TestKing switched LAN is shown below:



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Based on the information show above, which device will provide the spanning-tree designated port role for the TestKing network segment that services the printers?

A. Switch TestKingA
B. Hub TestKingE
C. Switch TestKingC
D. Switch TestKingB
E. Switch TestKingD
F. None of the switches will provide the designated port role

Answer: C
Explanation:
Designated port A designated port is one that has been determined as having the best (lowest) cost. A designated port will be marked as a forwarding port.

QUESTION NO: 5
The TestKing network administrator needs to a switch named TK1 to become the root bridge for a redundant path switched network. What can be done to ensure that TK1 will always assume the role as the root bridge?

A. Assign the switch a higher MAC address than the other switches in the network have
B. Establish a direct link from the switch to all other switches in the network
C. Configure the switch full-duplex operation and configure the other switches for half-duplex operation
D. Configure the switch so that it has lower priority than other switches in the network
E. None of the above

Answer: D
Explanation:
Switch having lowest bridge ID will become the root bridge. The bridge ID is how STP keeps track of all the switches in the network. It is determined by a combination of the bridge priority (32,768 by default on all Cisco switches) and the base MAC address. The bridge with the lowest bridge ID becomes the root bridge in the network. To elect the desired switch as a root bridge, set the bridge priority lowest than other switch.

QUESTION NO: 6
Four TestKing PCs connect to a single switch as shown below:

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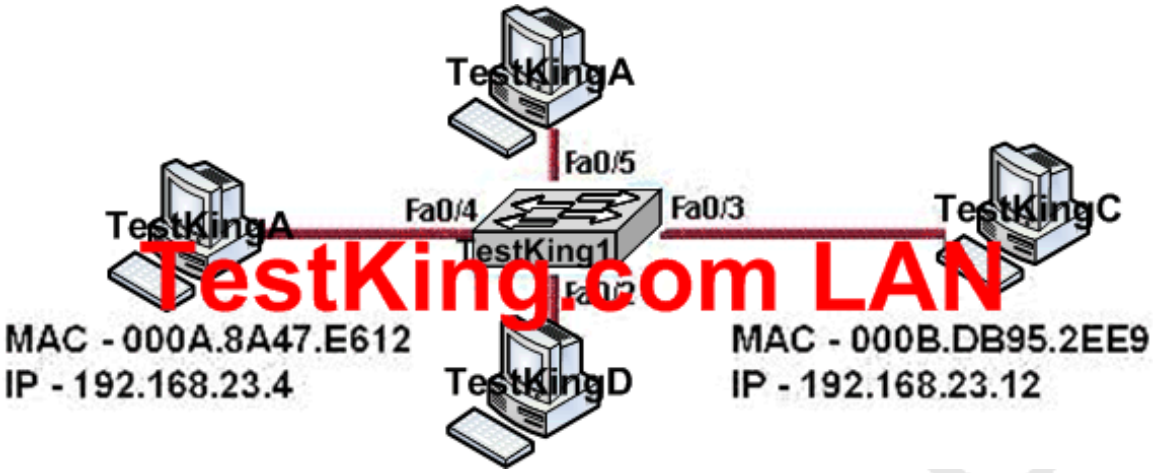

In the TestKing network shown above, switch TestKing1 has just been restarted and has passed the POST routine. Host TestKingA (the one on the left) sends its initial frame to Host TestKingC. What is the first thing the switch will do as regards to populating the switching table?

A. Switch TestKing1 will add 192.168.23.12 to the switching table
B. Switch TestKing1 will add 192.168.23.4 to the switching table
C. Switch TestKing1 will add 000B.DB95.2EE9 to the switching table
D. Switch TestKing1 will add 000A.8A47.E612 to the switching table
E. None of the above

Answer: D

QUESTION NO: 7
TK1 is a switch in the TestKing network. Why will TK1 never learn the broadcast address?

A. Broadcast frames are never sent to switches
B. A broadcast frame is never forwarded by a switch
C. Broadcasts only use network layer addressing
D. A broadcast address will never be the source address of a frame

E. Broadcast addresses use an incorrect format for the switching table
F. None of the above

Answer: D
Explanation:
As a communication wise there are three different address types:
* Unicast : One source to One destination
* Broadcast: One source to multiple destination
* Multicast: One source to multiple destination joined to group

Either on unicat, broadcast or multicast communication, source address is always unicat address but destination address can be broadcast, multicast.

QUESTION NO: 8 DRAG DROP
You work as a network technician at TestKing.com. Your boss, Mrs. Tess King, is interested in basic switch configurations. Match the IOS command with the appropriate purpose.

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Answer:
Explanation:

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enable : This command is used to enter into User Privileges Mode
configure terminal: This command is used to enter into global configuration mode
hostname : This command is used to set the hostname of switch
ip default-gateway : This command should enter should enter on global configuration mode to set default gateway of switch.
Interface vlan 1

: Enters into the vlan 1 SVI (Switched Virtual Interface) configuration mode, where you can enter vlan 1 SVI interface specific configuration
ip add x.x.x.x y.y.y.y : Use to assign the ip address on interface
no shutdown: Brings the interface on up state from administratively down state

QUESTION NO: 9
A TestKing LAN is displayed in the diagram below:

Switch 1 switch table

Host	MAC Address	Port
A	00-0A-8A-47-E6-12	0/5
D	01-00-CD-22-03-14	0/9
B	01-1B-25-AB-32-E8	0/2

Host TestKingB sends a frame to host TestKingC.
What will the switch do with the frame?

A. Drop the frame
B. Send the frame out all ports except port 0/2
C. Return the frame to host TestKingB
D. Send an ARP request for host TestKingC
E. Send an ICMP Host Unreachable message to Host TestKing B
F. Record the destination MAC address in the switching table and send the frame directly to Host TestKingC

Answer: B
Explanation:

An Ethernet switch appears to use the same logic as a transparent bridge. However, the internal logic of the switch is optimized for performing the basic function of choosing when to forward and when to filter a frame. Just as with a transparent bridge, the basic logic of a LAN switch is as follows:

Step 1	A frame is received.
Step 2	If the destination is a broadcast or multicast, forward on all ports.
Step 3	If the destination is a unicast and the address is not in the address table, forward on all ports.
Step 4	If the destination is a unicast and the address is in the address table, forward the frame out the associated port, unless the MAC address is associated with the incoming port.

QUESTION NO: 10
The following was seen on a TestKing switch.

TestKing1 # show mac-address-table

< non-essential output omitted >

Destination Address	Address Type	VLAN	Destination Port
00b0.d056.fe4d	Dynamic	1	FastEthernet0/3
00b0.d043.ac2e	Dynamic	1	FastEthernet0/4
00b0.d0fe.ac32	Dynamic	1	FastEthernet0/5
00b0.d0da.cb56	Dynamic	1	FastEthernet0/6

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Frame received by SwitchA:

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Source MAC	Destination MAC	Source IP	Destination IP
00b0.d056.fe4d	00b0.d0da.895a	192.168.40.5	192.168.40.6

TestKing1 receives the frame with the addressing shown. According to the command output shown in the exhibit, how will TestKing1 handle this frame?

A. It will forward the frame out port Fa0/3 only.
B. It will drop the frame.
C. It will flood the frame out all ports except Fa0/3.
D. It will flood the frame out all ports.

Answer: C
Explanation:
 Switches learn the MAC addresses of PCs or workstations that are connected to their switch ports by examining the source address of frames that are received on that port.
 Machines may have been removed from a port, turned off, or moved to another port on the same switch or a different switch.
 This could cause confusion in frame forwarding.
 The MAC address entry is automatically discarded or aged out after 300 seconds
 If there is not MAC address of destination host in MAC table, switch sends broadcast to all ports except the source to find out the destination host.
In the output there is no MAC address of the given host so the switch will flood to all ports except the source port, which is port fa 0/3.

QUESTION NO: 11
Refer to the topology and MAC address table shown in the exhibit:

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Host TestKingA sends a data frame to host TestKingD. What will the TestKing1 switch do when it receives the frame from host A?

A. The TestKing1 switch will flood the frame out of all ports except for port Fa0/3.
B. The TestKing1 switch will discard the frame and send an error message back to host TestKingA.
C. The TestKing1 switch will add the destination address of the frame to the MAC address table and forward the frame to host D.
D. The TestKing1 switch will add the source address and port to the MAC address table and forward the frame to host TestKingD.
E. None of the above

Answer: D
Explanation:
When switch receives the data frame from the host not having the MAC address already in the MAC table, it will add the MAC address to the source port on the MAC address table and sends the data frame. If the switch already has the MAC address in it's table for the destination, as it is in this case, it will forward the frame directly to the destination port. If it was not already in it's MAC table, then they frame would have been flooded out all ports except for the port that it came from.

QUESTION NO: 12
Switch TestKingA receives the frame with the addressing shown in the exhibit.

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According to the command output also shown in the exhibit, how will Switch TestKingA handle this frame?

A. It will flood the frame out all ports except Fa0/3.
B. It will forward the frame out port Fa0/3 only.
C. It will flood the frame out all ports.
D. It will forward the frame out port Fa0/6 only.
E. It will drop the frame.
F. None of the above

Answer: D
Explanation:
When frame receives the frame, it checks the source address on MAC table if MAC address found in MAC table it tries to forward if not in MAC table adds the Address on MAC table. After checking the source address, it checks the destination address on MAC table, if MAC address found on MAC table it forwards to proper ports otherwise floods on all ports except the source port. In this case, the MAC address shown is already in the table so it will be forwarded directly.

QUESTION NO: 13
Please study the exhibit shown below carefully.

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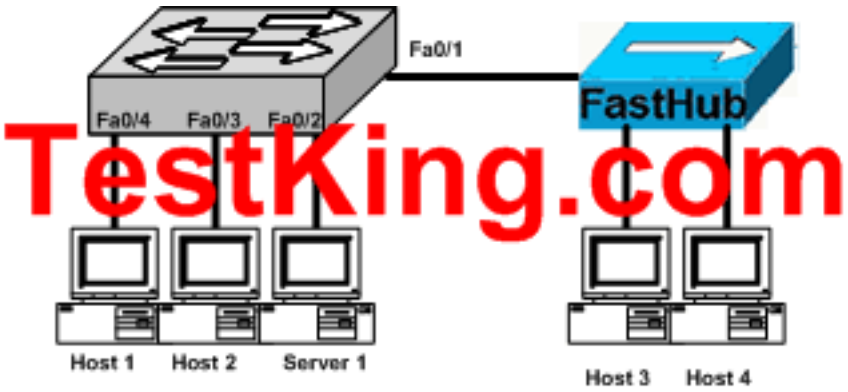

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Switch MAC Address Table

Address	Port
0010.0de0.e289	FastEthernet0/1
0010.7b00.1545	FastEthernet0/1
0060.5cf4.0076	FastEthernet0/2
00e0.1e9f.3900	FastEthernet0/4

Why does the switch have two MAC addresses assigned to the FastEthernet 0/1 port in the switch address table?

A. Either Host3 or Host4 has just had the NIC replaced.
B. Data from Host3 and Host4 has been received by switch port FastEthernet 0/1.
C. Host3 and Host4 are on two different VLANs.
D. Data from two of the devices connected to the switch has been sent to Host3.
E. None of the above

Answer: B
Explanation:
Switches learn the MAC addresses of PCs or workstations that are connected to their switch ports by examining the source address of frames that are received on that port. When more than one device is attached to a switch port, such as via the use of a hub as shown in this example, the switch will retain the MAC address of each of the known devices on that port.

QUESTION NO: 14

The system LED is amber on a new TestKing Catalyst 2950 series switch. What does this indicate?

A. The system is powered up and operational.
B. The system is sensing excessive collisions.
C. The system is forwarding traffic.
D. The system is not powered up.
E. The system is malfunctioning.
F. None of the above

Answer: E
Explanation:
While the switch powers on, it begins POST, a series of tests. POST runs automatically to verify that the switch functions properly. When the switch begins POST, the system LED is off. If POST completes successfully, the LED turns green. If POST fails, the LED turns amber.
Note: POST failures are usually fatal. Call Cisco Systems if your switch does not pass POST.

QUESTION NO: 15
Some of the older TestKing switches store the entire frame before forwarding it to the destination. What are two effects on network performance of configuring a switch to do this? (Choose two)

A. Filtering of collision fragments only
B. Decreased latency
C. Increased latency
D. Filtering of all frame errors
E. Increase in switch operating speed
F. Propagation of corrupted or damaged frames

Answer: C, D
Explanation:

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Switches that store the entire frame before forwarding to the destination are using the store and forward process. This mode copies the entire frame into memory, computes the Cyclic Redundancy Check (CRC) for errors, and then looks up the destination MAC address and forwards the frame. This is slow but offers the best solution for error correction without affecting the entire backbone in retransmission. This gives us the best method for filtering errors from traversing the network, but at a cost of higher latency.

Section 5: Perform and verify initial switch configuration tasks including remote access management (10 questions)

QUESTION NO: 1
The following output was displayed on a TestKing device:

```
TestKing2# show interfaces ethernet 0
Ethernet0 is up, line protocol is up
  Hardware is QUICC Ethernet, address is 00c0.ab73.dead (bia 0010.7bcc.7321)
  MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
     reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
<output omitted>
TestKing2#
```

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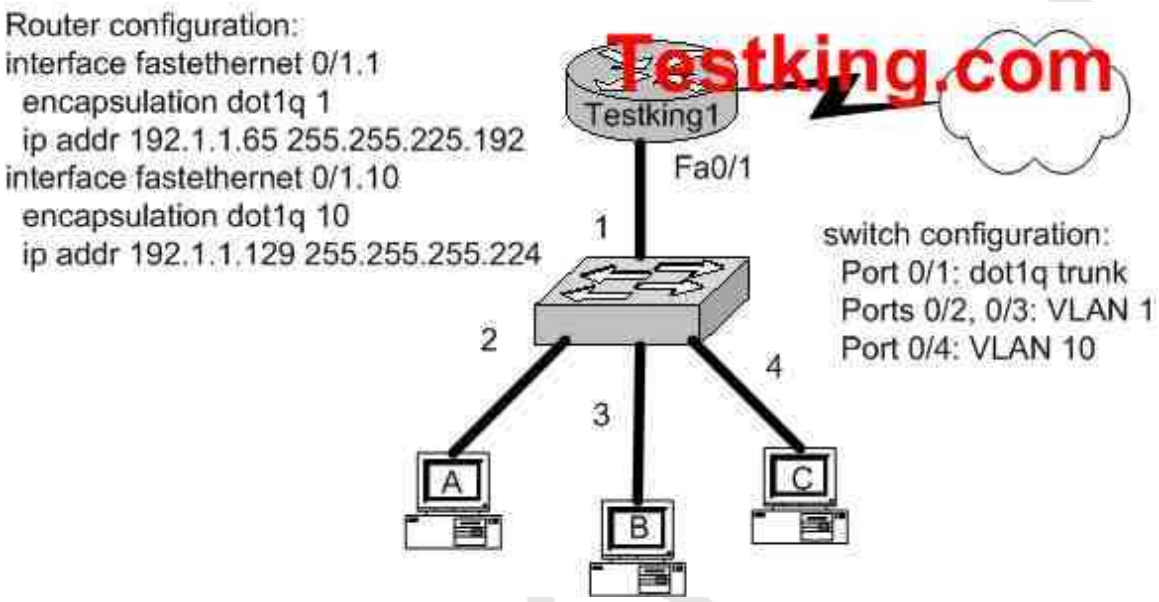
While troubleshooting the installation of a new TestKing LAN device, the command output shown above was issued. What is the meaning of the output "MTU 1500 bytes" shown above?

A. The maximum number of bytes that can transverse this interface per second is 1500
B. The maximum segment size that can transverse this interface is 1500 bytes
C. The maximum packet size that can transverse this interface is 1500 bytes
D. The maximum frame size that can transverse this interface is 1500 bytes

Answer: C
Explanation:

Maximum transmission unit (MTU) defines the largest size of packets that an interface can transmit without the need to fragment. IP packets larger than the MTU must go through IP fragmentation procedures.

QUESTION NO: 2
A TestKing Switch is connected as shown below:



Which IOS commands should you enter if you wanted to link the router TestKing1 with switch port 1? (Select three answer choices)

A. Switch(config)# interface fastethernet 0/1
B. Switch(config-if)# switchport mode access
C. Switch(config-if)# switchport mode trunk
D. Switch(config-if)# switchport access vlan 1
E. Switch(config-if)# switchport trunk encapsulation isl
F. Switch(config-if)# switchport trunk encapsulation dot1q

Answer: A, C, F
Explanation:
Before you can begin, you have to get into the interface. Answer choice A is the only command in the selection that puts the IOS into interface mode. Once in the interface you have to set it to trunk mode, so choice C is correct. The switch port needs encapsulation. Answer choice E give you the choice of ISL and choice F gives you dot1q. Since the diagram suggests that the router is using 802.1Q, you must also use dot1q.
Incorrect Answers:
B, D: We wish to set up a trunk over this connection, not set up a single VLAN.
E. Both ends of the trunk must use the same trunk encapsulation type. Since the diagram shows that the router is set to 802.1Q, the switch must be set up similarly.

QUESTION NO: 3
As a TestKing trainee you are required to set the default gateway on a Cisco switch to the IP address of 192.168.1.115. Which IOS command should you use?

A. TestKSwitch(config)# ip route-default 192.168.1.115
B. TestKSwitch(config)# ip default-gateway 192.168.1.115
C. TestKSwitch(config)# ip route 192.168.1.115 0.0.0.0
D. TestKSwitch(config)# ip default-network 192.168.1.115
E. None of the above

Answer: B
Explanation:
Use the "ip default-gateway" command to enter the IP address of the next-hop router interface that is directly connected to the switch where a default gateway is being configured. The default gateway receives IP packets with unresolved destination IP addresses from the switch.
Once the default gateway is configured, the switch has connectivity to the remote networks with which a host needs to communicate.

QUESTION NO: 4
You need to perform some initial configuration tasks on a new TestKing switch. What is the purpose of assigning an IP address to a switch?

A. To provide local hosts with a default gateway address

B. To allow remote management of the switch.
C. To allow the switch to respond to ARP requests between two hosts
D. To ensure that hosts on the same LAN can communicate with each other.
E. None of the above

Answer: B
Explanation:
Switch is a layer 2 device and doesn't use network layer for packet forwarding. The IP address may be used only for administrative purposes such as Telnet access or for network management purposes.

QUESTION NO: 5
You need to perform some initial configuration tasks on a new TestKing switch. What are the possible trunking modes for this switch port? (Choose three)

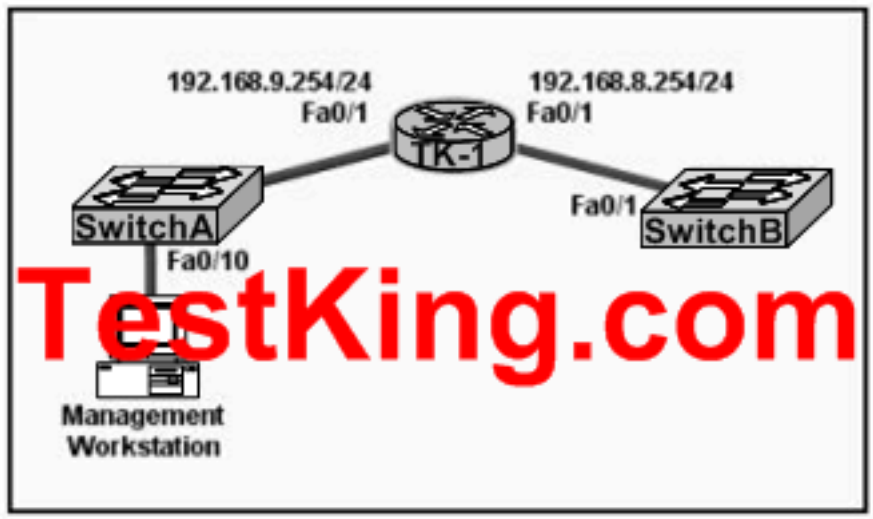
A. Transparent
B. Auto
C. On
D. Desirable
E. Client
F. Forwarding
G. Learning

Answer: B, C, D
Explanation:
Here, the trunk link is identified by its physical location as the switch module number and port number. The trunking mode can be set to any of the following:
 on-This setting places the port in permanent trunking mode. The corresponding switch port at the other end of the trunk should be similarly configured because negotiation is not allowed. The encapsulation or identification mode should also be manually configured.
 off-This setting places the port in permanent non-trunking mode. The port will attempt to convert the link to non-trunking mode.
 desirable-Selecting this port will actively attempt to convert the link into trunking mode. If the far end switch port is configured to on, desirable, or auto mode, trunking will be successfully negotiated.
 auto-The port will be willing to convert the link into trunking mode. If the far end switch

port is configured to on or desirable, trunking will be negotiated. By default, all Fast Ethernet and Gigabit Ethernet links that are capable of negotiating using DTP are configured to this mode. Because of the passive negotiation behavior, the link will never become a trunk, if both ends of the link are left to the auto default.
 nonegotiate-The port is placed in permanent trunking mode, but no DTP frames are generated for negotiation. The far end switch port must be manually configured for trunking mode.

QUESTION NO: 6
Please study the exhibit carefully. A TestKing technician has installed SwitchB and needs to configure it for remote access from the management workstation connected to SwitchA. Which set of commands is required to accomplish this task?

Exhibit:



A. SwitchB(config)# interface FastEthernet 0/1
SwitchB(config-if)# ip address 192.168.8.252 255.255.255.0
SwitchB(config-if)# no shutdown
B. SwitchB(config)# ip default-network 192.168.8.254
SwitchB(config)# interface vlan 1
SwitchB(config-if)# ip address 192.168.8.252 255.255.255.0
SwitchB(config-if)# no shutdown
C. SwitchB(config)# ip route 192.168.8.254 255.255.255.0
SwitchB(config)# interface FastEthernet 0/1
SwitchB(config-if)# ip address 192.168.8.252 255.255.255.0

SwitchB(config-if)# no shutdown
D. SwitchB(config)# ip default-gateway 192.168.8.254
SwitchB(config)# interface vlan 1
SwitchB(config-if)# ip address 192.168.8.252 255.255.255.0
SwitchB(config-if)# no shutdown
E. SwitchB(config)# interface vlan 1
SwitchB(config-if)# ip address 192.168.8.252 255.255.255.0
SwitchB(config-if)# ip default-gateway 192.168.8.254 255.255.255.0
SwitchB(config-if)# no shutdown
F. None of the above

Answer: D
Explanation:
IP default-gateway address is a global command that sets the default gateway so that the management interface can be reached from a remote network. This is the correct command used on Cisco switches. In this example, the interface also needs to be enable using the "no shut" command.
Incorrect Answers:
A: The default gateway of the switch needs to be specified.
B: The correct command for a switch is "ip default-gateway" not "ip default-network"
C: This static route is not valid, and does not correctly specify the default route.
E: "IP default-gateway" is a global command, not an interface command.

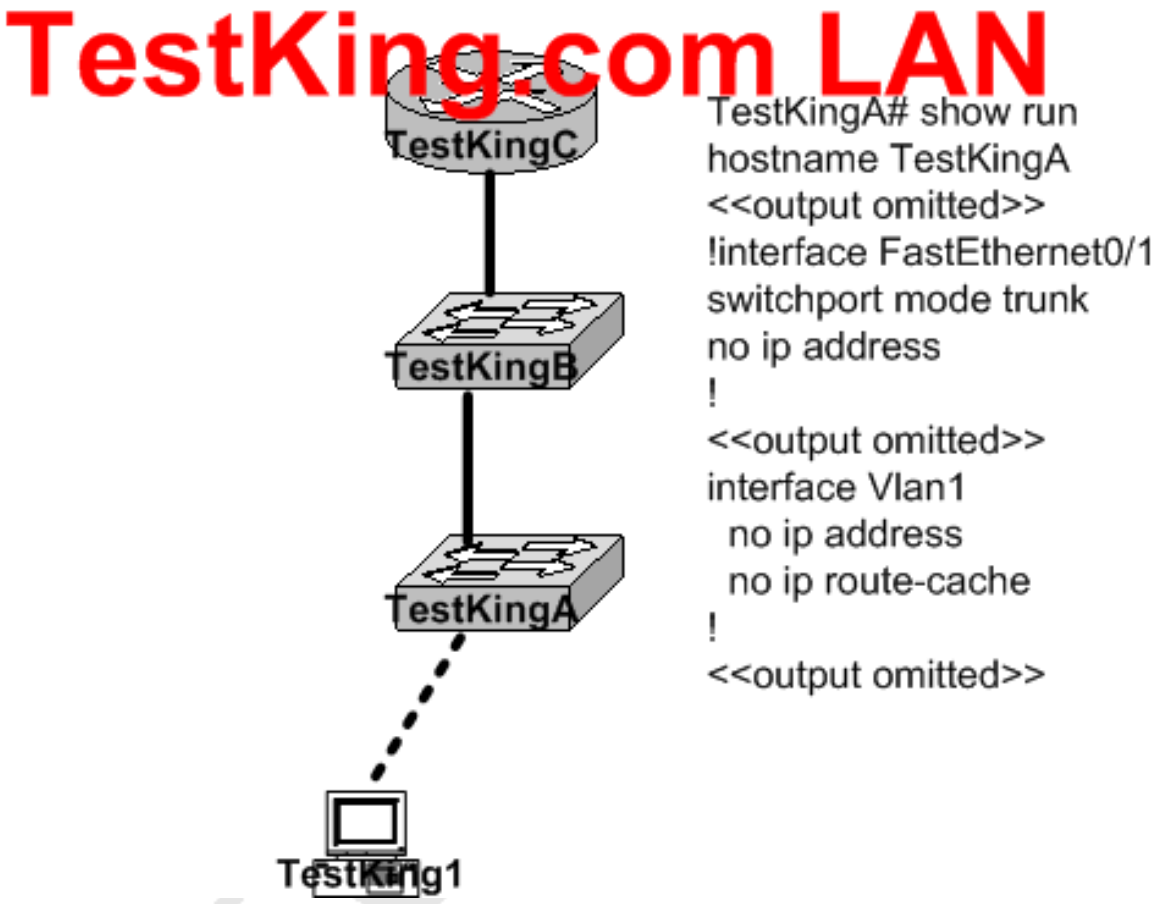
QUESTION NO: 7
An administrator would like to configure a switch over a virtual terminal connection from locations outside of the local LAN. Which of the following are required in order for the switch to be configured from a remote location? (Choose two)

A. The switch must be reachable through a port connected to its management VLAN.
B. The switch console port must be connected to the Ethernet LAN.
C. The switch must be fully configured as an SNMP agent.
D. The switch must be configured with an IP address, subnet mask, and default gateway.
E. The switch management VLAN must be created and have a membership of at least one switch port.
F. The switch must be connected to a router over a VLAN trunk.

Answer: A, D

Explanation:
In order the telnet to any Cisco device, the device must be reachable from the remote location. For a Cisco switch to be reachable from remote locations, it must have an IP address, subnet mask, and default gateway assigned.
Communication with the switch management interfaces is through the switch IP address. The IP address is associated with the management VLAN, which by default is VLAN 1

QUESTION NO: 8
A TestKing LAN is shown in the diagram below:



In this network, Host TestKing1 is consoled into Switch TestKingA. Telnet connections and pings run from the command prompt on Switch TestKingA fail.

Which of the following could cause this problem? Select all that apply.

A. Switch TestKingA is not directly connected to router TestKingC.
B. Switch TestKingA does not have a default gateway assigned.
C. Switch TestKingA does not have a CDP entry for Switch TestKing B or Router TestKingC.
D. Switch TestKingA does not have an IP address.
E. Port 1 on Switch TestKingA should be an access port rather than a trunk port.

Answer: B, D
For ping and Telnet the switch should be configured with the IP address and the default gateway. IP is used for administrative purposes, and is needed so the end device will know which IP address to direct the ICMP and telnet reply traffic to.
Incorrect Answers:
A. This is not required, since switch LANs can span multiple VLANs and switches and hubs can be connected directly together.
C. CDP is not required in order for ping and telnet traffic to work.
E. The port type in this case will not cause any kind of connectivity problems, since Trunk ports pass information from all VLANs by default.

QUESTION NO: 9
The TestKing network administrator cannot connect to SwitchTK1 over a Telnet session, although the hosts attached to SwitchTK1 can ping the interface Fa0/0 of the router. Given the information shown below and assuming that the router and Switch2 are configured properly, which of the following commands should be issued on SwitchTK1 to correct this problem?

Exhibit:

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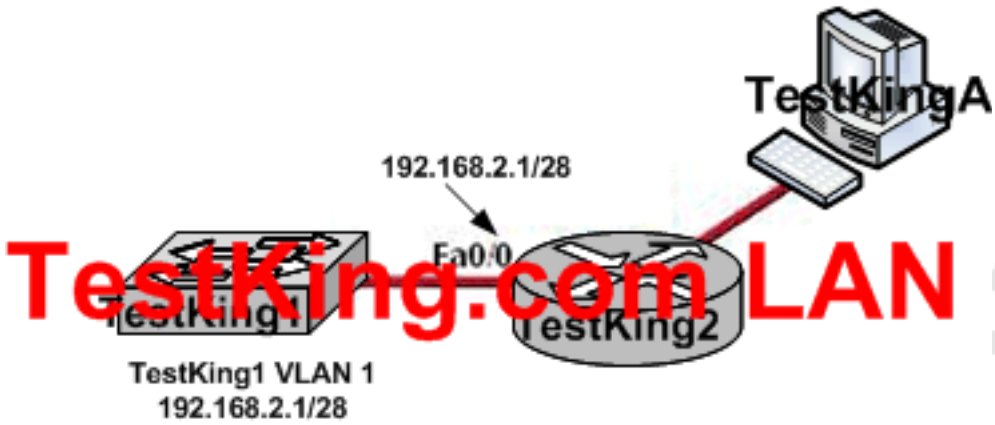
A. SwitchTK1(config)# ip default-gateway 192.168.24.1
B. SwitchTK1(config)# interface fa0/1
SwitchTK1(config-if)# ip address 192.168.24.3 255.255.255.0
C. SwitchTK1(config)# line con0
SwitchTK1(config-line)# password cisco
SwitchTK1(config-line)#login
D. SwitchTK1(config)# interface fa0/1
SwitchTK1(config-if)# duplex full
SwitchTK1(config-if)# speed 100
E. SwitchTK1(config)# interface fa0/1
SwitchTK1(config-if)# switchport mode trunk
F. None of the above

Answer: A
Explanation:
To route traffic to other vlans, we need to enter the IP address of the next-hop router interface that is directly connected to the switch where a default gateway is being configured. The default gateway receives IP packets with unresolved destination IP addresses from the switch.
Once the default gateway is configured, the switch will have connectivity to the remote networks with which a host needs to communicate.

QUESTION NO: 10

Exhibit:



TestKing.com LAN

In the TestKing network segment shown above, host TestKingA must be able to telnet to switch TestKing1 through router TestKing2 for management purposes. What must be configured or done for this connection to be successful?

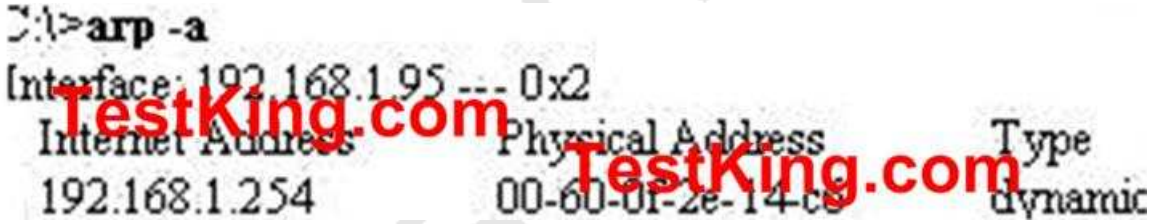
A. VLAN 1 on TestKing1
B. A default gateway on TestKing1
C. A cross-over cable connecting TestKing1 and TestKing2
D. IP routing on TestKing1
E. None of the above

Answer: B
Explanation:
In order for a switch to send traffic to a destination that is not located directly, as is the case in our example, a default gateway must be configured on the switch. This will enable it to send the traffic to router TestKing2 where it can be routed to host TestKingA.
Incorrect Answers:
A: This is the default VLAN used and does not need to be configured.
C: A cross over cable is used to connect two switches or two routers together back to back, but a straight through cable should be used when connecting a switch to a routers.
D: IP routing does not need to be enabled, just the default gateway.

Section 6: Verify network status and switch operation using basic utilities (including: ping, traceroute, telnet, SSH, arp, ipconfig), SHOW & DEBUG commands (10 questions)

QUESTION NO: 1
Network topology exhibit:

Output exhibit:



You work as a network technician at TestKing and you issued the arp -a command from a host named TestKingA as shown above.

The user of host TestKingA wants to ping the DSL modem/router at 192.168.1.254. Based on the Host TestKingA ARP table that is shown in the exhibit, what will host TestKingA do?

A. Send a unicast ARP packet to the DSL modem/router
B. Send a Layer 2 broadcast that is received by Host TestKingB, the switch and the DSL modem/router
C. Send unicast ICMP packets to the DSL modem/router
D. Send Layer 3 broadcast packets to which the DSL modem/router responds
E. None of the above

Answer: C

QUESTION NO: 2
While troubleshooting a connectivity problem, the TestKing network administrator notices that a port status LED on a Cisco Catalyst Series switch is alternating between green and amber. Which condition could this indicate?

A. The port is experiencing errors
B. The port has ac active link with normal traffic activity
C. The port blocked by spanning tree
D. The port is administratively disabled
E. None of the above

Answer: A
Explanation: Here are some Port status LEDs

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Port Mode	LED Color	Meaning
STAT (port status)	Off	No link, or port was administratively shut down.
	Green	Link present.
	Flashing green	Activity. Port is transmitting or receiving data.
	Alternating green-amber	Link fault. Error frames can affect connectivity, and errors such as excessive collisions, CRC errors, and alignment and jabber errors are monitored for a link-fault indication.
	Amber	Port is blocked by Spanning Tree Protocol (STP) and is not forwarding data. Note After a port is reconfigured, the port LED can remain amber for up to 30 seconds as STP checks the switch for possible loops.
	Flashing amber	Port is blocked by STP and is transmitting or receiving packets.
DUPLX (duplex)	Off	Port is operating in half duplex.
	Green	Port is operating in full duplex.
SPEED	Off	Port is operating at 10 Mbps.
	Green	Port is operating at 100 Mbps.
	Flashing green	Port is operating at 1000 Mbps.

QUESTION NO: 3
Two TestKing hosts are connected as shown below:

Ping Exhibit:

In the network shown above, a network administrator attempts to ping Host TestKingII from Host TestKingI and receives the results that are shown. What is a possible problem?

A. TCP/IP is not functioning on Host TestKingI
B. The default gateway on Host TestKingI is incorrect
C. The link between Router TestKing1 and Router TestKing2 is down
D. The link between Host TestKingI and Switch TestKingA is down
E. Interface Fa0/0 on Router TestKing1 is down
F. The link between Switch TestKingA and Router TestKing1 is down
G. None of the above

Answer: C
Explanation:
Destination Unreachable: If a router can't send an IP datagram any further, it uses ICMP to send a message back to the sender, advising it of the situation.

QUESTION NO: 4
Two TestKing switches are connected together as shown below:

The interface status of TestKing A is shown below:

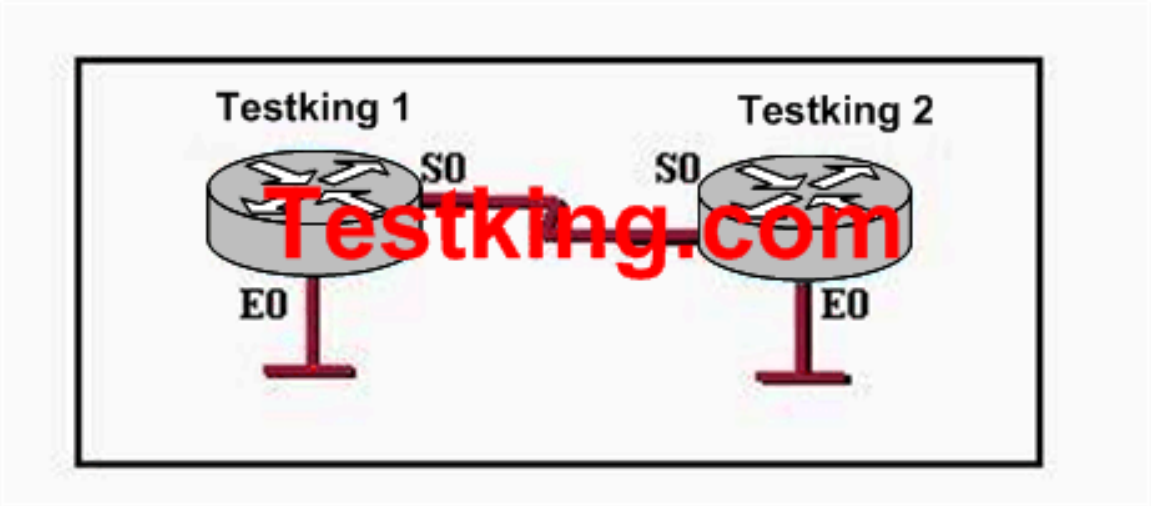
```
TestKingA# show interfaces FastEthernet0/1
  FastEthernet0/1 is up, line protocol down (notconnect)
    Hardware is FastEthernet, address is 0009.11f3.8848 (bia 0009.11f3.8848)
  <output omitted>
```

The TestKing network administrator has verified that a functioning cable connects Switch TestKing1 and Switch TestKing2 shown above. From the output that is shown above, what two pieces of information below are true? (Choose two)

A. Using a source MAC address of 0009.11f3.8848, Switch TestKing2 is sending frames to Switch TestKing1
B. The status of fa0/2 should be checked on Switch TestKing2
C. The interface is functional at OSI layer 1
D. There is likely to be an IP address issue on Switch TestKing1 Fa0/1
E. Interface fa0/1 on Switch TestKing1 is in a shutdown state
F. Switch TestKingB is not powered on

Answer: B, C

QUESTION NO: 5
Two TestKing routers are connected as shown below:



After configuring the routers shown in the graphic, the technician decides to test and document the network. Pings from the technician's laptop to all of the interfaces on each router were successful. If a technician initiates a Telnet session to Testking 1 and issues the "show arp" command, which of the following items will be among the entries displayed in the output?

A. The MAC address of the S0 interface on Testking 1
B. The MAC address of the E0 interface on Testking 1
C. The MAC address of the S0 interface on Testking 2
D. The MAC address of the E0 interface on Testking 2
E. None of the above

Answer: B
Explanation:
To display the Address Resolution Protocol (ARP) cache, enter the show arp command in EXEC mode. ARP establishes correspondences between network addresses (an IP address, for example) and Ethernet hardware addresses. A record of each correspondence is kept in a cache for a predetermined amount of time and then discarded. Serial interfaces will not appear, only the local Ethernet interfaces on the router.

QUESTION NO: 6
You are the administrator of the TestKing LAN and you have been reviewing error logs of networking devices and notice a large number of errors associated with several MAC addresses. You suspect that some of the errors are being generated by the routers. Which router commands will allow you to find the ip address associated with each MAC address? (Choose two)

A. show arp
B. show version
C. show address
D. show hosts
E. show interface
F. show protocols

Answer: A, E
Explanation:
The "show arp" command Displays the entries in the ARP table, including their layer 2 MAC address and layer 3 IP address.
Example:
The following is the output for the show arp command on Router 1:

TK1 # show arp

Protocol Address Age (min) Hardware Addr Type Interface
Internet 10.0.0.3 0 0004.dd0c.ffcb ARPA Ethernet01
Internet 10.0.0.1 - 0004.dd0c.ff86 ARPA Ethernet0

To see the MAC (hardware) address of the router interfaces as well as their IP addresses, use the "show interfaces" command as shown in the example below:

TK1# show interfaces

Ethernet 0 is up, line protocol is up
Hardware is MCI Ethernet, address is 0000.0c00.750c (bia 0000.0c00.750c)
Internet address is 10.108.28.8, subnet mask is 255.255.255.0
MTU 1500 bytes, BW 10000 Kbit, DLY 100000 usec, rely 255/255, load 1/255

QUESTION NO: 7

The TestKing network administrator issues the ping 192.168.2.5 command and successfully tests connectivity to a host that has been newly connected to the network. Which protocols were used during the test? (Choose two)

A. ARP
B. CDP
C. DHCP
D. DNS
E. ICMP

Answer: A, E
Explanation:
ARP finds the hardware address of a host from a known IP address. Here's how it works: when IP has a datagram to send, it must inform a Network Access protocol, such as Ethernet or Token Ring, of the destination's hardware address on the local network. (It has already been informed by upper-layer protocols of the destination's IP address.) If IP doesn't find the destination host's hardware address in the ARP cache, it uses ARP to find this information.

ICMP works at the Network layer and is used by IP for many different services. ICMP is a management protocol and messaging service provider for IP. Its messages are carried as IP datagrams. RFC 1256 is an annex to ICMP, which affords hosts' extended capability in discovering routes to gateways. Periodically, router advertisements are announced over the network, reporting IP addresses for the router's network interfaces. Hosts listen for these network infomercials to acquire route information. A router solicitation is a request for immediate advertisements and may be sent by a host when it starts up.

QUESTION NO: 8
Refer to the TestKing network segment shown below:

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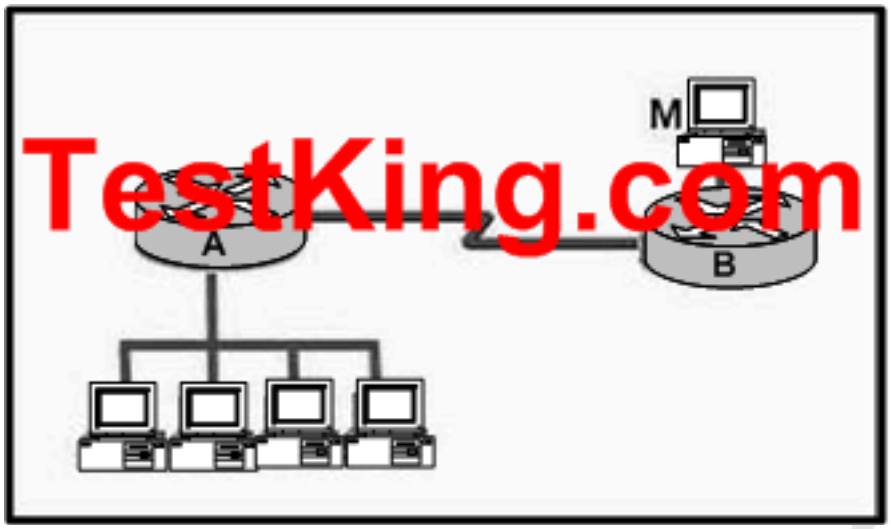

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In this network, The TestKing manager on workstation M uses Telnet to log in to the command line interface of router A. The administrator wishes to discover information about active workstations on the LAN attached to router A, including their IP and MAC addresses. Which command will provide this information?

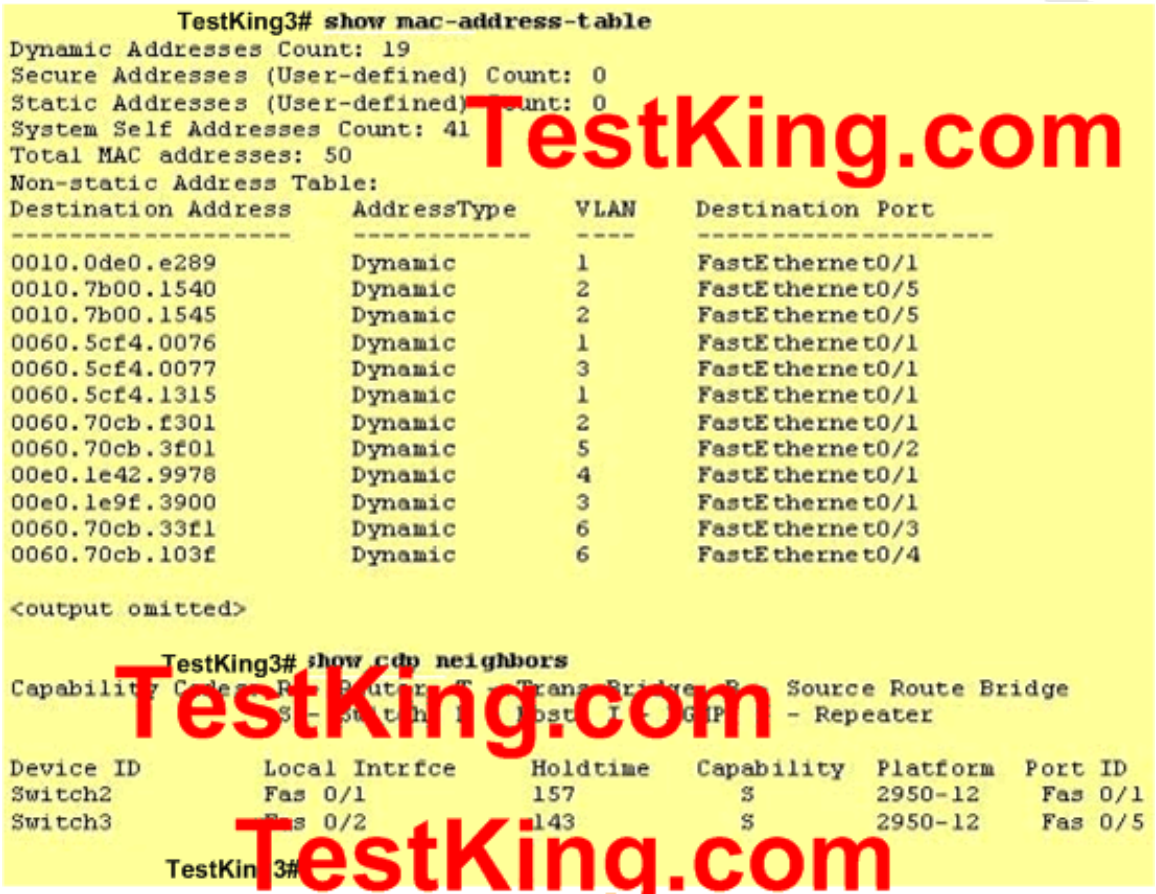
A. show running-config
B. show hosts
C. show ip arp
D. show cdp neighbors
E. show interfaces
F. None of the above

Answer: C
Explanation:
ARP establishes correspondences between network addresses (an IP address, for example) and LAN hardware addresses (Ethernet addresses). A record of each correspondence is kept in a cache for a predetermined amount of time and then discarded. The following is sample output from the show ip arp command:
TK1# show ip arp

Protocol Address Age(min) Hardware Addr Type Interface
Internet 172.16.233.22 9 0000.0c59.f892 ARPA Ethernet0/0
Internet 172.16.233.21 8 0000.0c07.ac00 ARPA Ethernet0/0
Internet 172.16.233.19 - 0000.0c63.1300 ARPA Ethernet0/0
Internet 172.16.233.30 9 0000.0c36.6965 ARPA Ethernet0/0

Reference:
http://www.cisco.com/en/US/products/sw/iosswrel/ps5187/products_command_reference_chapter09186a0

QUESTION NO: 9
Exhibit:



You work as a network engineer at TestKing.com. You study the exhibit carefully.

You are told by your boss, Mrs. Tess King, to study the interfaces of switch TestKing3 in particular. What can you tell her? (Select two)

A. A hub is connected directly to FastEthernet0/5.
B. FastEthernet0/1 is connected to a host with multiple network interface cards.
C. Interface FastEthernet0/2 has been disabled.
D. Multiple devices are connected directly to FastEthernet0/1.
E. FastEthernet0/1 is configured as a trunk link.
F. FastEthernet0/5 has statically assigned MAC addresses.

Answer: E, F
Explanation:
Based on the output shown, there are multiple MAC addresses from different VLANs attached to the FastEthernet 0/1 interface. Only trunks are able to pass information from devices in multiple VLANs.

QUESTION NO: 10 DRAG DROP
You work as a network administrator at a TestKing office.
Your boss, Mrs. Tess King, is interested in the CLI commands. Match the commands with the appropriate functions. Not all options are used.

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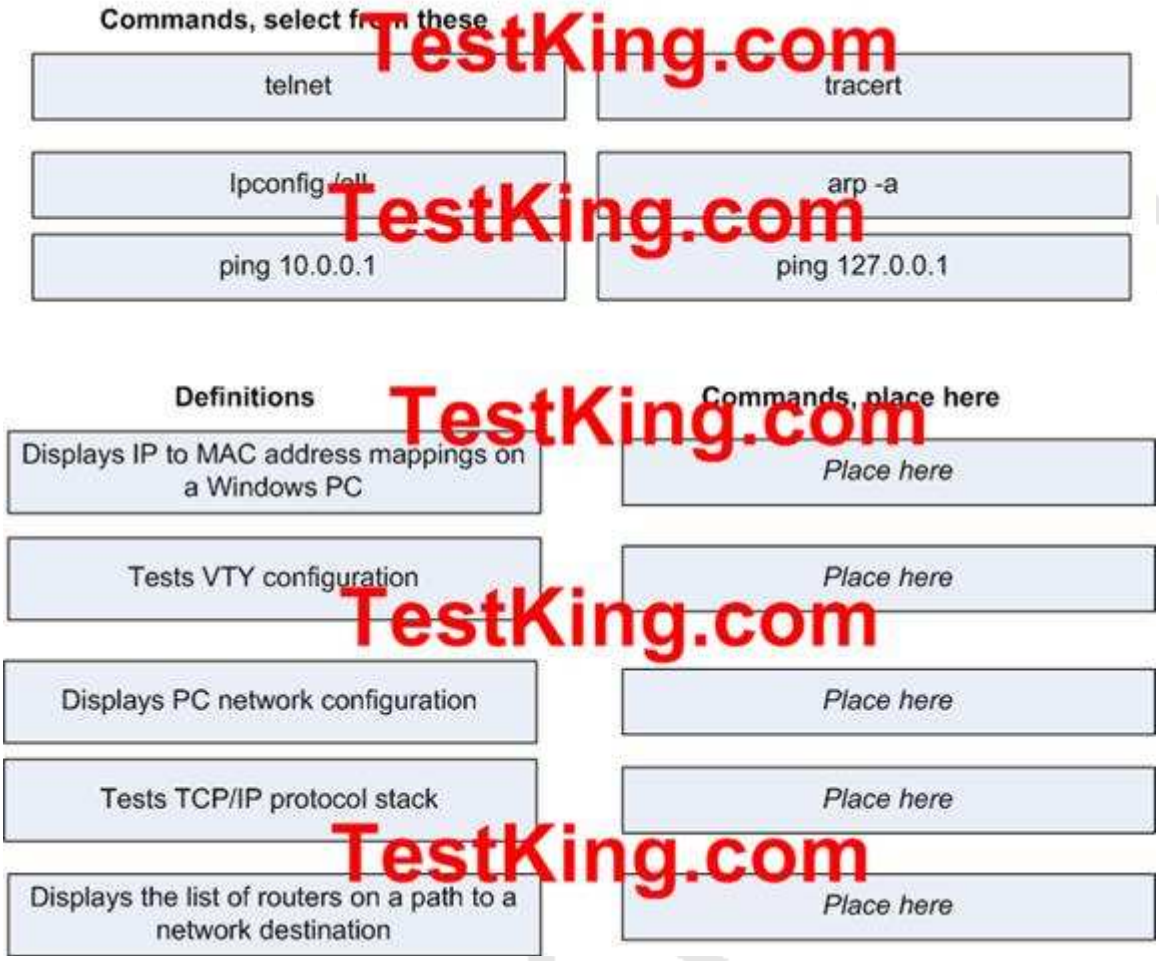

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Answer:
Explanation:

Commands, select from these

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ping 10.0.0.1

Definitions	Commands, place here
Displays IP to MAC address mappings on a Windows PC	arp -a
Tests VTY configuration	telnet
Displays PC network configuration	Ipconfig /all
Tests TCP/IP protocol stack	ping 127.0.0.1
Displays the list of routers on a path to a network destination	tracert

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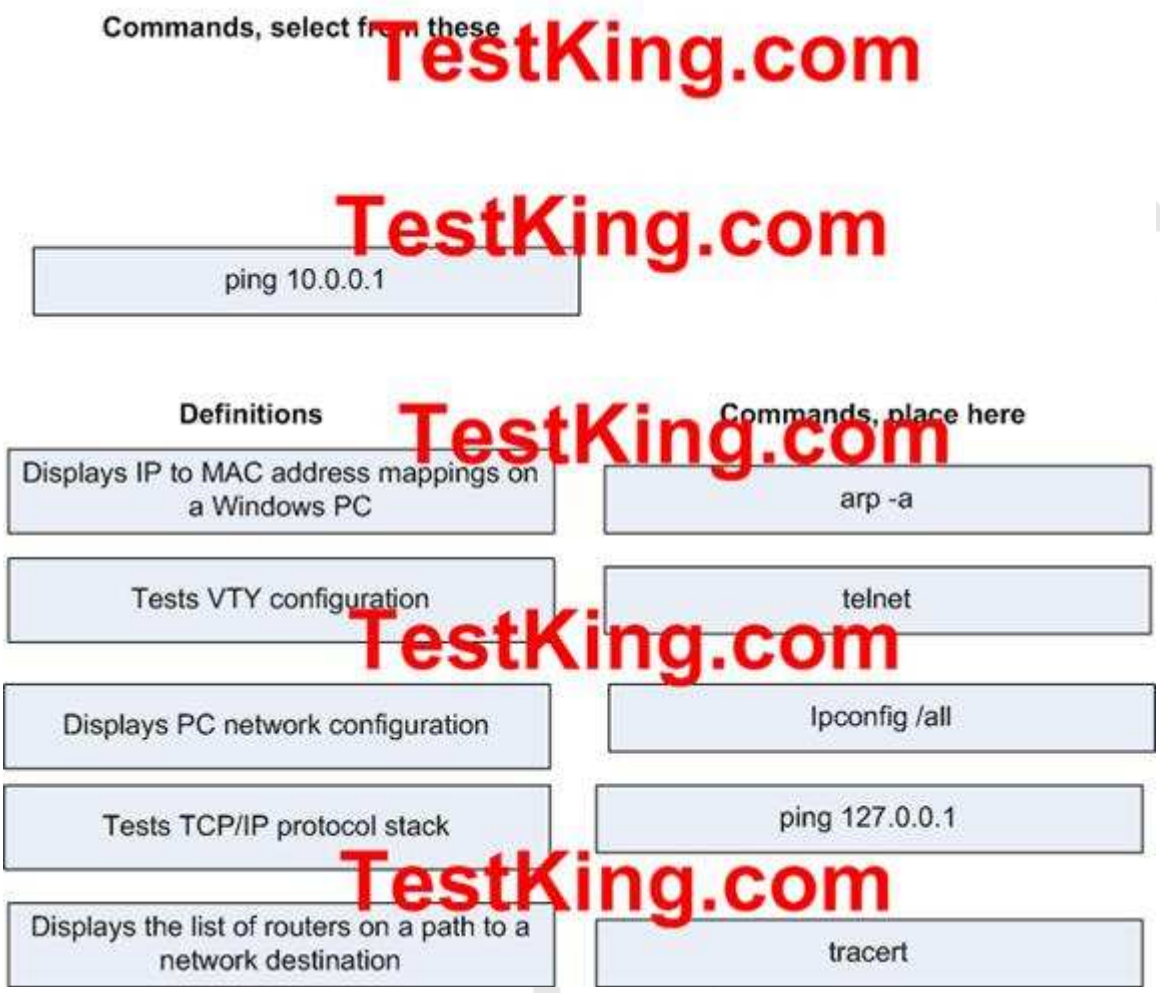

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Section 7: Identify, prescribe, and resolve common switched network media issues, configuration issues, auto negotiation, and switch hardware failures (6 questions)

QUESTION NO: 1
While troubleshooting an issue in the TestKing LAN you notice that a network interface port has collision detection and carrier sensing enabled on a shared twisted pair network. From this statement, what is known about the network interface port?

A. This is an Ethernet port operating at half duplex
B. This is an Ethernet port operating at full duplex
C. This is a port on a network interface card in a PC
D. This is 10 MB/s switch port
E. This is a 100 MB/s switch port
F. None of the above

Answer: A
Explanation:
Half-duplex Ethernet is defined in the original 802.3 Ethernet; Cisco says it uses only one wire pair with a digital signal running in both directions on the wire.

It also uses the CSMA/CD protocol to help prevent collisions and to permit retransmitting if a collision does occur. If a hub is attached to a switch, it must operate in half-duplex mode because the end stations must be able to detect collisions. Half-duplex Ethernet-typically 10BaseT-is only about 30 to 40 percent efficient as Cisco sees it because a large 10BaseT network will usually only give you 3 to 4Mbps, at most

QUESTION NO: 2
When a switch port is used as a VLAN trunk, which of the following trunk modes are valid? (Select all that apply.)

A. Blocking
B. Auto
C. Desirable
D. On
E. Transparent

F. Learning

Answer: B, C, D

Explanation:

A trunk port can be configured as one of the following 5 different modes: on, off, desirable, auto, or nonegotiate.

The table below is a summary of the configuration modes.

Mode	Function	DTP Frames Transmitted	Final State (Local Port)
`Auto`(default)	Makes the port willing to convert the link to a trunk. The port becomes a trunk port if the neighboring port is set to `on` or `desirable` mode.	Yes, periodic.	Trunking
`On`	Puts the port into permanent trunking mode and negotiates to convert the link into a trunk. The port becomes a trunk port even if the neighboring port does not agree to the change.	Yes, periodic.	Trunking, **unconditionally**.
`Nonegotiate`	Puts the port into permanent trunking mode but prevents the port from generating DTP frames. You must configure the neighboring port manually as a trunk port to establish a trunk link. This is useful for devices that do not support DTP.	No	Trunking, **unconditionally**.
`Desirable`	Makes the port actively attempt to convert the link to a trunk link. The port becomes a trunk port if the neighboring port is set to `on`, `desirable`, or `auto` mode.	Yes, periodic.	It will end up in trunking state only if the remote mode is `on`, `auto`, or `desirable`.
`Off`	Puts the port into permanent non-trunking mode and negotiates to convert the link into a non-trunk link. The port becomes a non-trunk port even if the neighboring port does not agree to the change.	No in steady state, but will transmit informs to speed up remote end detection after the change from `on`.	Non-trunking

QUESTION NO: 3
Which of following VLAN frame encapsulation types are configurable on a Cisco switch? (Select two answer choices.)

A. VTP
B. 802.1Q
C. LLC
D. ISL
E. CDP
F. PAP

Answer: B, D
Explanation:
ISL and 802.1Q are the two trunking encapsulations that can be configured on a Cisco switch. ISL is Cisco proprietary and 802.1Q is the IEEE standard method.
Incorrect Answers:
A. VTP is the VLAN Trunking Protocol, which is used to carry VLAN information across the trunks. The question is asking for the encapsulation options for the trunk, which will be used by VTP.
C. LLC is the Logical Link Control, which is a sub-layer of the data link layer.
E. CDP is the Cisco Discovery Protocol, which is used by Cisco devices to discover information on neighboring Cisco devices.
F. PAP is the Password Authentication Protocol, which is used as an authentication mechanism on PPP links.

QUESTION NO: 4
TestKing users have noticed extremely slow network performance, intermittent connectivity, and connection losses. After entering the "show interfaces" command, you notice that the Ethernet interface is configured as 100 Mbps full-duplex and that there is evidence of late collisions. What could be the cause of this problem?

A. Duplex mismatch
B. A routing loop
C. Trunking mode mismatch
D. Improperly configured root bridge

E. Improperly configured static VLAN
F. None of the above

Answer: A
Explanation:
A duplex mismatch may result in performance issues, intermittent connectivity, and loss of communication. When troubleshooting NIC issues, verify that the NIC and switch are using a valid configuration. Some third-party NIC cards may fall back to half-duplex operation mode, even though both the switchport and NIC configuration have been manually configured for 100 Mbps, full-duplex. This behavior is due to the fact that NIC autonegotiation link detection is still operating when the NIC has been manually configured. This causes duplex inconsistency between the switchport and the NIC. Symptoms include poor port performance and frame check sequence (FCS) errors that increment on the switchport. To troubleshoot this issue, try manually configuring the switchport to 100 Mbps, half-duplex. If this action resolves the connectivity problems,you may be running into this NIC issue. Try updating to the latest drivers for your NIC, or contact your NIC card vendor for additional support.
Reference:
http://www.cisco.com/en/US/products/hw/switches/ps700/products_tech_note09186a00800a7af0.shtml

QUESTION NO: 5
You are experiencing intermittent issues relating to congestion within the TestKing network. What are the possible causes of congestion on this LAN? (Choose all that apply)

A. A broadcast domain with too many hosts.
B. Full duplex operation.
C. Broadcast storms.
D. Multicasting.
E. Network Segmentation.
F. Low bandwidth.

Answer: A, C, F
Explanation:

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A LAN segment with too many hosts can mean that there are a large number of stations contending for bandwidth. It can also mean an increase in the number of collisions on the segment, which can cause further congestion issues. Broadcast storms are the result of a large number of broadcasts sent over the LAN. Because each station listens to these broadcast messages, congestion can occur quickly. Finally, low bandwidth can simply mean that the LAN can not process all of the LAN traffic that is being sent. This can mean that TCP sessions are retransmitted, which can lead to additional congestion.

Incorrect Answers:

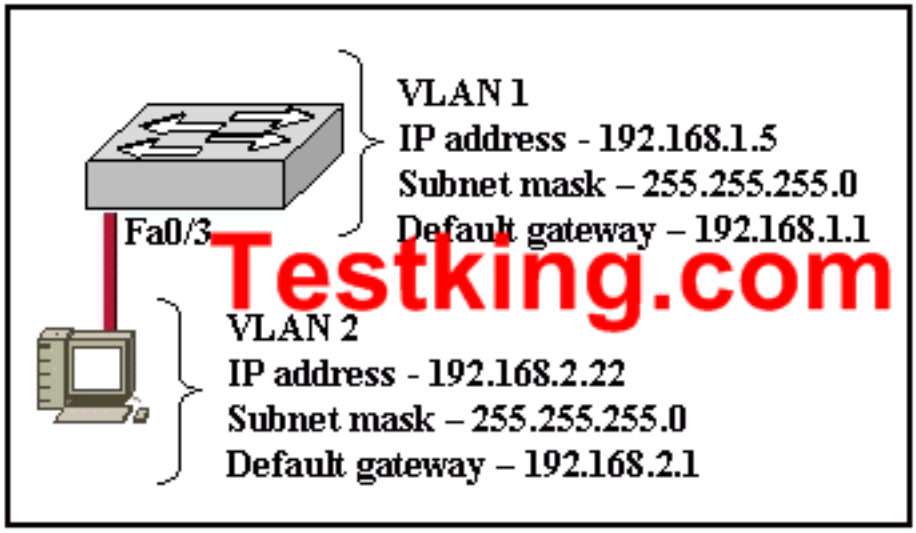
B. This can alleviate congestion, as data can be sent and received at the same time. In addition, collisions are not possible in a full duplex LAN.

D. Multicasting can actually alleviate congestion issues, as single streams of information can reach multiple hosts at the same time, instead of using a series of point to point connections.

E. Segmentation breaks up a large LAN into multiple, smaller LANS. This will mean fewer hosts per broadcast domain.

QUESTION NO: 6

Exhibit:



Refer to the graphic. A TestKing host is connected to switch port Fa0/3 with a crossover cable. The host and switch have been fully configured for IP connectivity as shown. However, the port indicator on switch port Fa0/3 is not on, and the host can not communicate with any other hosts including those connected to VLAN 2 on the same switch. Based on the information given, what is the problem?

A. Switch port Fa0/3 is not configured as a trunk port.
B. The cable is the wrong type.
C. The switch has been assigned an incorrect subnet mask.
D. Switch port Fa0/3 has been blocked by STP.
E. The switch and the hosts must be in the same subnet.

Answer: B
Explanation:
To connect two different devices, we use straight-through cables. In the scenario, a host is connected to a switch with a cross-over cable, so there will be no communication between them. Choice B is correct. Cross over cables should be used between two devices in the same layer of the OSI model, such as when connected together two routers, two switches, etc.

Section 8: Describe enhanced switching technologies (including: VTP, RSTP, VLAN, PVSTP, 802.1q) (35 questions)

QUESTION NO: 1
Switches TK1 and TK2 are connected as shown below:

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Study the Exhibit carefully. Which ports could safely be configured with Port Fast? (Choose two)

A. SwitchTK1 - port Fa1/2
B. SwitchTK2 - port Fa1/2

C. SwitchTK1 - port Fa1/3
D. SwitchTK2 - port Fa1/3
E. SwitchTK1 - port Fa1/1
F. None of the ports should use port fast

Answer: C, D
Explanation:
Using Port Fast:
1. Immediately brings an interface configured as an access or trunk port to the forwarding state from a blocking state, bypassing the listening and learning states
2. Normally used for single server/workstation can be enabled on a trunk
So, Port fast can only be enabled to a switch port attaching to workstation or a server
.Reference: http://www.911networks.com/node/273

QUESTION NO: 2
You need to configure two TestKing switches to exchange VLAN information. Which protocol provides a method of sharing VLAN configuration information between these two switches?

A. STP
B. 802.1Q
C. VLSM
D. ISL
E. VTP
F. HSRP
G. None of the above

Answer: E
Explanation:

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VLAN Trunking Protocol (VTP) is a Cisco proprietary Layer 2 messaging protocol that manages the addition, deletion, and renaming of VLANs on a network-wide basis. Virtual Local Area Network (VLAN) Trunk Protocol (VTP) reduces administration in a switched network. When you configure a new VLAN on one VTP server, the VLAN is distributed through all switches in the domain. This reduces the need to configure the same VLAN everywhere. To do this VTP carries VLAN information to all the switches in a VTP domain. VTP advertisements can be sent over ISL, 802.1q, IEEE 802.10 and LANE trunks. VTP traffic is sent over the management VLAN (VLAN1), so all VLAN trunks must be configured to pass VLAN1. VTP is available on most of the Cisco Catalyst Family products.

QUESTION NO: 3
TestKing has implemented the use of the Virtual Trunking Protocol (VTP). Which statement below accurately describes a benefit of doing this?

A. VTP will allow physically redundant links while preventing switching loops
B. VTP will allow switches to share VLAN configuration information
C. VTP will allow a single port to carry information to more than one VLAN
D. VTP will allow for routing between VLANs
E. None of the above

Answer: B
Explanation:
Trunking Protocol (VTP) are to manage all configured VLANs across a switched internetwork and to maintain consistency throughout that network VTP allows you to add, delete, and rename VLANs-information that is then propagated to all other switches in the VTP domain.

Here's a list of some features of VTP:

* Consistent VLAN configuration across all switches in the network
* VLAN trunking over mixed networks, such as Ethernet to ATM LANE or even FDDI
* Accurate tracking and monitoring of VLANs
* Dynamic reporting of added VLANs to all switches in the VTP domain
* Plug and Play VLAN adding

QUESTION NO: 4

Two TestKing switches are connected together as shown in the diagram below:

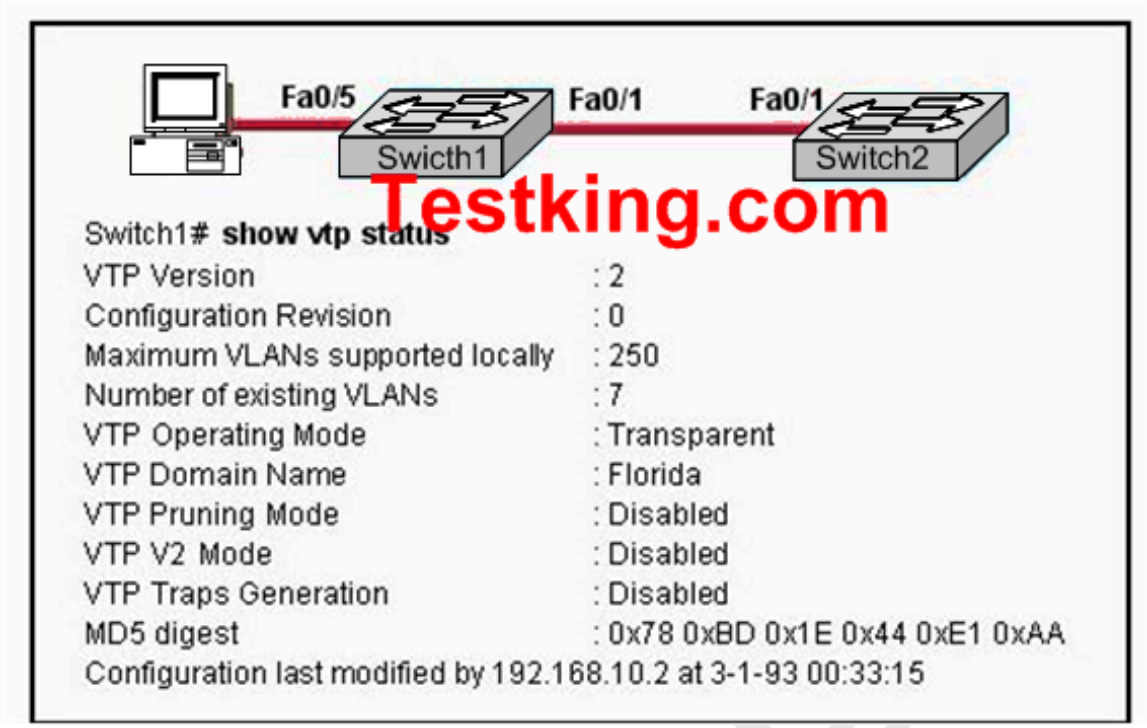

Exhibit:

Based on the information shown above, what will be the result of issuing the following commands:

Switch1(config)# interface fastethernet 0/5
Switch1(config-if)# switchport mode access
Switch1(config-if)# switchport access vlan 30

A. The VLAN will be added to the database, but the VLAN information will not be passed on to the Switch2 VLAN database.
B. The VLAN will be added to the database and VLAN 30 will be passed on as a VLAN to add to the Switch2 VLAN database.

C. The VLAN will not be added to the database, but the VLAN 30 information will be passed on as a VLAN to the Switch2 VLAN database.
D. The VLAN will not be added to the database, nor will the VLAN 30 information be passed on as a VLAN to the Switch2 VLAN database.
E. None of the above

Answer: A
Explanation:
The three VTP modes are described below:
Server: This is the default for all Catalyst switches. You need at least one server in your VTP domain to propagate VLAN information throughout the domain. The switch must be in server mode to be able to create, add, or delete VLANs in a VTP domain. You must also change VTP information in server mode, and any change you make to a switch in server mode will be advertised to the entire VTP domain.
Client: In client mode, switches receive information from VTP servers; they also send and receive updates, but they can't make any changes. Plus, none of the ports on a client switch can be added to a new VLAN before the VTP server notifies the client switch of the new VLAN. Here's a hint: if you want a switch to become a server, first make it a client so that it receives all the correct VLAN information, then change it to a server-much easier!
Transparent: Switches in transparent mode don't participate in the VTP domain, but they'll still forward VTP advertisements through any configured trunk links. These switches can't add and delete VLANs because they keep their own database-one they do not share with other switches. Transparent mode is really only considered locally significant.
In our example, the switch is configured for transparent mode. In transparent mode the local VLAN information can be created but that VLAN information will not be advertised to the other switch.

QUESTION NO: 5
A TestKing switch is configured with all ports assigned to VLAN 2. In addition, all ports are configured as full-duplex FastEthernet. What is the effect of adding switch ports to a new VLAN on this switch?

A. The additions will create more collisions domains.
B. IP address utilization will be more efficient.
C. More bandwidth will be required than was needed previously.
D. An additional broadcast domain will be created.
E. The possibility that switching loops will occur will increase dramatically.

Answer: D
Explanation:
A VLAN is a group of hosts with a common set of requirements that communicate as if they were attached to the same wire, regardless of their physical location. A VLAN has the same attributes as a physical LAN, but it allows for end stations to be grouped together even if they are not located on the same LAN segment.
Networks that use the campus-wide or end-to-end VLANs logically segment a switched network based on the functions of an organization, project teams, or applications rather than on a physical or geographical basis. For example, all workstations and servers used by a particular workgroup can be connected to the same VLAN, regardless of their physical network connections or interaction with other workgroups. Network reconfiguration can be done through software instead of physically relocating devices.
Cisco recommends the use of local or geographic VLANs that segment the network based on IP subnets. Each wiring closet switch is on its own VLAN or subnet and traffic between each switch is routed by the router. The reasons for the Distribution Layer 3 switch and examples of a larger network using both the campus-wide and local VLAN models will be discussed later.
A VLAN can be thought of as a broadcast domain that exists within a defined set of switches. Ports on a switch can be grouped into VLANs in order to limit unicast, multicast, and broadcast traffic flooding. Flooded traffic originating from a particular VLAN is only flooded out ports belonging to that VLAN, including trunk ports, so a switch that connects to another switch will normally introduce an additional broadcast domain.

QUESTION NO: 6
A new switch is installed in the Testking network. This switch is to be configured so that VLAN information will be automatically distributed to all the other Cisco Catalyst switches in the network.

Which of the conditions below have to be met in order for this to occur? (Choose all that apply).

A. The switch that will share the VLAN information must be in the VTP Server mode.
B. The switches must be in the same VTP domain.
C. The switch that will share the VLAN information must be configured as the root bridge.
D. The switches must be configured to use the same VTP version.
E. The switches must be configured to use the same STP version.

F. The switches must be configured to use the same type of ID tagging.
G. The switches must be connected over VLAN trunks.

Answer: A, B, F, G
Explanation:
For the VLAN information to pass automatically throughout the network, VTP must be set up correctly. In order for VTP to work, a VTP server is needed, the VLAN's must be in the same VTP domain, and the encapsulation on each end of the trunk must both set to either 802.1Q or ISL.
Incorrect Answers:
C. Root bridges and other functions of the Spanning Tree Protocol (STP) have no impact of the VTP configuration.
D, E. There is only one version of VTP and STP.

QUESTION NO: 7
A network administrator needs to force a high-performance switch that is located in the MDF to become the root bridge for a redundant path switched network. What can be done to ensure that this switch assumes the role of the Root Bridge?

A. Configure the switch so that it has a lower priority than other switches in the network.
B. Assign the switch a higher MAC address than the other switches in the network have.
C. Configure the switch for full-duplex operation and configure the other switches for half-duplex operation.
D. Connect the switch directly to the MDF router, which will force the switch to assume the role of root bridge.
E. Establish a direct link from the switch to all other switches in the network.
F. None of the above

Answer: A
Explanation:

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For all switches in a network to agree on a loop-free topology, a common frame of reference must exist. This reference point is called the Root Bridge. The Root Bridge is chosen by an election process among all connected switches. Each switch has a unique Bridge ID (also known as the bridge priority) that it uses to identify itself to other switches. The Bridge ID is an 8-byte value. 2 bytes of the Bridge ID is used for a Bridge Priority field, which is the priority or weight of a switch in relation to all other switches. The other 6 bytes of the Bridge ID is used for the MAC Address field, which can come from the Supervisor module, the backplane, or a pool of 1024 addresses that are assigned to every Supervisor or backplane depending on the switch model. This address is hard coded, unique, and cannot be changed.
The election process begins with every switch sending out BPDUs with a Root Bridge ID equal to its own Bridge ID as well as a Sender Bridge ID. The latter is used to identify the source of the BPDU message. Received BPDU messages are analyzed for a lower Root Bridge ID value. If the BPDU message has a Root Bridge ID (priority) of the lower value than the switch's own Root Bridge ID, it replaces its own Root Bridge ID with the Root Bridge ID announced in the BPDU. If two Bridge Priority values are equal, then the lower MAC address takes preference.

QUESTION NO: 8
Which of the protocols below, operates at Layer 2 of the OSI model, and is used to maintain a loop-free network?

A. RIP
B. STP
C. IGRP
D. CDP
E. VTP
F. None of the above

Answer: B
Explanation:
STP (spanning tree protocol) operates on layer 2 to prevent loops in switches and bridges.
Incorrect Answers:
A, C. RIP and IGRP are routing protocols, which are used at layer 3 to maintain a loop free routed environment.
D. CDP does indeed operate at layer 2, but it doest not provide for a loop free topology. CDP is used by Cisco devices to discover information about their neighbors.

E. VTP is the VLAN Trunking Protocol, used to pass VLAN information through switches. It relies on the STP mechanism to provide a loop free network.

QUESTION NO: 9
By default, which of the following factors determines the spanning-tree path cost?

A. It is the individual link cost based on latency
B. It is the sum of the costs based on bandwidth
C. It is the total hop count
D. It is dynamically determined based on load
E. None of the above

Answer: B
Explanation:
"The STP cost is an accumulated total path cost based on the available bandwidth of each of the links."
Reference: Sybex CCNA Study Guide 4th Edition (Page 323)
Note: A path cost value is given to each port. The cost is typically based on a guideline established as part of 802.1d. According to the original specification, cost is 1,000 Mbps (1 gigabit per second) divided by the bandwidth of the segment connected to the port. Therefore, a 10 Mbps connection would have a cost of (1,000/10) 100.
To compensate for the speed of networks increasing beyond the gigabit range, the standard cost has been slightly modified. The new cost values are:

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Bandwidth	STP Cost Value
4 Mbps	250
10 Mbps	100
16 Mbps	62
45 Mbps	39
100 Mbps	19
155 Mbps	14
622 Mbps	6
1 Gbps	4
10 Gbps	2

You should also note that the path cost can be an arbitrary value assigned by the network administrator, instead of one of the standard cost values.

Incorrect Answers:

A, D: The STP process does not take into account the latency or load of a link. STP does not recalculate the link costs dynamically.

C. Hop counts are used by RIP routers to calculate the cost of a route to a destination. The STP process resides at layer 2 of the OSI model, where hop counts are not considered.

QUESTION NO: 10

What is the purpose of the spanning-tree algorithm in a switched LAN?

A. To provide a monitoring mechanism for networks in switched environments.
B. To manage VLANs across multiple switches.
C. To prevent switching loops in networks with redundant switched paths.
D. To segment a network into multiple collision domains.
E. To prevent routing loops in networks.

Answer: C

Explanation:
STP is used in LANs with redundant paths or routes to prevent loops in a layer 2 switched or bridged LAN.
Incorrect Answers:
A, B: The primary purpose of STP is to prevent loops, not for monitoring or management of switches or VLANs.
D. VLANs are used to segment a LAN into multiple collision domains, but the STP process alone does not do this.
E. Routers are used to prevent routing loops at layer 3 of the OSI model. STP operates at layer 2.

QUESTION NO: 11
Which two of the following values does STP take into consideration when it elects the root bridge? (Select two answer choices)

A. The BPDU version number
B. The access layer bridge setting
C. The Bridge ID
D. The spanning-tree update number
E. The bridge priority
F. The VLAN number

Answer: C, E
Explanation:
The bridges elect a root bridge based on the bridge IDs in the BPDUs. The root bridge is the bridge with the lowest numeric value for the bridge ID. Because the two part bridge ID starts with the priority value, essentially the bridge with the lowest priority becomes the root. For instance, if one bridge has priority 100, and another bridge has priority 200, the bridge with priority 100 wins, regardless of what MAC address was used to create the bridge ID or each bridge/switch.
Reference: CCNA Self-Study CCNA ICND Exam Certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 39

QUESTION NO: 12
Which of the following are spanning tree port states? (Select three answer choices)

A. Learning
B. Spanning
C. Listening
D. Forwarding
E. Initializing
F. Filtering
G. Permitting

Answer: A, C, D
Explanation:
There are 4 STP states that a bridge port can be in: Blocking, Listening, Learning, and Forwarding:

Spanning-Tree Intermediate States

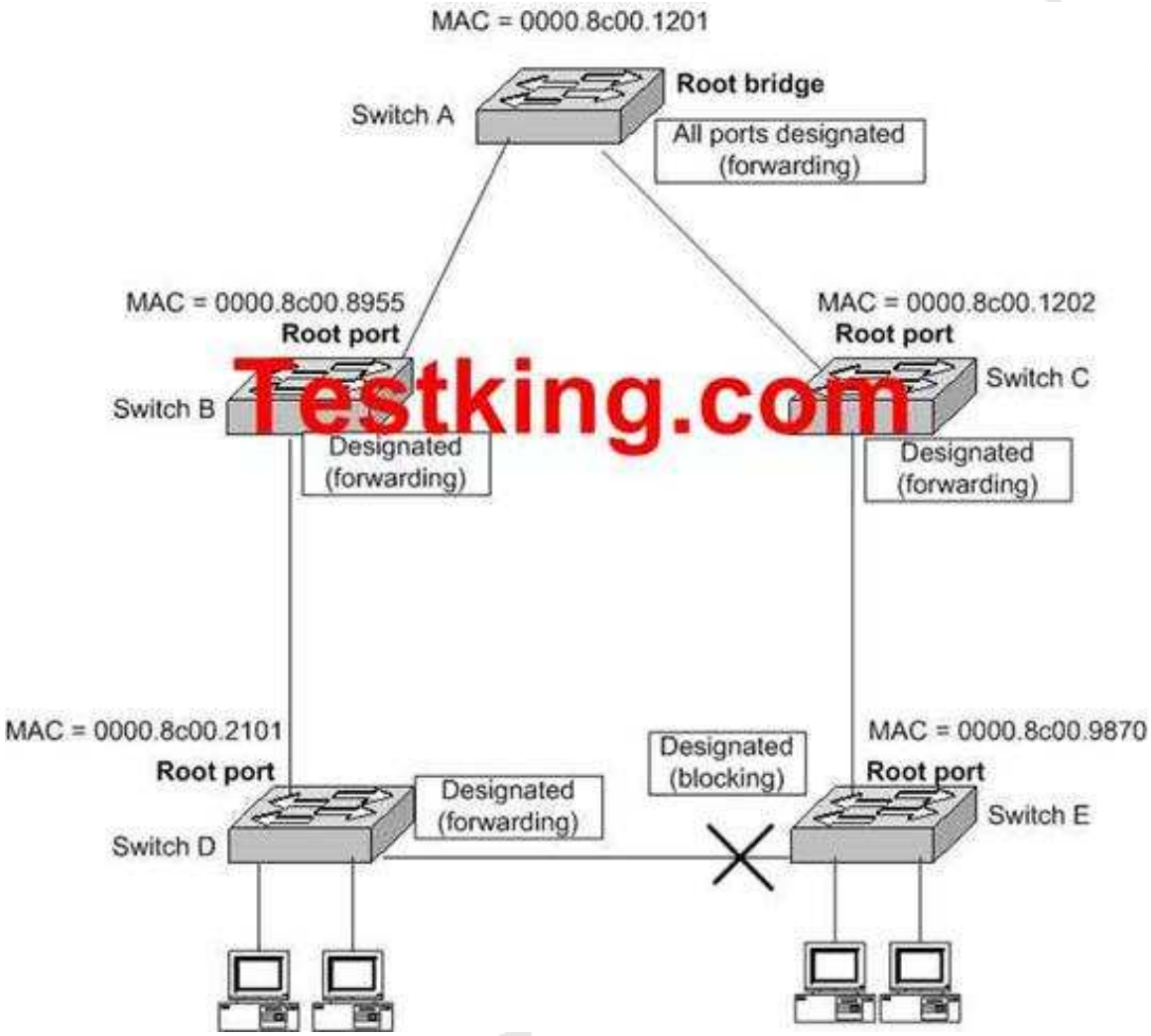
State	Forwards Data Frames?	Learns MACs Based on Received Frames?	Transitory or Stable State?
Blocking	No	No	Stable
Listening	No	No	Transitory
Learning	No	Yes	Transitory
Forwarding	Yes	Yes	Stable

QUESTION NO: 13
What are the switch and bridge port characteristics of a layer two spanning-tree network that is fully converged?

A. All switch and bridge ports are in the forwarding state.
B. All switch and bridge ports are in the stand-by state.
C. All switch and bridge ports are assigned as either root or designated ports.
D. All switch and bridge ports are in either the forwarding or blocking state.
E. All switch and bridge are either blocking or looping.

Answer: D
Explanation:

When a switch first comes up, it will be in the listening and learning states. This is needed so that the switch learns the MAC addresses of the devices on the LAN, and to learn where any loops in the network may exist. After this initial period of listening and learning, the ports will be forwarding to the hosts, or blocking certain ports that create a loop in the network. An example of this is shown below:



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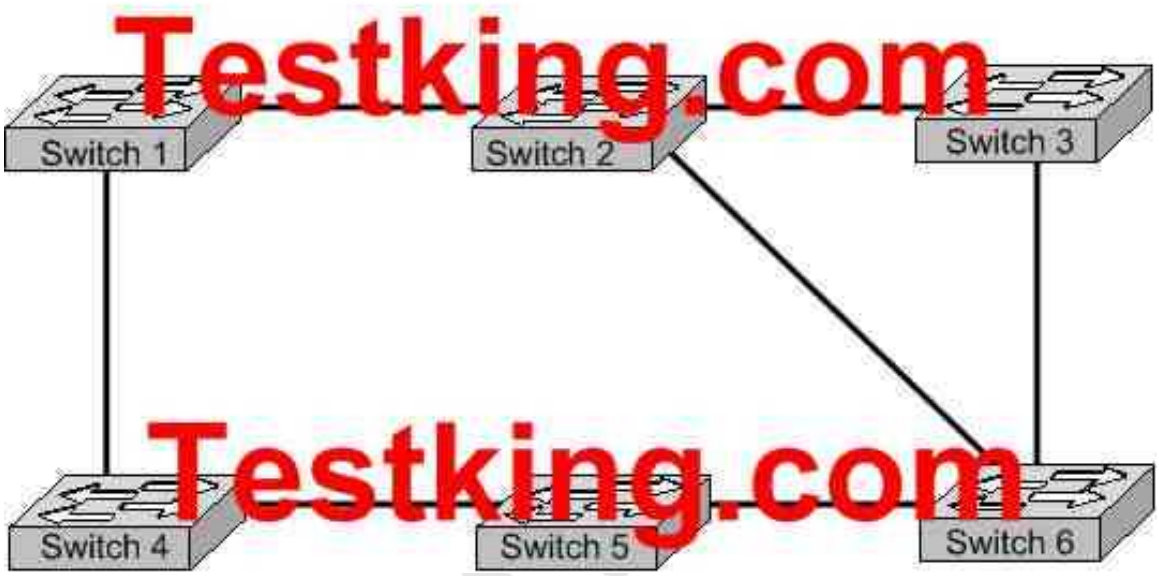
In the above figure, after the network has converged, spanning tree protocol puts each port either in designated (Forwarding) or Non-designated (Blocking) state. So, Choice D is correct.
If you get a converged spanning-tree network, you have only two port states.
Forwarding and Blocking. Forwarding: all traffic will be forwarded
Blocking: all traffic to devices that will create a loop in a spanning-tree network will be blocked. It is possible to get redundant paths in large switched and routed networks.

QUESTION NO: 14
The Testking LAN consists of 6 switches connected together as shown in the diagram below:



What is the name of the potential problem of this switch setup, and what protocol can prevents its occurrence. (Select only one answer choice)

A. Routing loops, hold down timers
B. Switching loops, split horizon
C. Routing loops, split horizon
D. Switching loops, VTP

E. Routing loops, STP
F. Switching loops, STP

Answer: F
Explanation:
The spanning-Tree Protocol (STP) prevents loops from being formed when switches or bridges are interconnected via multiple paths. Spanning-Tree Protocol implements the 802.1D IEEE algorithm by exchanging BPDU messages with other switches to detect loops, and then removes the loop by shutting down selected bridge interfaces. This algorithm guarantees that there is one and only one active path between two network devices.

QUESTION NO: 15
In a switched LAN network, what is the Spanning-Tree algorithm used for?

A. It is used to provide a mechanism for routing updates in switched environments.
B. It is used to prevent routing loops in networks with redundant routes.
C. It is used to prevent switching loops in networks with redundant switched routes.
D. It is used to manage, the addition, deletion, and naming of VLANs across multiple switches.
E. It is used to segment a network into multiple collision domains.
F. None of the above.
G. All of the above are functions of STP.

Answer: C
Explanation:
To avoid loops, all bridging devices, including switches, use STP. STP causes each interface on a bridging device to settle into a blocking state or a forwarding state. Blocking means that the interface cannot forward or receive data frames. Forwarding means that the interface can send and receive data frames. By having a correct subset of the interfaces blocked, a single currently active logical path will exist between each pair of LANs. STP resides at the data link layer, so it is used to prevent loops within a switched network. It is not used to prevent routing loops; that is the function of the mechanisms within a routing protocol.
Reference:
CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) page 248.

QUESTION NO: 16
In which Spanning-Tree states does a switch port learn MAC addresses? (Select two)

A. Blocking
B. Listening
C. Forwarding
D. Learning
E. Relaying

Answer: C, D
Explanation:
STP uses a couple of port states besides forwarding and blocking.

1. Listening - Listens to incoming Hello messages to ensure that there are no loops, but does not forward traffic. This is an interim state between blocking and forwarding.
2. Learning - Still listens to BPDUs, plus learns MAC addresses from incoming frames. It does not forward traffic. This is an interim state between blocking and forwarding.
3. Disabled - Administratively down.

Reference: Cisco CCNA intro 640-821

QUESTION NO: 17
Three TestKing switches are connected together as shown in the diagram below:

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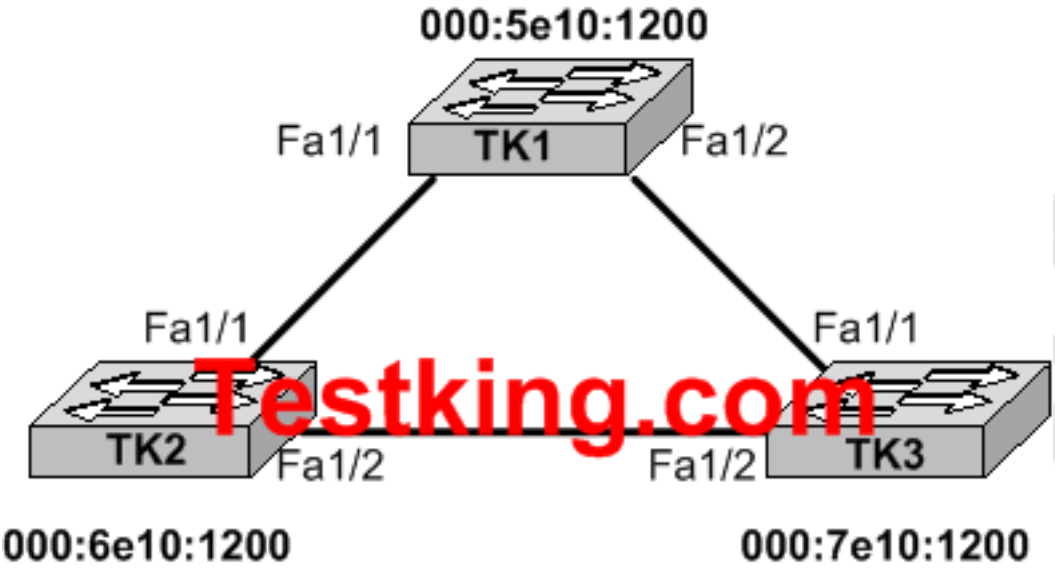

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Study the Exhibit carefully. All switches have the default STP configuration and all links are Fast Ethernet. Which port on which switch will Spanning Tree place in blocking mode?

A. Switch TK1 - Port Fa1/1
B. Switch TK1 - Port Fa1/2
C. Switch TK2 - Port Fa1/2
D. Switch TK2 - Port Fa1/1
E. Switch TK3 - Port Fa1/1
F. Switch TK3 - Port Fa1/2

Answer: F
Explanation:
Switch TK1 will become the ROOT BRIDGE because it has the lowest MAC address. Its both ports will become designated ports so choice A and B are wrong.

Next Election will be of ROOT PORTS. Port FA1/1 of both the switches TK2 and TK3 will become ROOT ports because they have minimum path cost to reach the root bridge. So, choices D and E are also wrong.

Next Election will be of Designated Ports on the segment connecting TK2 and TK3. TK2 has lower MAC address so, its port FA1/2 will become designated port and FA1/2 of TK3 will be placed in a BLOCKING state to avoid switching LOOPS.

QUESTION NO: 18
Four TestKing switches are connected together as shown below:

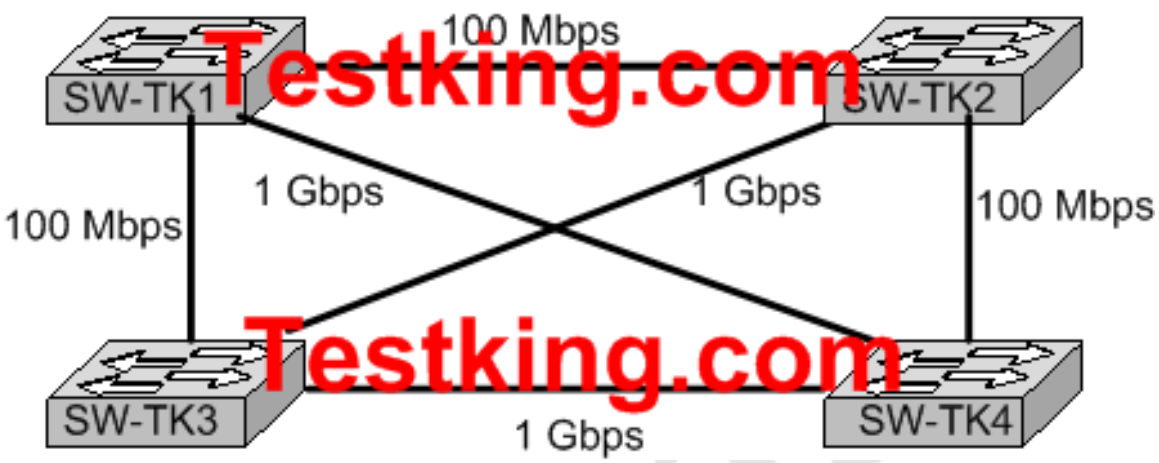
The network shown in the exhibit was designed to provide reliability through redundancy. Both of the IDF switches, TK3, and TK4, are connected to both of the MDF switches, TK1 and TK2. Which configuration scenario will provide a loop-free switching environment?

A. Spanning Tree Protocol should be running on all switches.
B. Spanning Tree Protocol should be running on only the MDF switches TK1 and TK2.
C. Spanning Tree Protocol should be running on only the IDF switches TK3 and TK4.
D. Spanning Tree Protocol should be run only on the root bridge.
E. Spanning Tree Protocol is not needed in this network.

Answer: A
Explanation:
Spanning-Tree Protocol (STP) prevents loops from being formed when switches or bridges are interconnected via multiple paths. Spanning-Tree Protocol implements the 802.1D IEEE algorithm by exchanging BPDU messages with other switches to detect loops, and then removes the loop by shutting down selected bridge interfaces. This algorithm guarantees that there is one and only one active path between two network devices.
Reference:

http://www.cisco.com/en/US/tech/tk389/tk621/tsd_technology_support_protocol_home.html

QUESTION NO: 19
Four TestKing switches are connected together as shown in the diagram below:



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Study the Exhibit carefully. What is the purpose of the Spanning Tree Protocol that is operating in the exhibited switch topology?

A. To elect a particular switch as backup designated switch.
B. To have one active Layer 2 path through the switches network.
C. To select the best path to a remote destination that is on a different network.
D. To learn the MAC addresses of host attached to the switches network.
E. To distribute VLAN configuration information throughout the switched network.

Answer: B
Explanation:
Switches are connected in a way to provide full-mesh topology. So, a redundant path is provided in the case of a link or switch failure. The STP is used to prevent frames from looping throughout the network.

QUESTION NO: 20
When is a switched network that is running the Spanning Tree Protocol considered to be fully converged?

A. when all switches have the same BID as the root switch
B. when all switches have received the MAC address of each neighboring switch
C. when every enabled switch port has been assigned a unique identifier
D. when every operating switch port is in either the blocking or forwarding state
E. when all switches are in either client, server, or transparent mode

Answer: D
Explanation:
States of the Spanning Tree Protocol:
Blocking A blocked port won't forward frames; it just listens to BPDUs. All ports are in blocking state by default when the switch is powered up. The purpose of the blocking state is to prevent the use of looped paths.
Listening The port listens to BPDUs to make sure no loops occur on the network before passing data frames. A port in listening state prepares to forward data frames without populating the MAC address table.
Learning The switch port listens to BPDUs and learns all the paths in the switched network. A port in learning state populates the MAC address table but doesn't forward data frames.
Forwarding The port sends and receives all data frames on the bridged port.
Disabled A port in the disabled state does not participate in the frame forwarding or STP. A port in the disabled state is virtually non-operational.

In Blocking States, all ports are in blocking state. The purpose of the blocking state is to prevent the use of looped paths. The forward state sends and receives the all data frames in a loop free network. So these two states are considered to be fully converged.

QUESTION NO: 21
Exhibit:
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```
TestKingSwitch #show spanning-tree
  VLAN0001
    Spanning tree enabled protocol ieee
    Root ID    Priority    32769
               Address     000b.5fe0.7a80
               Cost        19
               Port        17 (FastEthernet0/17)
               Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

    Bridge ID  Priority    32769  (priority 32768 sys-id-ext 1)
               Address     000b.fdeb.c600
               Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
               Aging Time 300

Interface        Role Sts Cost      Prio.Nbr Type
---------------- ---- --- --------- -------- --------------------------------
Fa0/1            Desg FWD 19        128.1    P2p
Fa0/11           Desg FWD 100       128.11   Shr
Fa0/13           Desg FWD 19        128.13   P2p
Fa0/17           Root FWD 19        128.17   P2p
Fa0/23           Altn BLK 19        128.23   P2p
```

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Based on the output from the show spanning-tree command shown, what can be determined about the switch configuration? (Choose two.)

A. This switch is the root bridge for VLA.N 1
B. The 802.1d protocol is enabled on the switch
C. This switch is connected to port 17 on the root bridge
D. The switches are using Rapid Spanning Tree Protocol
E. Port 17 is the root port and port 23 is the redundant link

Answer: B, E

The answer shows that the bridge output is the root bridge for VLAN 1. If that were the case, then there would be no blocked ports for this output. Also, the Root ID and Bridge ID would have the same Address.

QUESTION NO: 22
Exhibit:

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Based on the information shown above, what can be determined from the output shown?

A. The TestKing1 switch is using VTP.
B. This is the only switch in the LAN topology.
C. The TestKing1 switch is not the root switch.
D. The link to the root bridge is through a 1 Gbps connection.
E. Spanning Tree Protocol is disabled on the TestKing1 switch.

Answer: C
Explanation:
The root ID of the switch is the default root ID assigned to all Cisco switches, in order to force this switch to become the Root switch you may issue the spanning-tree vlan 1 priority [0-61440 in increments of 4096] command.

QUESTION NO: 23
What is the purpose of the Spanning Tree Protocol (STP)?

A. To prevent routing loops
B. To create a default route
C. To provide multiple gateways for hosts

D. To maintain a loop-free Layer 2 network topology
E. To enhance the functions of SNMP

Answer: D
Explanation:
STP's main task is to stop network loops from occurring on your Layer 2 network (bridges or switches). It vigilantly monitors the network to find all links, making sure that no loops occur by shutting down any redundant ones. STP uses the spanning-tree algorithm (STA) to first create a topology database, then search out and destroy redundant links. With STP running, frames will only be forwarded on the premium, STP-picked links.

QUESTION NO: 24
The TestKing network is shown below:

How will Spanning Tree affect the operation of the network devices shown in the graphic?

A. Spanning Tree will block client ports that suffer from excessive errors.
B. Spanning Tree will learn client MAC addresses and assign them to switch ports.
C. Spanning Tree will allow these switches to load balance across the redundant links to increase network throughput.
D. Spanning Tree will learn which of the redundant links should be blocked.
E. Spanning tree will automatically configure the switches with VLAN information.

Answer: D

Explanation:

STP states are as follows:

Disabled-Ports that are administratively shut down by the network administrator, or by the system due to a fault condition, are in the Disabled state. This state is special and is not part of the normal STP progression for a port.

Blocking-After a port initializes, it begins in the Blocking state so that no bridging loops can form. In the Blocking state, a port cannot receive or transmit data and cannot add MAC addresses to its address table. Instead, a port is allowed to receive only BPDUs so that the switch can hear from other neighboring switches. In addition, ports that are put into standby mode to remove a bridging loop enter the Blocking state.

Listening-The port will be moved from Blocking to Listening if the switch thinks that the port can be selected as a Root Port or Designated Port. In other words, the port is on its way to begin forwarding traffic. In the Listening state, the port still cannot send or receive data frames. However, the port is allowed to receive and send BPDUs so that it can actively participate in the Spanning Tree topology process. Here, the port is finally allowed to become a Root Port or Designated Port because the switch can advertise the port by sending BPDUs to other switches. Should the port lose its Root Port or Designated Port status, it returns to the Blocking state.

Learning-After a period of time called the Forward Delay in the Listening state, the port is allowed to move into the Learning state. The port still sends and receives BPDUs as before. In addition, the switch can now learn new MAC addresses to add to its address table. This gives the port an extra period of silent participation and allows the switch to assemble at least some address table information.

Forwarding-After another Forward Delay period of time in the Learning state, the port is allowed to move into the Forwarding state. The port can now send and receive data frames, collect MAC addresses in its address table, and send and receive BPDUs. The port is now a fully functioning switch port within the Spanning Tree topology.

QUESTION NO: 25

Four TestKing switches are shown below:

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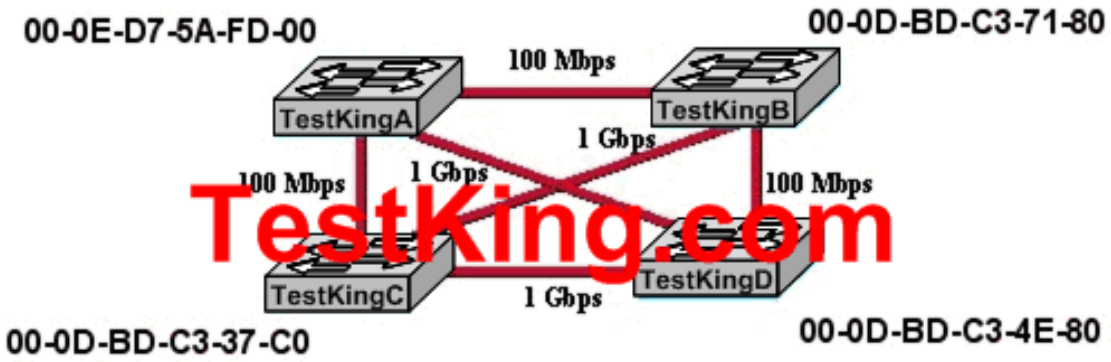
Assuming these are the only four switches in the network and the switches are connected with redundant links, which switch will be elected as the spanning-tree root bridge?

A. TestKing1
B. TestKing2
C. TestKing3
D. TestKing4

Answer: A
Explanation:
To elect the root bridge in the LAN, first check the priority value. The switch having lowest priority will win the race. If Priority Value is same then it checks the MAC Address, the switch having lowest MAC Address will be the root bridge. Here Switch 1 has the lowest MAC Address so it becomes the root bridge.

QUESTION NO: 26
Four TestKing switches are shown below:



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The bridge ID for each switch and the bandwidth for each link is shown. Assuming that all switches are set to the default configuration, which ports will be blocking when Spanning Tree has converged? (Choose three.)

A. TestKingA port that connects to TestKingD
B. TestKingA port that connects to TestKingB
C. TestKingA port that connects to TestKingC
D. TestKingB port that connects to TestKingC
E. TestKingB port that connects to TestKingD
F. TestKingD port that connects to TestKingA

Answer: A, B, E
Explanation:

STP uses the concept of cost to determine many things. Selecting a Root Port involves evaluating the Root Path Cost. This value is the cumulative cost of all the links leading to the Root Bridge. A particular switch link has a cost associated with it, too, called the Path Cost. To understand the difference between these values, remember that only the Root Path Cost is carried inside the BPDU. As the Root Path Cost travels along, other switches can modify its value to make it cumulative. The Path Cost, however, is not contained in the BPDU. It is known only to the local switch where the port (or "path" to a neighboring switch) resides.

Path Costs are defined as a 1-byte value, with the default values shown in Table 9-3. Generally, the higher the bandwidth of a link, the lower the cost of transporting data across it. The original IEEE 802.1D standard defined Path Cost as 1000 Mbps divided by the link bandwidth in Mbps. These values are shown in the center column of the table. Modern networks commonly use Gigabit Ethernet and OC-48 ATM, which are both either too close to or greater than the maximum scale of 1000 Mbps. The IEEE now uses a nonlinear scale for Path Cost, as shown in the right column of the table.
All Remaining ports then root will be in blocking mode.

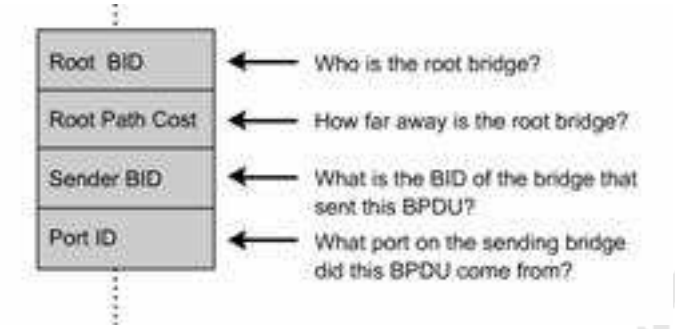
QUESTION NO: 27
Two TestKing switches are shown below:

This network is stable and operating properly. Assuming that default STP configurations are running on both switches, which port will be in blocking mode?

A. Port Fa0/1 on TestKing1
B. Port Fa0/2 on TestKing1

C. Port Fa0/1 on TestKing2
D. Port Fa0/2 on TestKing2

Answer: A
Explanation:
Spanning-Tree Protocol (STP) is a Layer 2 protocol that utilizes a special-purpose algorithm to discover physical loops in a network and effect a logical loop-free topology. STP creates a loop-free tree structure consisting of leaves and branches that span the entire Layer 2 network. The actual mechanics of how bridges communicate and how the STP algorithm works will be discussed at length in the following topics. Note that the terms bridge and switch are used interchangeably when discussing STP. In addition, unless otherwise indicated, connections between switches are assumed to be trunks.



The switches move on to selecting Root Ports. The Root Port of a bridge is the port that is closest to the Root Bridge in terms of Path Cost. Every non-Root Bridge must select one Root Port. Again, bridges use the concept of cost to measure closeness. As with some routing metrics, the measure of closeness using STP is not necessarily reflected by hop count. Specifically, bridges track what is referred to as Root Path Cost, which is the cumulative cost of all links to the Root Bridge. So, Answer A is correct.

QUESTION NO: 28
Exhibit:

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Exhibit:

Please study the exhibit carefully. How can a network administrator ensure that the STP election process would result in TestKingB being elected as the root switch?

A. Clear the TestKingB STP revision number.
B. Assign TestKingB a low priority number.
C. Increase the TestKingB priority number.
D. Change the MAC address of TestKingB

Answer: B
Explanation:
An election process among all connected switches chooses the Root Bridge. Each switch has a unique Bridge ID that identifies it to other switches. The Bridge ID is an 8-byte value consisting of the following fields:

Bridge Priority 2 bytes-The priority or weight of a switch in relation to all other switches. The priority field can have a value of 0 to 65,535 and defaults to 32,768 (or 0x8000) on every Catalyst switch.

MAC Address 6 bytes-The MAC address used by a switch can come from the Supervisor module, the backplane, or a pool of 1024 addresses that are assigned to every Supervisor or backplane depending on the switch model. In any event, this address is hardcoded and unique, and the user cannot change it.

When a switch first powers up, it has a narrow view of its surroundings and assumes that it is the Root Bridge itself. This notion will probably change as other switches check in and enter the election process. The election process then proceeds as follows: Every switch begins by sending out BPDUs with a Root Bridge ID equal to its own Bridge ID and a Sender Bridge ID of its own Bridge ID. The Sender Bridge ID simply tells other switches who is the actual sender of the BPDU message. (After a Root Bridge is decided upon, configuration BPDUs are only sent by the Root Bridge. All other bridges must forward or relay the BPDUs, adding their own Sender Bridge Ids to the message.) Received BPDU messages are analyzed to see if a "better" Root Bridge is being announced. A Root Bridge is considered better if the Root Bridge ID value is lower than another. Again, think of the Root Bridge ID as being broken up into Bridge Priority and MAC address fields. If two Bridge Priority values are equal, the lower MAC address makes the Bridge ID better. When a switch hears of a better Root Bridge, it replaces its own Root Bridge ID with the Root Bridge ID announced in the BPDU. The switch is then required to recommend or advertise the new Root Bridge ID in its own BPDU messages; although, it will still identify itself as the Sender Bridge ID.

QUESTION NO: 29
Which of the following components must be elected before the Spanning Tree Protocol can converge in a switched LAN?

A. Designated ports.
B. Duplex operating mode.
C. Fast mode ports.
D. Root bridge.
E. Root ports.
F. BDPU priority.

Answer: A, D, E
Explanation:
Designated port: Either a root port or a port that has been determined as having the best (lower) cost-a designated port will be marked as a forwarding port.

Root bridge: The root bridge is the bridge with the best bridge ID. With STP, the key is for all the switches in the network to elect a root bridge that becomes the focal point in the network. All other decisions in the network-like which port is to be blocked and which port is to be put in forwarding mode-are made from the perspective of this root bridge.

Root port: Always the link directly connected to the root bridge, or the shortest path to the root bridge. If more than one link connects to the root bridge, then a port cost is determined by checking the bandwidth of each link. The lowest cost port becomes the root port.

So these three components must be elected before the spanning tree protocol can converge in a switched LAN

QUESTION NO: 30

Why would the TestKing administrator change the value of the spanning-tree priority of a switch?

A. in order to optimize the path that frames take from source to destination
B. to increase the priority so a designated port will become a root port
C. to increase the BID, so the switch is more likely to become root bridge
D. in order to allow VLANs to be sent from one switch to another across a single link
E. to force a given switch to become an STP server
F. None of the above

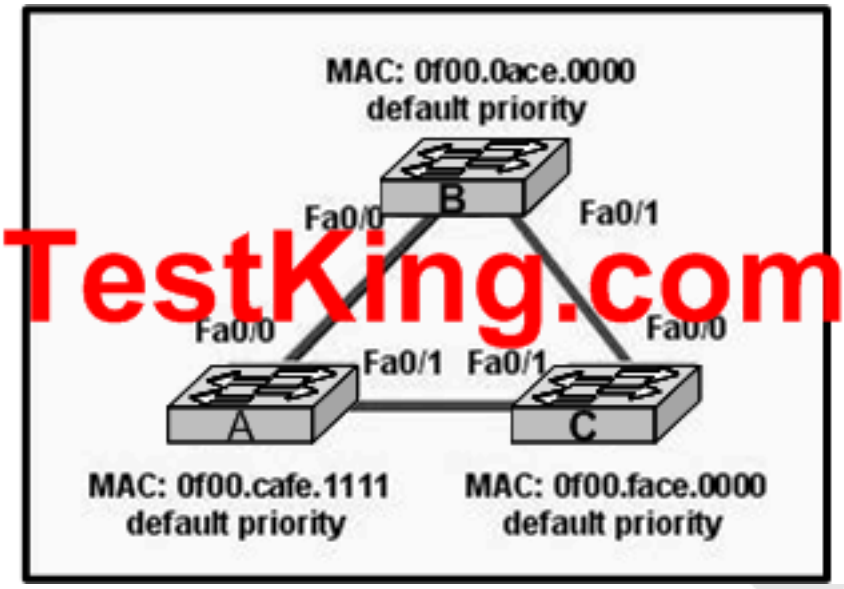
Answer: A
Explanation:
The Bridge Priority is used to measure the preference of a bridge in the spanning-tree Algorithm. The possible values range between 0 and 65,535. The default setting is 32,768. By adjusting the priority, the root bridge can be manually assigned to meet the needs of the network administrator.

QUESTION NO: 31
What value is primarily used to determine which port becomes the root port on each nonroot switch in a spanning-tree topology?

A. path cost
B. lowest port MAC address
C. VTP revision number
D. highest port priority number
E. port priority number and MAC address
F. None of the above

Answer: A
Explanation:
At the conclusion of the root bridge election process, the switches move on to selecting Root Ports. The Root Port of a bridge is the port that is closest to the Root Bridge in terms of Path Cost. Every non-Root Bridge must select one Root Port. Again, bridges use the concept of cost to measure closeness. As with some routing metrics, the measure of closeness using STP is not necessarily reflected by hop count. Specifically, bridges track what is referred to as Root Path Cost, which is the cumulative cost of all links to the Root Bridge.

QUESTION NO: 32
Refer to the topology shown in the exhibit below:



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Based on the information above, which ports will be STP designated ports if all the links are operating at the same bandwidth? (Choose three)

A. Switch A - Fa0/1
B. Switch B - Fa0/0
C. Switch A - Fa0/0
D. Switch B - Fa0/1
E. Switch C - Fa0/0
F. Switch C - Fa0/1

Answer: A, B, D
Explanation:
To remove the possibility of bridging loops, STP makes a final computation to identify one Designated Port on each network segment. Suppose that two or more switches have ports connected to a single common network segment. If a frame appears on that segment, all the bridges attempt to forward it to its destination. Recall that this behavior was the basis of a bridging loop and should be avoided.

Instead, only one of the links on a segment should forward traffic to and from that segment-the one that is selected as the Designated Port. Switches choose a Designated Port based on the lowest cumulative Root Path Cost to the Root Bridge. For example, a switch always has an idea of its own Root Path Cost, which it announces in its own BPDUs. If a neighboring switch on a shared LAN segment sends a BPDU announcing a lower Root Path Cost, the neighbor must have the Designated Port. If a switch learns only of higher Root Path Costs from other BPDUs received on a port, however, it then correctly assumes that its own receiving port is the Designated Port for the segment. Notice that the entire STP determination process has served only to identify bridges and ports. All ports are still active, and bridging loops still might lurk in the network. STP has a set of progressive states that each port must go through, regardless of the type or identification. These states actively prevent loops from forming and are described in the next section.

Note:

In each determination process discussed so far, two or more links might have identical Root Path Costs. This results in a tie condition, unless other factors are considered. All tie-breaking STP decisions are based on the following sequence of four conditions:

1. Lowest Root Bridge ID
2. Lowest Root Path Cost to Root Bridge
3. Lowest Sender Bridge ID
4. Lowest Sender Port ID

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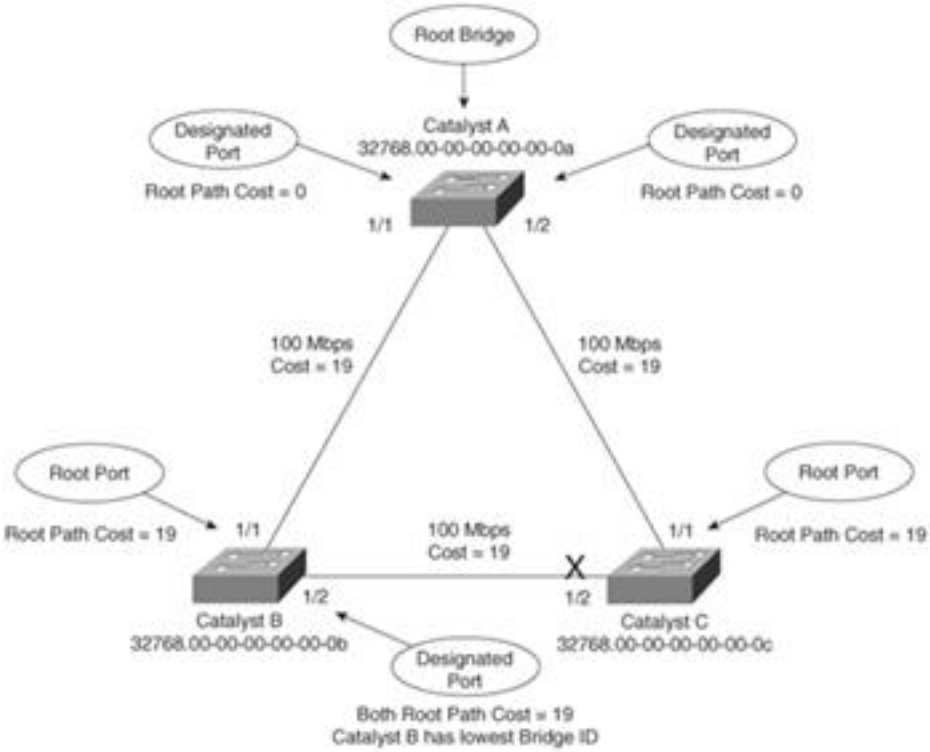
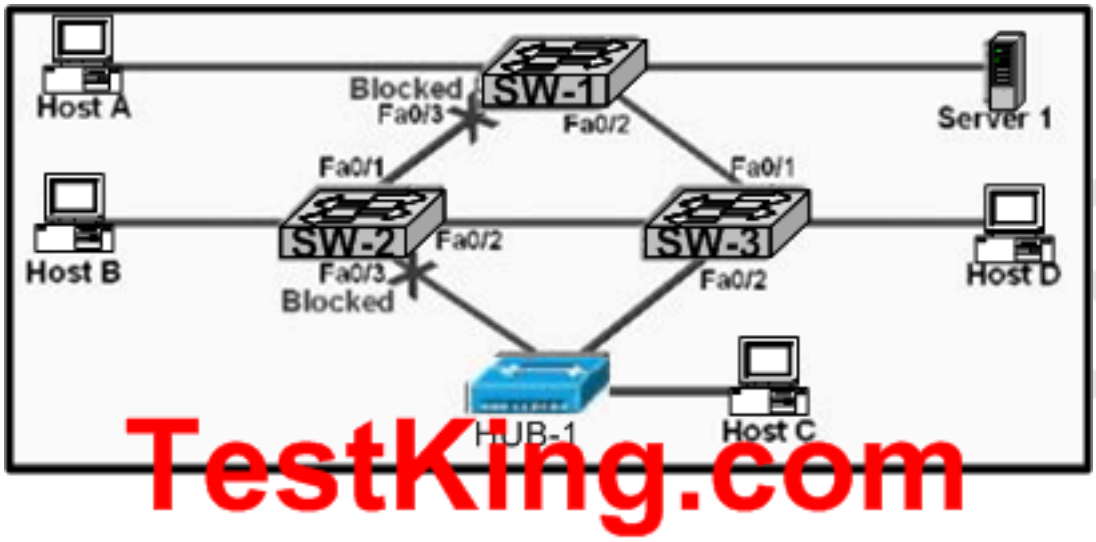


The three switches have chosen their Designated Ports (DP) for the following reasons:

1. **Catalyst A**- Because this switch is the Root Bridge, all its active ports are Designated Ports, by definition. At the Root Bridge, the Root Path Cost of each port is 0.
2. **Catalyst B**- Catalyst A port 1/1 is the DP for the Segment A-B because it has the lowest Root Path Cost (0). Catalyst B port 1/2 is the DP for segment B-C. The Root Path Cost for each end of this segment is 19, determined from the incoming BPDU on port 1/1. Because the Root Path Cost is equal on both ports of the segment, the DP must be chosen by the next criteria-the lowest Sender Bridge ID. When Catalyst B sends a BPDU to Catalyst C, it has the lowest MAC address in the Bridge ID. Catalyst C also sends a BPDU to Catalyst B, but its Sender Bridge ID is higher. Therefore, Catalyst B port 1/2 is selected as the segment's DP.
3. **Catalyst C**- Catalyst A port 1/2 is the DP for Segment A-C because it has the lowest Root Path Cost (0). Catalyst B port 1/2 is the DP for Segment B-C. Therefore, Catalyst C port 1/2 will be neither a Root Port nor a Designated Port. As discussed in the next section, any port that is not elected to either position enters the Blocking state. Where blocking occurs, bridging loops are broken.

Reference: CCNP BCMSN Exam Certification Guide, 3rd Edition, Cisco Press

QUESTION NO: 33
Exhibit:



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The switches in the exhibit above are configured with the default parameters. What can be determined from the exhibit?

A. Fa0/2 on SW-1 and Fa0/2 on SW-2 are nondesignated ports.
B. SW-1 is the backup designated root bridge.
C. SW-3 is the root bridge.
D. Fa0/3 on SW-1 and Fa0/3 on SW-2 are attached to the lowest-cost paths to the root bridge.
E. None of the above

Answer: C
Explanation:
Remember that one root switch is identified per-VLAN. After the root switch identification, the switches adhere to these rules:
1. **STP Rule 1**-All ports of the root switch must be in forwarding mode.
Next, each switch determines the best path to get to the root. The switches determine this path by a comparison of the information in all the BPDUs that the switches receive on all ports. The switch uses the port with the least amount of information in the BPDU in order to get to the root switch; the port with the least amount of information in the BPDU is the root port. After a switch determines the root port, the switch proceeds to rule 2.
1. **STP Rule 2**-The root port must be set to forwarding mode.
In addition, the switches on each LAN segment communicate with each other to determine which switch is best to use in order to move data from that segment to the root bridge. This switch is called the designated switch.
1. **STP Rule 3**

-In a single LAN segment, the port of the designated switch that connects to that LAN segment must be placed in forwarding mode.
2. **STP Rule 4**-All the other ports in all the switches (VLAN-specific) must be placed in blocking mode. The rule only applies to ports that connect to other bridges or switches. STP does not affect ports that connect to workstations or PCs. These ports remain forwarded.
Our answer can be found in Rule 1 above. Since none of the ports in SW-3 are blocking, we can determine that this switch must be the root.
Reference:
http://www.cisco.com/en/US/tech/tk389/tk621/technologies_configuration_example09186a008009467c.sh

QUESTION NO: 34
In the TestKing switched LAN environment, what does the IEEE 802.1Q standard describe?

A. VLAN pruning
B. A method of VLAN trunking
C. An approach to wireless LAN communication
D. The operation of VTP
E. The process for root bridge selection
F. None of the above

Answer: B
Explanation:
A broadcast domain must sometimes exist on more than one switch in the network. To accomplish this, one switch must send frames to another switch and indicate which VLAN a particular frame belongs to. On Cisco switches, a trunk link is created to accomplish this VLAN identification. ISL and IEEE 802.1Q are different methods of putting a VLAN identifier in a Layer 2 frame.
The IEEE 802.1Q protocol interconnects VLANs between multiple switches, routers, and servers. With 802.1Q, a network administrator can define a VLAN topology to span multiple physical devices.
Cisco switches support IEEE 802.1Q for FastEthernet and Gigabit Ethernet interfaces. An 802.1Q trunk link provides VLAN identification by adding a 4-byte tag to an Ethernet Frame as it leaves a trunk port.

QUESTION NO: 35
You are an administrator of the TestKing switched network and your goal is to reduce some of the administrative overhead on your network. You plan on achieving this by configuring a new VLAN for each department in the TestKing network. However, you need to share the VLAN information across numerous switches. Which of the following would allow you accomplish this?

A. STP
B. GVRP
C. SNMP
D. VTP
E. DHCP
F. None of the above

Answer: D
Explanation:
The VTP (VLAN Trunking Protocol) is a Cisco Layer 2 messaging protocol that manages the addition, deletion, and renaming of VLANs on a network-wide basis. It allows for VLAN information to span multiple switches within the switch domain.
Incorrect Answers:
A. STP is a switching protocol but it is used for preventing network loops.
B. GVARP is an actual protocol used in switch administration, but it beyond the scope of what a CCNA is expected to know.
C. SNMP is a protocol used for managing and monitoring networks
E. DHCP is the Dynamic Host Configuration Protocol, which allows for PC's to obtain their IP address dynamically upon booting up, along with their DNS and default gateway information.

Section 9: Describe how VLANs create logically separate networks and the need for routing between them (10 questions)

QUESTION NO: 1

Which of the following a true statements regarding the use of VLANs to segment a network? (Select three)

A. They increase the size of collision domains
B. They allow logical grouping of users by function.
C. They can enhance network security.
D. They increase the size of the broadcast domain while decreasing the number of collision domains.
E. They increase the number of broadcast domains while decreasing the size of the broadcast domains.
F. They simplify switch administration.

Answer: B, C, E
Explanation:
VLANs are used to segment a LAN into multiple, smaller LANs. This can be used to enhance security as local traffic from one VLAN will not be passed to users in other VLANS.
Incorrect Answers:
A. VLANs are used to decrease the size of a collision domain, not increase it.
D. The opposite is true.
F. The default operation of a switch is to allow all traffic and to enable all ports in VLAN 1. The use of VLANs will increase the complexity of the switch environment, making for more difficult administration.

QUESTION NO: 2
You wish to segment your LAN into multiple broadcast domains. Which technology method should you implement in order to do this?

A. Transparent bridging
B. Cut-through switching
C. Fragment-free switches
D. Virtual LANs
E. Store-and-forward switching
F. None of the above

Answer: D
Explanation:

The creation of VLANs in a switch will provide separate Broadcast domains. By default, all ports in a Catalyst switch belong to VLAN 1. By creating additional VLANs, the LAN will be logically segmented into separate broadcast domains.

Incorrect Answers

A. Transparent bridging is called Transparent because the endpoints devices do not need to know that the bridges exists. It will not play any role for creating separate broadcast domain

B, E. Both of these are switching methods.

C. This has nothing to do with the creation of multiple broadcast domains.

QUESTION NO: 3

TestKing has implemented the use of VLANs in their network. Which of the following are considered to be a benefit of VLANs? (Choose three)

A. They increase the size of collision domains.
B. They allow logical grouping of users by function.
C. They can enhance network security,
D. The increase the size of broadcast domains while decreasing the number of the broadcast domains.
E. The increase the number of broadcast domains while decreasing the size of the broadcast domains.
F. They simplify switch administration.

Answer: B, C, E

Explanation:

There are many motivations for using VLANs, including these:

1. To group users by department, or by groups that work together, instead of by physical location. (B)
2. To reduce overhead by limiting the size of each broadcast domain (E)
3. To enforce better security by keeping sensitive devices on a separate VLAN (C)
4. To separate specialized traffic from mainstream traffic - for example, putting IP telephones on a separate VLAN form user PCs.

QUESTION NO: 4

What are some of the characteristics of a typical VLAN arrangement, found throughout the TestKing switched LAN? (Select all that apply)

A. VLANs logically divide a switch into multiple, independent switches at Layer 2.
B. Trunk links can carry traffic for multiple VLANs.
C. VLAN implementation significantly increases traffic due to added trunking information.
D. A VLAN can span multiple switches.
E. VLANs typically increase the number of switches needed
F. VLANs typically decrease the number of switches needed

Answer: A, B, D
Explanation:
VLANs give you the power of making virtual LAN networks to subdivide collision domains into smaller units of functionality, without being limited by physical location. A is correct because that is the exact function of a VLAN. B is correct because trunk links are used to carry traffic for multiple VLANs. D is correct because a VLAN can and often does span across multiple switches. VTP makes this possible.
Incorrect Answers:
C. Although trunking information does indeed add some level of overhead, the overall traffic overhead is greatly reduced though the use of VLANs.
E, F. The number of total switches needed in a network is the result of the number of devices on the entire LAN that need to be connected. Whether VLANs are used or not will have little, if any, impact on the total number of switches needed in a LAN.

QUESTION NO: 5
How could the TestKing corporation benefit from using VLANs on their network? (Select three answer choices.)

A. VLANs allow access to network services based on department, not physical location.
B. VLANs utilize packet filtering to enhance network security.
C. VLANs provide a low-latency, high bandwidth internetworking alternative.
D. VLANs provide a method of communication between IP addresses in large networks.
E. VLANs establish segmented broadcast domains in switched networks.
F. VLANs can greatly simplify adding, moving, or changing hosts on the network.

Answer: A, E, F
Explanation:

VLANs establish broadcast domains in switched networks, so by virtue of having the option to create many efficient broadcast domains, congestion is reduced and network throughput is greatly enhanced. VLANs allow networks to be divided by department or resource needs, rather then by physical location. When people move departments, leave a department, or join a department, administration is easy and convenient with a few keystrokes.

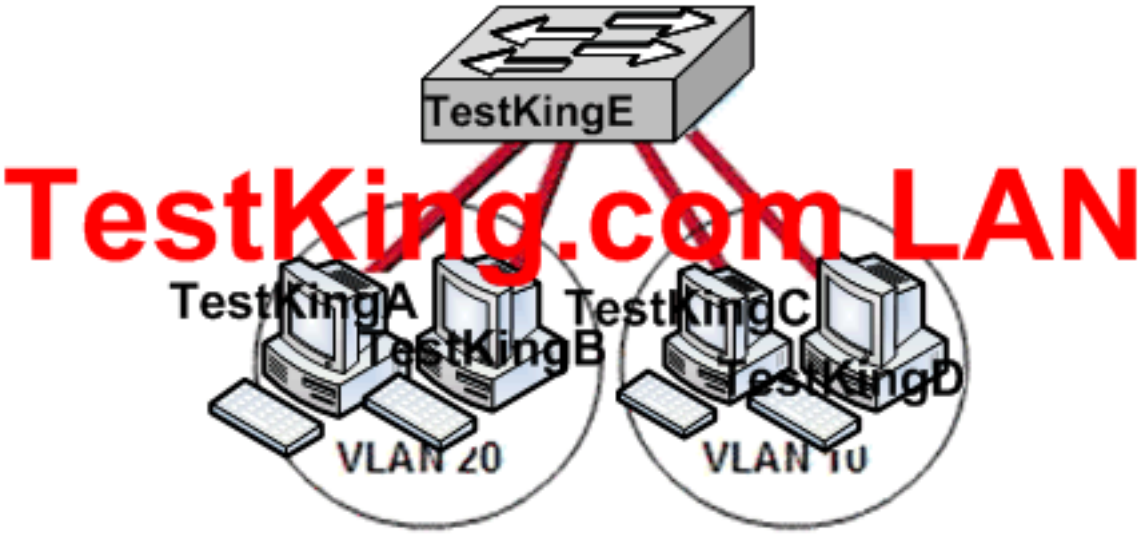
Incorrect Answers:

B, D. These would be router functions at layer 3. Switches and VLANs operate at layer 2 of the OSI model.

C. The use of VLANs may actually increase the latency in some cases, as traffic from one VLAN to the other will need to be routed.

QUESTION NO: 6

Two VLANs are connected to a switch as follows:



TestKing.com LAN

In this TestKing network segment, hosts on the same VLAN can communicate with each other but are unable to communicate with hosts on different VLANs. What is needed to allow communication between these two TestKing VLANs?

A. A router with subinterfaces configured on the physical interface that is connected to the switch

B. A router with an IP address on the physical interface that is connected to the switch

C. A switch with a trunk link that is configured between the switches

D. A switch with an access link that is configured between the switches

E. None of the above

Answer: A
Explanation:
By default, only hosts that are members of the same VLAN can communicate. To change this and allow inter-VLAN communication, you need a router or a layer 3 switch.

Here is the example of configuring the router for inter-vlan communication
RouterA(config)#int f0/0.1
RouterA(config-subif)#encapsulation ?
dot1Q IEEE 802.1Q Virtual LAN
RouterA(config-subif)#encapsulation dot1Q or isl VLAN ID
RouterA(config-subif)# ip address x.x.x.x y.y.y.y

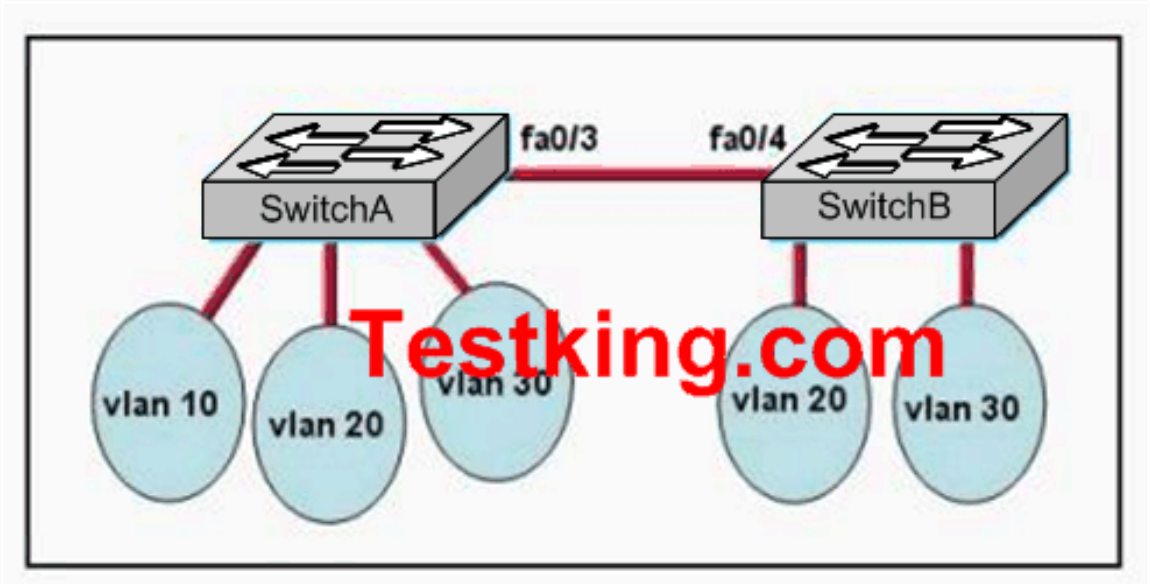
QUESTION NO: 7
You are working as a network technician at TestKing University, when you get a call from the Engineering Faculty. They're complaining that they're receiving obsolete information from the Business Faculty's network traffic broadcasts. What can you do to contain the Business Faculty's broadcast while still keeping it connected to the internet and the enterprise services of the University? (Select all valid answer choices)

A. Use half and full-duplex Ethernet on the Engineering Department LAN
B. Establish a VTP domain to minimize the obsolete traffic
C. Change the switch IP address of the switch
D. Create separate VLANs and subnets for the two departments and route between the two
E. Provide greater bandwidth to the Engineering Department LAN
F. Place the business department on a separate subnet and route between networks

Answer: D, F
Explanation:
In order to prevent the broadcast and link level multicast traffic separated between the departments, they need to be isolated at layer two. This can be accomplished in two ways. The first is to create separate VLANs and place each department into a different one. The second method would be to separate the two departments into two completely different networks, and route between them.
Incorrect Answers:

A. Mixing the use of half and full duplex will make no difference to the number of broadcasts sent.
B. Trunking is only useful in networks that already contain VLANs.
C. This will make no difference, as all users will still be contained within the same IP subnet.
E. The amount of bandwidth involved will not have any impact on the amount of broadcasts that are sent and received.

QUESTION NO: 8
Two TestKing switches are shown below:



The switches have been configured with static VLANs as shown. During testing, the network administrator notices that VLAN 20 on SwitchA has no connectivity with VLAN 30 on SwitchB. What should the network administrator do?

A. Configure the interconnected ports on SwitchA and SwitchB into access mode.
B. Connect the two switches with a straight-through cable.
C. Add a Layer 3 device to connect VLAN 20 and VLAN 30.
D. Configure the management VLAN with IP address.
E. Ensure that the VIP passwords match on both switches.

Answer: C

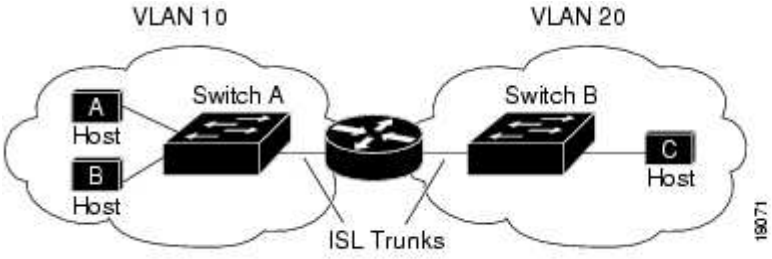
Explanation:

Network devices in different VLANs cannot communicate with one another without a router to route traffic between the VLANs. In most network environments, VLANs are associated with individual networks or subnetworks.

For example, in an IP network, each subnetwork is mapped to an individual VLAN. Configuring VLANs helps control the size of the broadcast domain and keeps local traffic local. However, when an end station in one VLAN needs to communicate with an end station in another VLAN, interVLAN communication is required. This communication is supported by interVLAN routing. You configure one or more routers to route traffic to the appropriate destination VLAN.

The diagram below shows a basic interVLAN routing topology. SwitchA is in VLAN 10 and SwitchB is in VLAN20. The router has an interface in each VLAN.

Basic InterVLAN Routing Topology:



When HostA in VLAN10 needs to communicate with HostB in VLAN10, it sends a packet addressed to that host. SwitchA forwards the packet directly to HostB, without sending it to the router.

When HostA sends a packet to HostC in VLAN20, SwitchA forwards the packet to the router, which receives the traffic on the VLAN10 interface. The router checks the routing table, determines the correct outgoing interface, and forwards the packet out the VLAN20 interface to SwitchB. SwitchB receives the packet and forwards it to HostC.

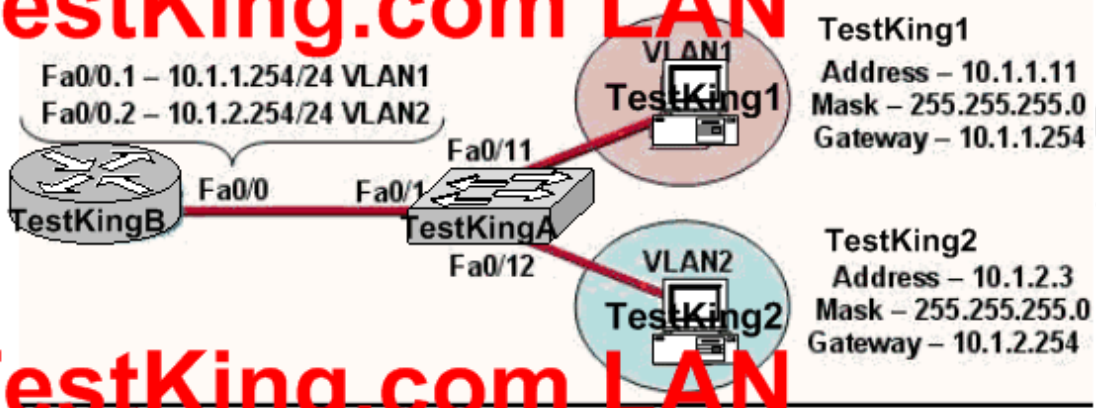
Reference:

http://www.cisco.com/univercd/cc/td/doc/product/lan/cat5000/rel_5_2/layer3/routing.htm#wp13354

QUESTION NO: 9

The TestKing network is displayed below:

TestKing.com LAN



TestKing.com LAN

TestKingA# show vlan

VLAN	Name	Status	Ports
1	default	active	Fa0/1, Fa0/2, Fa0/3, Fa0/4, Fa0/5, Fa0/6, Fa0/7, Fa0/8, Fa0/9 Fa0/10, Fa0/11, Gi0/1
2	VLAN0002	active	Fa0/12

<--- output omitted --->

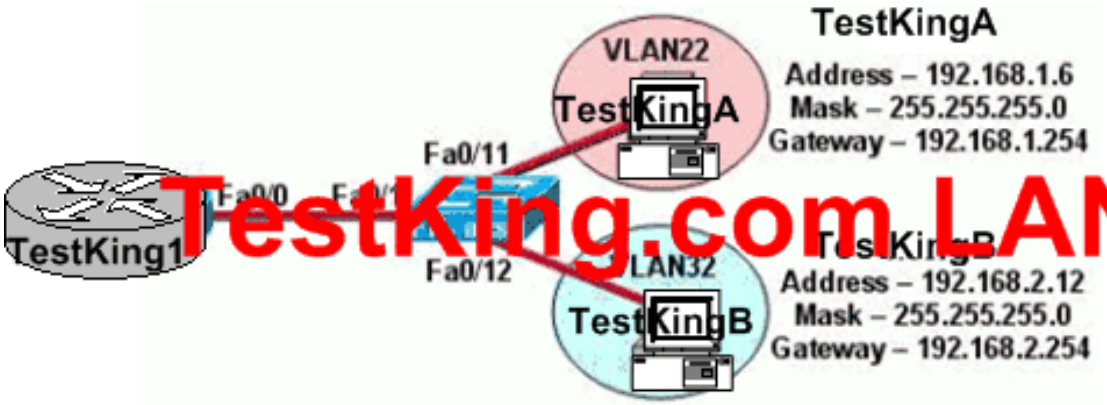
Study the exhibit: the topology and the partial switch command output.
The internetwork shown in the exhibit is experiencing connectivity problems. Host TestKing1 is unable to ping Host TestKing2.

What needs to be done to enable these hosts to ping each other?

A. The gateway on Host TestKing1 needs to be changed.
B. The IP address on Host TestKing2 needs to be reconfigured.
C. VLAN2 must be named.
D. The Fa0/1 interface on the TestKingA switch must be configured as a trunk port.
E. Switch port Fa0/1 must be moved to a different VLAN.

Answer: D
Explanation:
Interface FA0/1 should be in any case configured as a trunk port so that a router could switch packets between the VLANs. The IP addresses are acceptable, so no issues should be caused due this.

QUESTION NO: 10
A TestKing network is displayed below:




```
TestKing1 # show interfaces fastethernet 0/0.2
FastEthernet 0/0.2 is up, line protocol is up
Hardware is AmdFE, address is 000c.ce8d.8860 (bia 000c.cd8d.8860)
Internet address is 192.168.2.254/24
  MTU 1500 bytes, BW 10000 Kbit, DLY 100 usec, reliability 255/255
    txload 1/255, rxload 1/255
  Encapsulation 802.1Q Virtual LAN, VLAN ID 23.
  ARP type: ARPA, ARP Timeout 04:00:00
```

Host TestKingB in the diagram is experiencing connectivity problems. Further Testing reveals that it cannot ping the default gateway. Based on the information shown in the exhibit, what is the problem?

A. The IP address of TestKingB is on a different subnet than the default gateway.
B. The Fa0/1 interface on the switch is administratively shutdown.
C. The switch is connected to the wrong interface on the TestKing1 router.

D. The FastEthernet interface on the TestKing router is not configured for trunking.
E. The Fastethernet 0/0.2 interface on the TestKing1 router is configured for the wrong VLAN.
F. The FastEthernet interface of the TestKing1 router is configured with the wrong Ethernet encapsulation.

Answer: E
Explanation:
Based on the output shown above, the Fa 0/0.2 interface should be in VLAN 32, which is the same VLAN that other devices in the 192.168.2.X/24 subnet belong to. Interface FA0/0.1 should be configured for VLAN 22, while FA0/0/2 should be configured for VLAN 32.

Section 10: Configure, verify, and troubleshoot VLANs (11 questions)

QUESTION NO: 1
A TestKing switch is connected as shown below:

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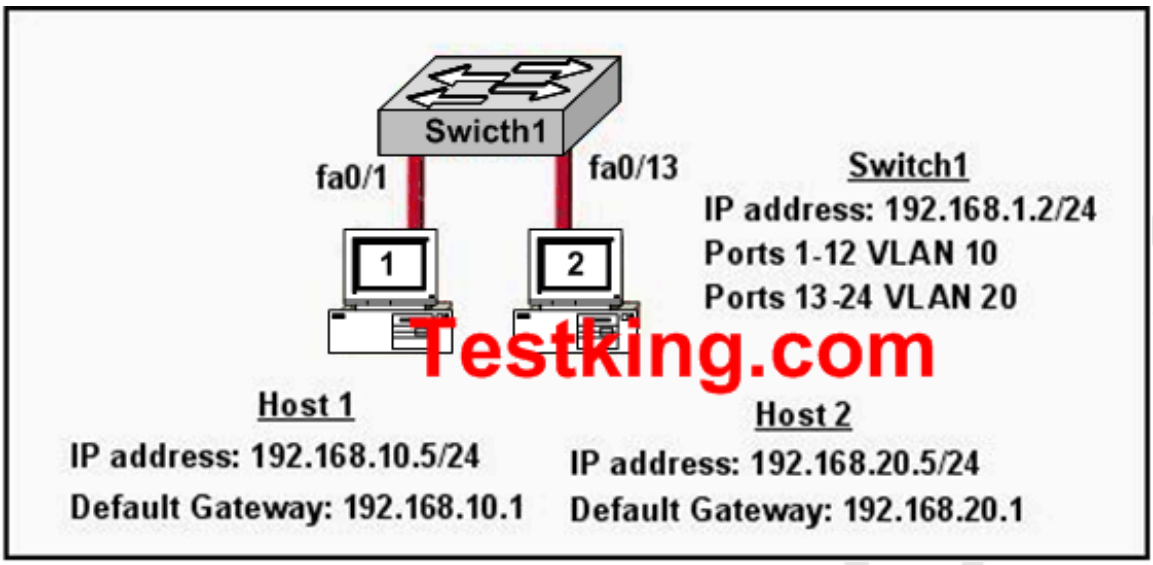
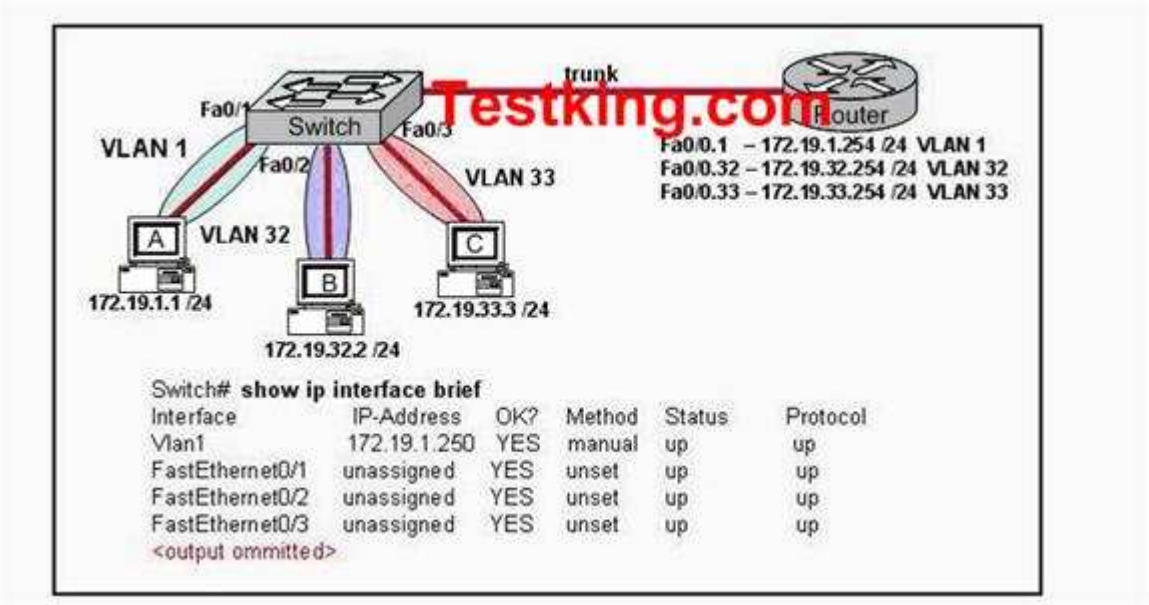


In the network above Host 1 cannot ping Host 2. What needs to be configured to allow host 1 and host 2 to communicate?

A. The switch needs to be configured with an IP address on the correct subnet.
B. The default gateway of the hosts should be configured to 192.168.1.2.
C. Spanning Tree Protocol needs to be configured on the switch.
D. A router needs to be configured to route between the VLANs.
E. VTP needs to be configured on the switch to create a trunk between the VLANs.

Answer: D
Explanation:
By default only members of the same VLAN can communicate with each other. For inter-VLAN communication we require a router to route between the different VLANs. Alternatively, if Host1 and Host2 were in the same subnet and the same VLAN, then they would also be able to communicate.

QUESTION NO: 2
The TestKing network is shown below:



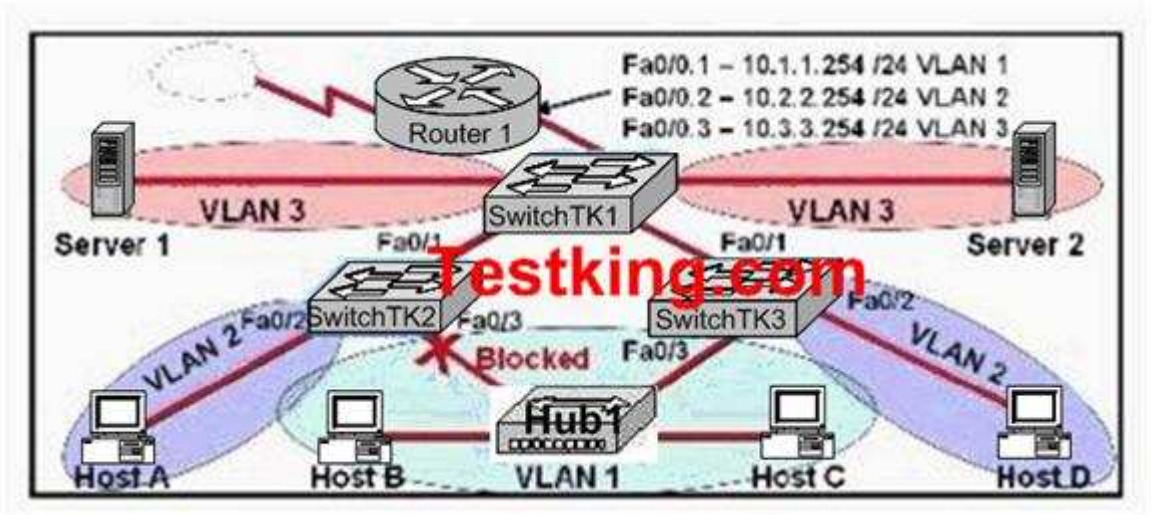
The network administrator normally establishes a Telnet session with the switch from host A. However, host A is unavailable. The administrator's attempt to telnet to the switch from host B fails, but pings to the other two hosts are successful. What is most likely the issue?

A. Host B and the switch need to be in the same subnet.
B. The switch interface connected to the router is down.
C. Host B needs to be assigned an IP address in VLAN 1.
D. The switch needs an appropriate default gateway assigned.
E. The switch interfaces need the appropriate IP addresses assigned.

Answer: D
Explanation:
This scenario requires inter-VLAN routing, which requires a layer three device. Based on the information above, a trunk has indeed been set up to route traffic between VLAN's so the only logical explanation why a host in VLAN 32 can not reach a host in VLAN1 (which is where the IP address of the switch is) would be because no default gateway has been specified in the switch.
Incorrect Answers:

A, C: This is not a requirement, as a number of VLAN's can be configured within a switch, while the management IP address can reside in a different VLAN on a different subnet.
B: Based on the output above, the trunk link (fa 0/3) is indeed up and active.
E: Since switches operate at layer 2, each individual VLAN does not need its own IP address.

QUESTION NO: 3
A portion of the TestKing network is shown in the following exhibit:



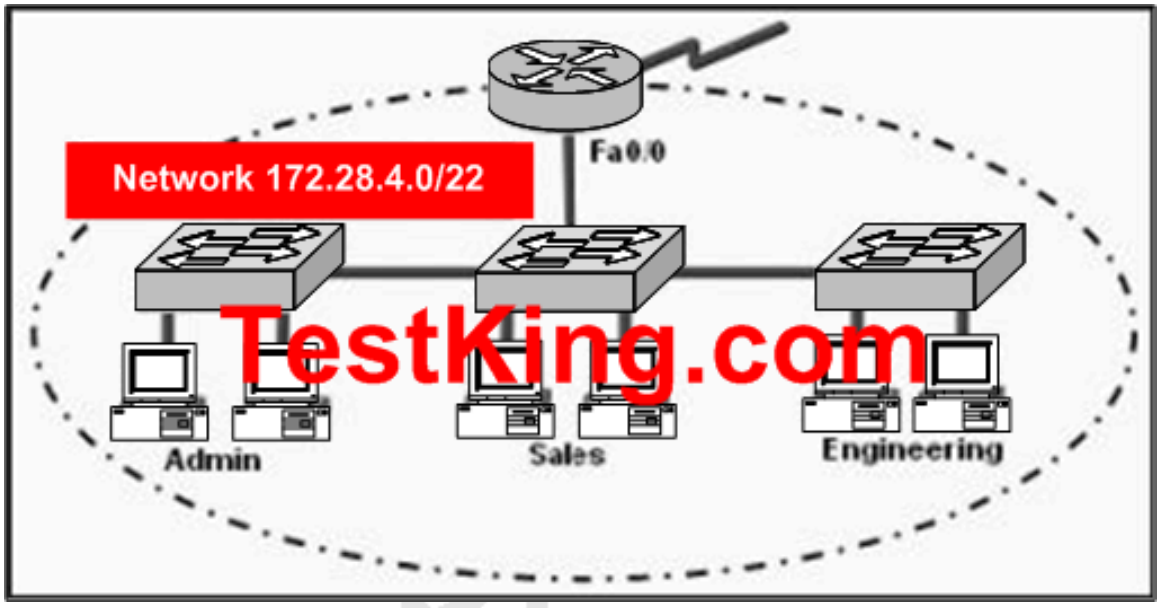
Based on this diagram, which of the following is true?

A. Switch TK2 is the root bridge.
B. Spanning Tree is not running.
C. Host D and Server 1 are in the same network.
D. No collisions can occur in traffic between Host B and Host C.
E. If Fa0/0 is down on Router 1, Host A cannot access Server 1.
F. If Fa0/1 is down on Switch 3, Host C cannot access Server 2.
G. None of the above

Answer: E

Explanation:
A VLAN is a group of hosts with a common set of requirements that communicate as if they were attached to the same wire, regardless of their physical location. A VLAN has the same attributes as a physical LAN, but it allows for end stations to be grouped together even if they are not located on the same LAN segment.
The above diagram is configured with inter-VLAN communication so the router has a great role to make communication between different VLAN. When router's port configured with trunk goes down all host can't communicate with other host in different VLAN as it is the router that directs traffic between the separate VLANs.

QUESTION NO: 4
The corporate LAN shown in the TestKing network uses IP network 172.28.4.0/22 for all departments. All workstations use 172.28.4.1 as a default gateway address.



In this network, administrators have recently become concerned that excessive broadcasts are slowing network performance. Which change is most likely to reduce broadcast traffic on the corporate LAN?

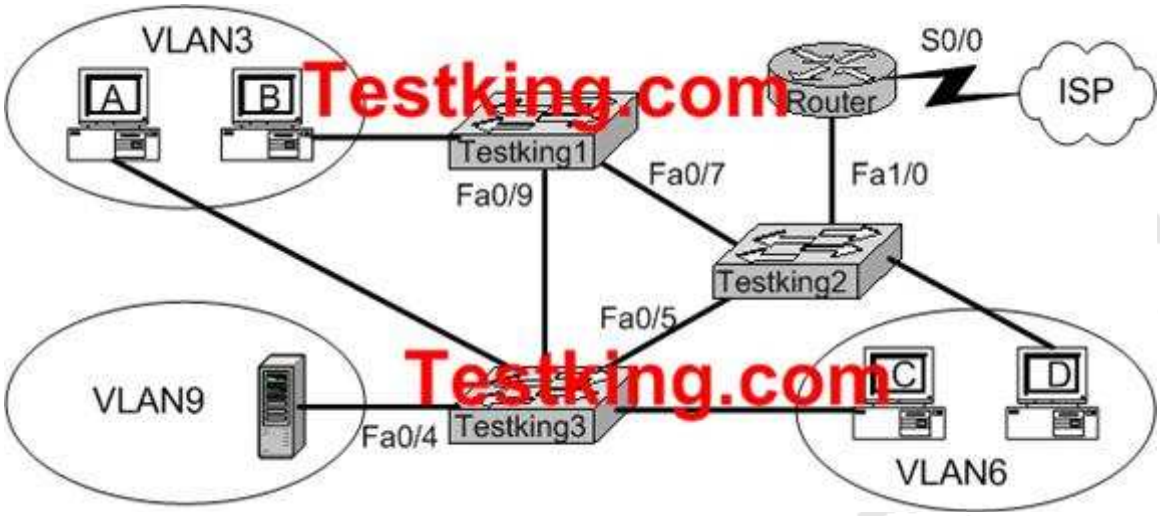
A. Configure an access control list on the router to prevent broadcast forwarding.
B. Configure each NIC and switch port to operate at full duplex.

C. Change the router-to-switch connection from Fast Ethernet to Gigabit Ethernet.
D. Implement VLANs after creating IP subnets for each department.
E. Increase the number of switches in the network closet of each department.

Answer: D
Explanation:
Switches using VLANs create the same division of the network into separate broadcast domains but do not have the latency problems of a router. Switches are also a more cost-effective solution.
There are several benefits to using VLANs, including:
1. Increased performance
2. Improved manageability
3. Network tuning and simplification of software configurations
4. Physical topology independence
5. Increased security options
Increased performance
Switched networks by nature will increase performance over shared media devices in use today, primarily by reducing the size of collision domains. Grouping users into logical networks will also increase performance by limiting broadcast traffic to users performing similar functions or within individual workgroups. Additionally, less traffic will need to be routed, and the latency added by routers will be reduced.

QUESTION NO: 5
The TestKing LAN is displayed below:

TestKing.com



Testking.com
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A technician is investigating a problem with the exhibited network. These symptoms have been observed:

1. **None of the user hosts can access the Internet.**
2. **None of the user hosts can access the server in VLAN 9.**
3. **Host A can ping Host B.**
4. **Host A CANNOT ping Host C or Host D.**
5. **Host C can ping Host D.**

What could cause these symptoms?

A. Interface S0/0 on the router is down.
B. Interface Fa1/0 on the router is down.
C. Interface Fa0/5 on Testking3 is down.
D. Testking1 is turned off.
E. Testking3 is turned off.

Answer: B
Explanation:

Choice B is correct because a Router is used for communication between different VLANs and it is stated that none of the hosts can access the server in VLAN 9 it means that there is no connection of the network with router so FA1/0 is down. In this example, connectivity problems only occur with inter-VLAN communication, which means the problem is with the routing element.

Incorrect Answers:

A. This may indeed be true, but until the LAN interface problems of the router are resolved, it is not an issue. If this was the only problem, then there would be no problems with Host A trying to reach Host C or D.

C. This choice is wrong because Host C can ping Host D so FA0/5 cannot be down.

D, E. Choice D and E are wrong because Host A can Ping Host B it means that the switch Testking1 and switch Testking3 are both functioning properly and is turned on.

QUESTION NO: 6

Which of the following steps are necessary in order to add a new VLAN to the TestKing switched network? (Select all that apply)

A. Create the VLAN.
B. Name the VLAN.
C. Configure an IP address for the VLAN.
D. Add the desired ports to the new VLAN.
E. Add the VLAN to the VTP domain.

Answer: A, B, D

Explanation:

The following are the basic requirements for creating VLANs:

* Creating the VLAN numbers and names
* Configuring each port's assigned VLAN

Incorrect Answers:

C. This is an optional feature, but not a necessary step for creating a VLAN.

E. Adding any VLAN to a Virtual Trunking Protocol (VTP) domain may be desired in a complex multi-switch and multi-VLAN network. However, it is not a necessary step for creating stand-alone VLANs on a single switch.

QUESTION NO: 7

Testking.com

You need to create a new VLAN on your Catalyst switch. This VLAN is to be named TESTKING. Which of the following need to be completed for the creation of this new VLAN? (Select all that apply)

A. The TESTKING VLAN must be created.
B. The desired ports must be added to the new TESTKING VLAN.
C. The TESTKING VLAN must be added to all of the domains.
D. The TESTKING VLAN must be named.
E. An IP address must be configured for the TESTKING VLAN.
F. None of the above. VLAN creations are automatic.

Answer: A, B, D
Explanation:
Creating a VLAN is done in 3 steps:
1. Create the VLAN
2. Name the VLAN
3. Assign ports to the VLAN

From there, other features and functionality can be configured, but these are the only steps that are required for the addition of a VLAN.
Incorrect Answers:
C. The VLAN needs only to be added to a single switch, where it can act as a stand-alone VLAN, or it can be transferred to other switches in the network through the use of the VTP protocol.
E. VLANs operate at layer 2, and although many are configured with a layer 3 IP address, it is not absolutely necessary to do this.

QUESTION NO: 8
What must the TestKing network administrator do in order to successfully configure a VLAN trunk between two switches named TK1 and TK2? (Select two answer choices)

A. Set each end of the trunk link to IEEE 802.1Q encapsulation.
B. Set the same VTP management domain name on both switches.
C. Set all ports on the two switched as access ports.
D. Configure one of the two switches as a VTP server.
E. Connect the two switches using a rollover cable.
F. Use a router to forward VTP traffic between the VLANs.

Answer: B, D
Explanation:
All switches that need to share VLAN information via a trunk must use the same VTP domain name, and a switch can only be in one domain at a time. This means that a switch can only share VTP domain information with other switches if they're configured into the same VTP domain. You can use a VTP domain if you have more than one switch connected in a network, but if you've got all your switches in only one VLAN, you don't need to use VTP. VTP information is sent between switches via a trunk port. Switches advertise VTP management domain information, as well as a configuration revision number and all known VLANs with any specific parameters. There's also something called VTP transparent mode, in it, you can configure switches to forward VTP information through trunk ports, but not to accept information updates or update their VTP databases. At least one of the switches will need to be configured as the VTP server in order to pass the VLAN info.
Incorrect Answers:
A. Although this is a valid option, it is not a requirement since using ISL as the encapsulation type is also a valid option.
E. A rollover cable is not used between switches for any of the port types.
F. Routers will be required for sending traffic from one VLAN to the other, but not to forward the actual VTP traffic.

QUESTION NO: 9
After connecting a PC to an available port on a switch, you find that the PC can not access any of the resources on the LAN. No other PC's connected to the switch appear to be having any issues. What is the most likely cause for this problem?

A. The router lacks a routing table entry for the new host
B. The host switch port is assigned to the incorrect VLAN
C. The host MAC address is incorrectly configured
D. A STP instance for the new host has not been initialized
E. The switch does not have the MAC address hard coded in the CAM table.

Answer: B
Explanation:
Virtual LANs break up broadcast domains in a layer-two switched internetwork. If a host is in a different VLAN then the network services it needs to use, the packets must go through a router. If routing does not take place, the PC will be unable to communicate with any other devices not in the same VLAN. Answer B is the best answer for this question.

Incorrect Answers:
A. The PC is unable to communicate with other LAN users. No router needs to even be installed for this to work.
C, E. The MAC address of the PC does not need to be entered manually into the switch. The switch will dynamically learn of the MAC address of the PC.
D. The STP algorithm does not need to have any end host information added in order for it to work.

QUESTION NO: 10
The TestKing network administrator needs to verify that switch interface 0/5 has been assigned to the Marketing VLA.N. Which command will accomplish this task?

A. Show vlan
B. Show mac-address-table
C. Show vtp status
D. show spanning-tree root
E. show ip interface brief
F. None of the above

Answer: A
Explanation:
The "show vlan" command displays the configured vlan name and ID as well as the ports that belong to each VLAN, etc. By default all ports belongs to VLAN 1
Note: You can also use: show vlan brief, show vlan ID where ID is the VLAN ID.

QUESTION NO: 11
Exhibit:

Testking.com

```
TestKing1# show vlan
VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa0/2, Fa0/6, Fa0/7
                                                Fa0/8, Fa0/10, Fa0/11, Fa0/12
                                                Fa0/13, Fa0/14, Fa0/15, Fa0/16
                                                Fa0/17, Fa0/18, Fa0/19, Fa0/20
                                                Fa0/21, Fa0/22, Fa0/23, Fa0/24
86   VLAN0086                         active    Fa0/9
1002 fddi-default                     active
1003 token-ring-default               active
1004 fddinet-default
1005 trnet-default
```

TestKing.com

Please study the exhibit shown above carefully. The TestKing switch that generated this output has 24 ports. Why are some of the ports missing from VLAN1?

A. The missing ports are in VLAN 86.
B. The missing ports are administratively disabled.
C. The missing ports are not participating in spanning tree.
D. The missing ports are configured as trunk ports.
E. The missing ports have a status problem such as a speed or duplex mismatch.
F. None of the above

Answer: D
Explanation:
The show vlan command displays the VLAN information and ports in all VLANs. This command displays only the ports in access mode. The missing ports must be configured as trunks.

Section 11: Configure, verify, and troubleshoot trunking on Cisco switches (14 questions)

QUESTION NO: 1
A new trunk has been configured on a switch in the TestKing LAN. By default, which VLANs are allowed over this trunk link?

A. No VLANs
B. Only the VLANs that are specified when creating the trunk
C. Only VLANs 1-64
D. All VLANs
E. All VLAN's except VLAN 1
F. None of the above

Answer: D
Explanation:
Trunk ports send and receive information from all VLANs by default, and if a frame is untagged, it's sent to the management VLAN. This applies to the extended range VLANs as well. But we can remove VLANs from the allowed list to prevent traffic from certain VLANs from traversing a trunked link.

Here is example:
RouterA(config)#int f0/1
RouterA(config-if)# switchport mode trunk
RouterA(config-if)#switchport trunk allowed vlan VLANID

RouterA(config-if)#switchport trunk allowed vlan remove VLANID

QUESTION NO: 2
The TestKing network administrator has just issued the "switchport trunk native vlan 998" command on switch TK2. What is the function of this command?

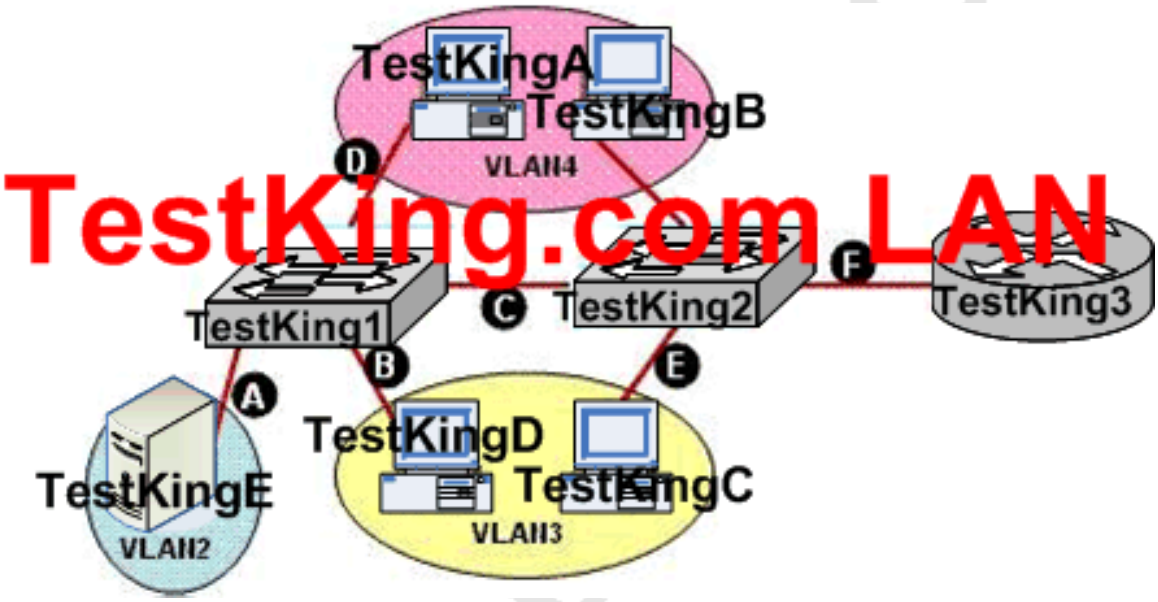
A. It designates VLAN 998 as the default for all unknown tagged traffic
B. It designates VLAN 998 for untagged traffic
C. It blocks VLAN 998 traffic from passing on the trunk
D. It creates a VLAN 998 interface
E. None of the above

Answer: B

Explanation:
Native VLAN is the VLAN that you configure on the Catalyst interface before you configure the trunking on that interface. By default, all interfaces are in VLAN 1. Therefore, VLAN 1 is the native VLAN that you can change. On an 802.1Q trunk, all VLAN packets except the native VLAN are tagged. You must configure the native VLAN in the same way on each side of the trunk. Then, the router or switch can recognize to which VLAN a frame belongs when the router or switch receives a frame with no tag.

To configure the native VLAN use the following command.
Cat2950(config-if)# switchport trunk native vlan 10

QUESTION NO: 3
Part of the TestKing switched LAN is shown in the following exhibit:



TestKing.com LAN

As a network associate for TestKing, you need to configure the switches and router in the graphic shown above so that the hosts in VLAN3 and VLAN4 can communicate with the enterprise server (TestKingE) in VLAN2. To accomplish this, which two Ethernet segments would need to be configured as trunk links? (Choose two)

A. A
B. B
C. C
D. D

E. E
F. F

Answer: C, F

QUESTION NO: 4
You are bringing up a new TestKing switch, and wish to connect it via a trunk to another switch from a different vendor, which uses the IEEE standard for the trunking method. When setting the encapsulation type on the trunk, what should you configure on the Cisco switch?

A. Switch(config)# switchport trunk encapsulation isl
B. Switch(config)# switchport trunk encapsulation ietf
C. Switch(config-if)# switchport trunk encapsulation isl
D. Switch(config-if)# switchport trunk encapsulation ietf
E. Switch(config-if)# switchport trunk encapsulation dot1q

Answer: E
Explanation:
The only real choices for setting up switching trunks are ISL and 802.1Q. ISL is Cisco proprietary, while 802.1Q uses the IEEE defined standard for trunking between switches. To configure the 802.1Q standard, the keyword "dot1q" is used in Cisco switches.
Incorrect Answers:
A, B, D. These are not valid options in a Cisco switch.
C. ISL is a Cisco proprietary method for setting up trunks, and will only work between Cisco switches.

QUESTION NO: 5
A new switch is being installed in the TestKing network and you have been assigned the task of connecting it to an existing switch. In doing this, you want to set up the VLAN Trunking Protocol so that VLAN information can be passed between the switches. Which of the following must you do to accomplish this? (Choose all that apply).

A. You must set each end of the trunk line to IEEE 802.1e encapsulation.
B. You must set the same VTP management domain name on both switches.

C. You must set all ports on the two switches as access ports.
D. You must configure one of the switches as a VTP server.
E. You must use a rollover cable to connect the two switches.

Answer: B, D
Explanation:
The following describes what is needed in order to correctly set up VTP:

VTP operates in one of three modes:

- Server mode
- Client mode
- Transparent mode

For VTP to exchange information, some switches act as servers, and some act as clients. VTP servers can create, modify, and delete VLANs and other configuration parameters for the entire VTP domain; this information, in turn, is propagated to the VTP clients and servers in that same domain. VTP servers save VLAN configurations in the Catalyst NVRAM, whereas in clients, the VLAN configuration is not stored at all. A VTP client cannot create, change, or delete VLANs, nor can it save VLAN configurations in nonvolatile memory.

Incorrect Answers:
A. The encapsulation can be either ISL or 802.1Q, and need to match at each end of the trunk.
C. Ports must only be assigned to VLANS. Once that is done and the trunk is up and running, the VLAN information will be passed between the switches.
E. A regular CAT5 cable is used to connect the switches, assuming 10/100 Ethernet is used.

QUESTION NO: 6
A new TestKing switch is installed into an existing LAN and a new VTP trunk is set up with an existing switch. Which VLANs will be allowed on this new trunk?

A. All defined VLANs are allowed on the trunk by default.
B. Each VLAN, or VLAN range, that is specified with the switchport mode command.
C. Each VLAN, or VLAN range, that is specified with the vtp domain command.
D. Each VLAN, or VLAN range, that is specified with the vlan database command.

E. None of the above

Answer: A
Explanation:
The question does not state that there are multiple VTP Domains meaning that all defined VLANs are allowed on the trunk until a vtp domain command is issued.

QUESTION NO: 7
You need to decide on which trunking method to implement in the TestKing network. What is a characteristic of ISL and 802.1q frame tagging in a switched LAN environment?

A. They are used to find the best path through a network.
B. They allow the exchange of filtering tables.
C. They specify different implementations of the Spanning-Tree Protocol.
D. They allow the exchange of routing tables
E. They provide inter-switch VLAN communication.

Answer: E
Explanation: A trunk link is the other type of Layer 2 port supported on Cisco switches. When a trunk port is configured, it begins marking frames as they exit the port to indicate which VLAN each frame is associated with. The trunk port can also read the markings, called tags, as they enter the trunk port. This enables the switch to send a frame only to the ports for the given VLAN associated with the incoming frame.
The main purpose of trunking is to carry traffic between switches and maintain the VLAN information. Unlike an access link, the trunk link does not belong to a single VLAN but instead can carry traffic from several VLANs over a point-to-point link between two devices that understand the protocol.
Two forms of trunking are used for Cisco switches on Ethernet networks:
An IEEE industry standard called IEEE 802.1Q. This is a frame-tagging mechanism that adds a VLAN identifier to the frame by inserting a tag at Layer 2.
Another form of trunking on Cisco switches is called Inter-Switch Link (ISL), which is a Cisco proprietary trunking mechanism. ISL uses a frame encapsulation method that adds a header to identify the VLAN.
Incorrect Answers:
A, D. These are the functions of routers, not switches.

B. Filtering tables can be used on certain Catalyst switches via the use of VLAN access control lists, but this information is never shared between switches.
C. A separate STP instance is created for each VLAN, but the STP implementation remains the same.

QUESTION NO: 8
Which one of the following protocols allows the information about the configuration of a new VLAN to be distributed across entire switched network?

A. STP
B. VTP
C. EIGRP
D. SNMP
E. CDP
F. None of the above

Answer: B
Explanation:
Sybex CCNA Study Guide 4th Edition states on page 359:
"The basic goals of VLAN Trunking Protocol (VTP) are to manage all configured VLANs across a switched internetwork and to maintain consistency throughout that network. VTP allows an administrator to add, delete, and rename VLANs-information that is then propagated to all other switches in the VTP domain."
Incorrect Answers:
A. STP is the Spanning Tree Protocol, used to prevent bridging loops in a LAN.
C. EIGRP is a routing protocol used to exchange routing information, not VLAN information.
D. SNMP is the Simple Network Management Protocol, used to provide information to remote network management stations.
E. CDP is the Cisco Discovery Protocol, which is used to exchange information between Cisco devices. It can only be used between Cisco routers and switches.
.

QUESTION NO: 9
Which encapsulation types are configurable on a Cisco switch for a trunk? (Select two answer choices)

A. VTP
B. ISL
C. CDP
D. 802.1Q
E. 802.1p
F. LLC
G. IETF

Answer: B, D
Explanation:
Trunks are used to carry traffic belonging to multiple VLANs between devices over the same link. A device can determine which VLAN the traffic belongs to by its VLAN identifier. The VLAN identifier is a tag that is encapsulated with the data. ISL and 802.1q are two types of encapsulations used to carry data from multiple VLANs over trunk links. ISL is a Cisco proprietary protocol for interconnecting multiple switches and maintaining VLAN information as traffic goes between switches. ISL provides VLAN trunking capabilities while maintaining full wire speed performance on Ethernet links in full-duplex or half-duplex mode. ISL operates in a point-to-point environment and will support up to 1000 VLANs. In ISL, the original frame is encapsulated and an additional header is added before the frame is carried over a trunk link. At the receiving end, the header is removed and the frame is forwarded to the assigned VLAN. .ISL uses Per VLAN Spanning Tree (PVST) which runs one instance of Spanning Tree Protocol (STP) per VLAN. PVST allows for optimal root switch placement for each VLAN and supports load balancing of VLANs over multiple trunk links.
802.1Q is the IEEE standard for tagging frames on a trunk and supports up to 4096 VLANs. In 802.1Q, the trunking device inserts a four-byte tag into the original frame and re-computes the Frame Check Sequence (FCS) before sending the frame over the trunk link. At the receiving end, the tag is removed and the frame is forwarded to the assigned VLAN. 802.1Q does not tag frames on the native VLAN. It tags all other frames transmitted and received on the trunk. While configuring a 802.1 trunk, you must make sure that the same native VLAN is configured on both sides of the trunk. IEEE 802.1Q defines a single instance of spanning tree running on the native VLAN for all the VLANs in the network which is called Mono Spanning Tree (MST). This lacks the flexibility and load balancing capability of PVST available with ISL. However, PVST+ offers the capability to retain multiple Spanning Tree topologies with 802.1Q trunking.

QUESTION NO: 10

You need to configure an 802.1Q link on a TestKing switch. Which commands, when used together, would do this? (Select two answer choices)

A. Switch(vlan)# mode trunk
B. Switch(config)# switchport access mode trunk
C. Switch(config-if)# switchport mode trunk
D. Switch(config-if)# switchport trunk encapsulation dot1q
E. Switch(config)# switchport access mode 1
F. Switch(vlan)# trunk encapsulation dot1q

Answer: C, D
Explanation:
Creating this trunk link is a two step process. First you have to set the switchport mode to trunk, and then you configure the encapsulation. The giveaway on this question is the fact that to create a trunk on an interface, you have to be in interface configuration mode. So switchport mode trunk sets the trunk, and switchport trunk encapsulation dot1q sets the encapsulation.

QUESTION NO: 11
Which of the following are VLAN frame encapsulation types that may be configured on a Catalyst switch? (Choose two.)

A. VTP
B. ISL
C. CDP
D. 802.1Q
E. 802.1p
F. LLC

Answer: B, D
Explanation:
The two VLAN trunking encapsulation types are:
Inter-Switch Link (ISL): This is proprietary to Cisco switches, and it's used for Fast Ethernet and Gigabit Ethernet links only. ISL routing can be used on a switch port, router interfaces, and server interface cards to trunk a server. ISL lets you explicitly tag VLAN information onto an Ethernet frame. This tagging information allows VLANs to be multiplexed over a trunk link through an external encapsulation method, which allows the switch to identify the VLAN membership of a frame over the trunked link.

IEEE 802.1Q: Created by the IEEE as a standard method of frame tagging, this actually inserts a field into the frame to identify the VLAN. If you're trunking between a Cisco switched link and a different brand of switch, you have to use 802.1Q for the trunk to work.

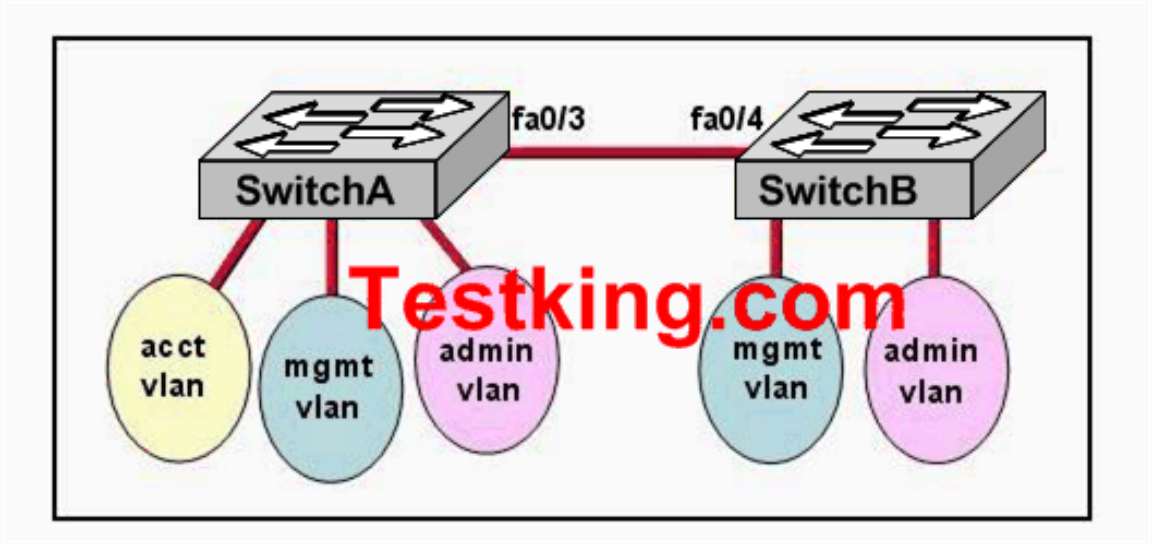
QUESTION NO: 12
There are 2 switches in the Testking LAN, with no routers. Ports 1, 2 & 3 are assigned to VLAN 1 in switch 1 and 2 and ports 4, 5 & 6 are assigned to VLAN 2 in both switches. These two switches are connected together via a trunked link. Which of the conditions below would verify trunk and VLAN operation? (Select all valid answers)

A. Host 1 on VLAN 1 can ping Host 2 on VLAN 1
B. Host 1 on VLAN 1 can ping Host 4 on VLAN 2
C. Host 1 on VLAN 1 can not ping Host 2 on VLAN 1
D. Host 4 on VLAN 2 can not ping Host 1 on VLAN 1
E. Host 4 on VLAN 2 can ping Host 2 on VLAN 2

Answer: A, D, E
Explanation:
If there is no router present, only hosts in the same VLAN will be able to ping each other. In order for any host on one VLAN to communicate with a host on another VLAN, the traffic must pass through a router. Host within the same VLAN will be able to ping each other, even though they reside on different switches, as long as the switches have a trunk connection configured between them.

QUESTION NO: 13
Two TestKing switches are connected as shown below:

Testking.com



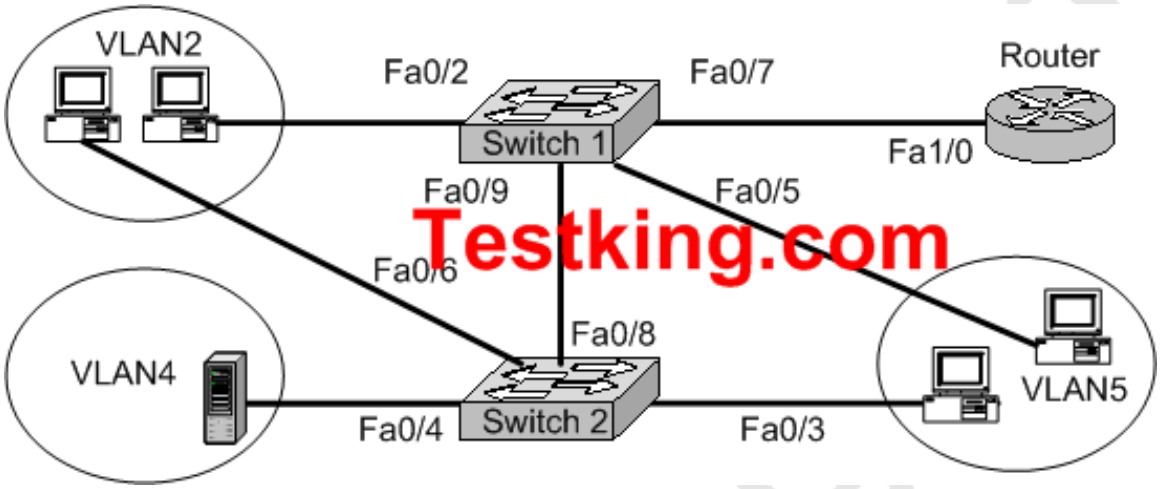
Please study the exhibit carefully. Configuration of both switches has been completed. During testing, the network administrator notices that users on SwitchA can not connect with users in the same VLAN on SwitchB. What should be done to solve this problem?

A. Ensure that the IP address of SwitchA is on the same network as the IP address of SwitchB.
B. Ensure that the same interface number is used to connect both switches.
C. Ensure that the ports connecting the two switches are configured to trunk.
D. Ensure that SwitchA and SwitchB are connected with a straight-through cable.

Answer: C
Explanation:
Ports can be in two states on a switch:
Access ports: This type of link is only part of one VLAN, and it's referred to as the native VLAN of the port. Any device attached to an access link is unaware of a VLAN membership the device just assumes it's part of a broadcast domain, but it does not understand the physical network.
Trunk links: Trunks can carry multiple VLANs and originally gained their name after the telephone system trunks that carry multiple telephone conversations.
So to carry the VLAN information from one switch to another switch, a trunk link needs to be configured between the two switches, using the "switchport mode trunk" command.

Note: By default all ports are in access mode.

QUESTION NO: 14
The TestKing network is displayed in the diagram below:



A network associate is trying to understand the operation of the TestKing network by studying the graphic. All hosts are able to reach the enterprise server on VLAN4. The associate needs to determine which interfaces are functioning as a trunk ports. Which of the interfaces are trunks? (Choose two)

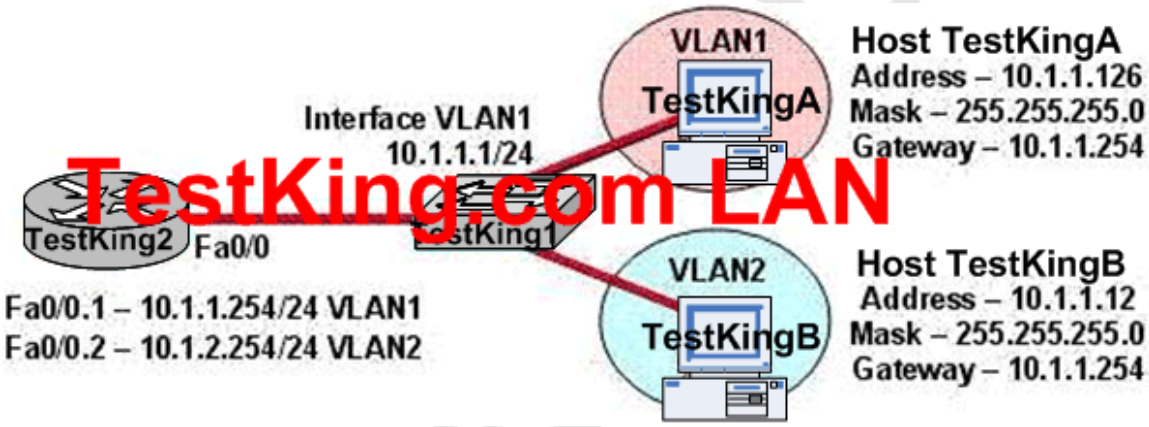
A. Switch1 - Fa0/2
B. Switch1 - Fa0/9
C. Switch2 - Fa0/3
D. Switch2 - Fa0/4
E. Switch2 - Fa0/6
F. Router - Fa1/0

Answer: B, F
Explanation:

Trunks are only used on connections between two switches, or between routers and switches. Trunk ports are not used on connections to end stations, such as servers or computer stations. In this example, only choice B and F are possible trunks.

Section 12: Configure, verify, and troubleshoot interVLAN routing (8 questions)

QUESTION NO: 1
Two TestKing hosts reside in different VLANs as shown below:



The TestKing network shown in the diagram above is experiencing connectivity problems. Which of the following will correct the problems? (Choose two.)

A. Configure the gateway on Host TestKingA as 10.1.1.1
B. Configure the IP Address of Host TestKingB as 10.1.2.2
C. Configure the IP Address of Host TestKingA as 10.1.2.2
D. Configure the gateway on host TestKingB as 10.1.2.254

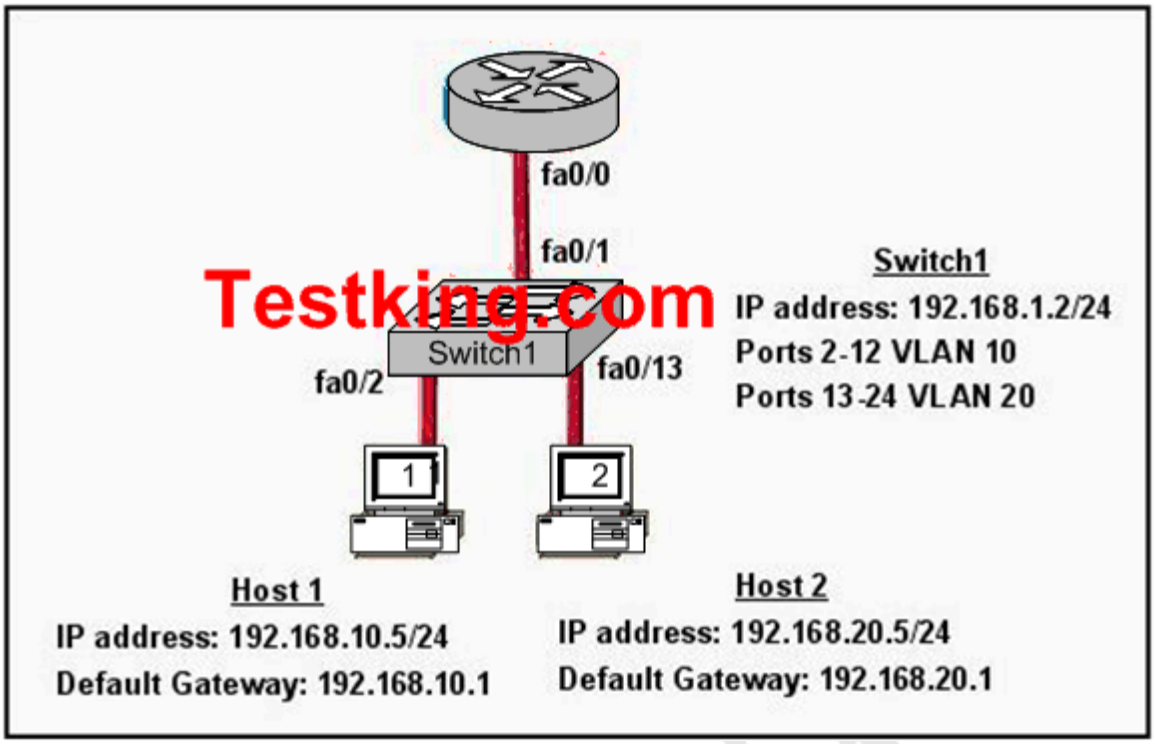
Answer: B, D
Explanation:
By default, only hosts that are members of the same VLAN can communicate. To change this and allow inter-VLAN communication, you need a router or a layer 3 switch.

Here is the example of configuring the router for inter-vlan communication
RouterA(config)#int f0/0.1
RouterA(config-subif)#encapsulation ?
dot1Q IEEE 802.1Q Virtual LAN
RouterA(config-subif)#encapsulation dot1Q or isl VLAN ID
RouterA(config-subif)# ip address x.x.x.x y.y.y.y

Host TestkingB is belonging to VLAN2,so should have the IP address of VLAN 2 and gateway should be the IP address of Router's same VLAN's IP.

QUESTION NO: 2
A TestKing network is shown below:

TestKing.com



Based on the information shown above, what commands must be configured on the TestKing switch and the router to allow communication between host 1 and host 2? (Choose two)

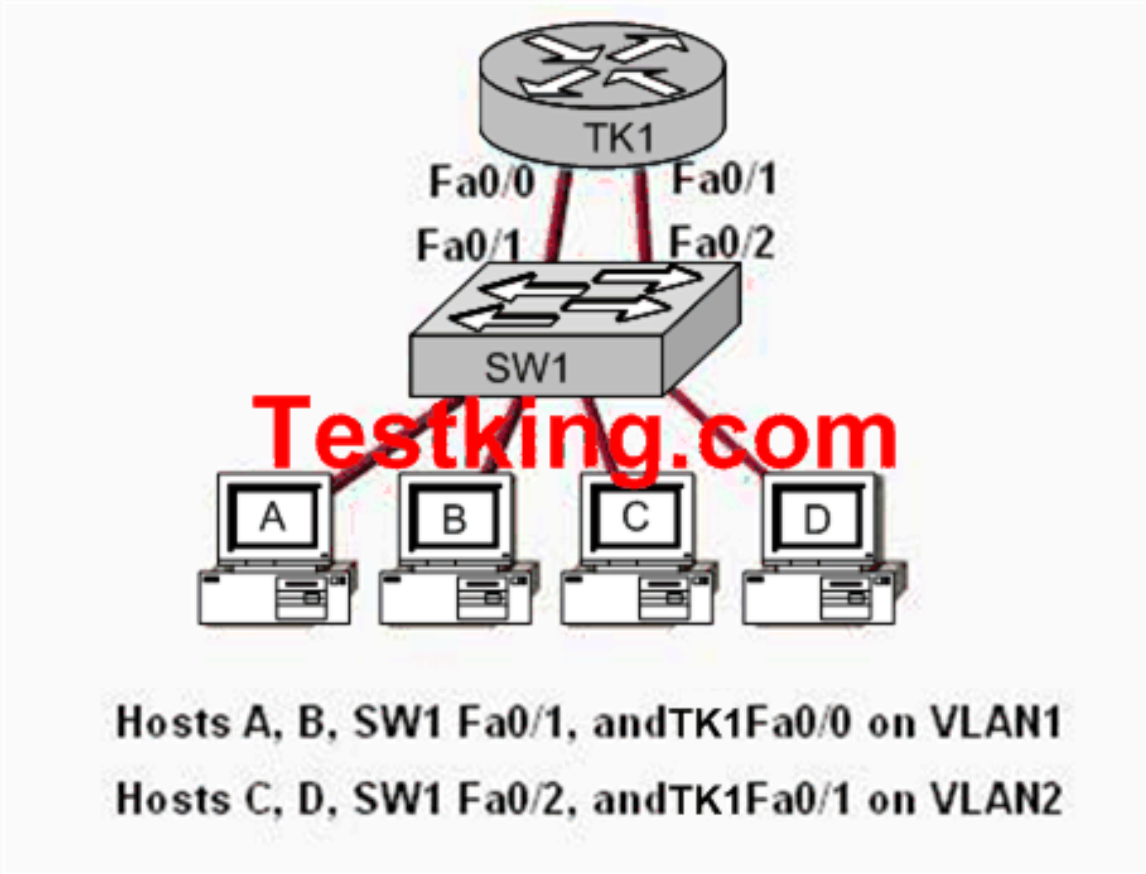
A. Router(config)# interface fastethernet 0/0
Router(config-if)# ip address 192.168.1.1 255.255.255.0
Router(config-if)# no shut down
B. Router(config)# interface fastethernet 0/0
Router(config-if)# no shutdown
Router(config)# interface fastethernet 0/0.1
Router(config-subif)# encapsulation dot1q 10
Router(config-subif)# ip address 192.168.10.1 255.255.255.0
Router(config)# interface fastethernet 0/0.2
Router(config-subif)# encapsulation dot1q 20
Router(config-subif)# ip address 192.168.20.1 255.255.255.0

C. Router(config)# router eigrp 100
Router(config-router)# network 192.168.10.0
Router(config-router)# network 192.168.20.0
D. Switch1(config)# vlan database
Switch1(config-vlan)# vtp domain XYZ
Switch1(config-vlan)# vtp server
E. Switch1(config)# interface fastethernet 0/1
Switch1(config-if)# switchport mode trunk
F. Switch1(config)# interface vlan 1
Switch1(config-if)# ip default-gateway 192.168.1.1

Answer: B, E
Explanation:
In this exhibit, there are two different VLANs (VLAN 10 and VLAN 20). In this case, the router is required for Inter-VLAN routing. In order to properly configure Inter-VLAN Routing, we need to assign the IP address and the encapsulation type. In the router we need two sub-interfaces created we need to assign the IP as well as defined the encapsulation type for each of these. In the switch, only a trunk port can carry the information of multiple VLANs so fa0/1 is trunked on the switch as shown by answer E.

QUESTION NO: 3
Two TestKing devices are connected as shown below:

TestKing.com



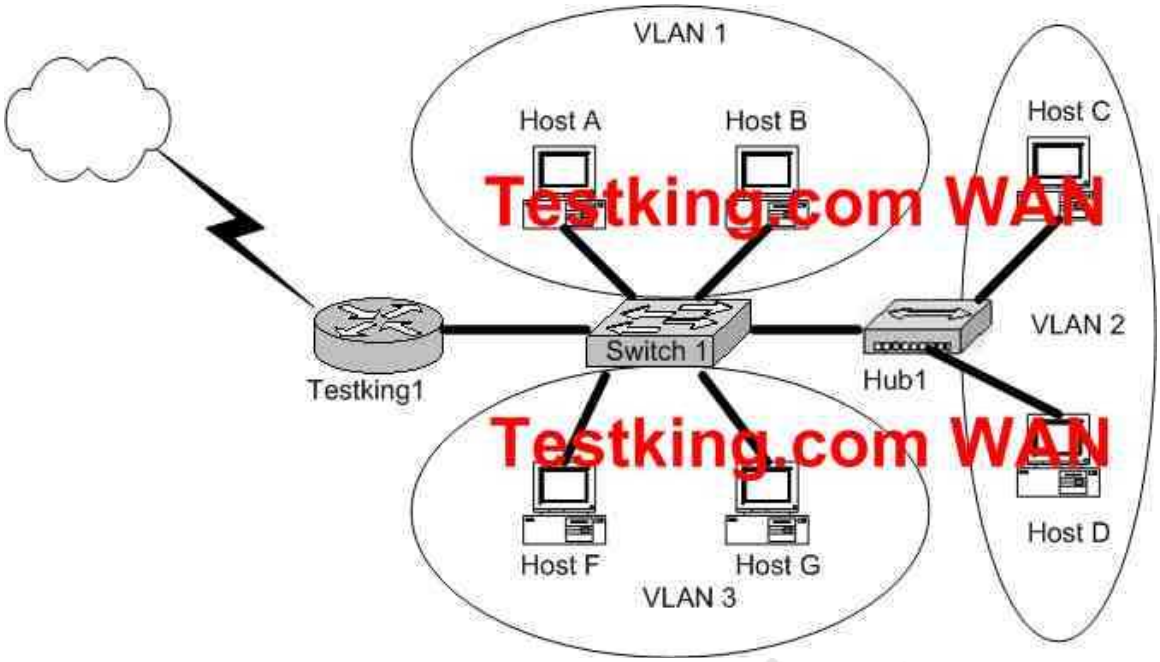
The TestKing network administrator needs to add a new VLAN, named VLAN3, to the network shown above. Unfortunately, there is not another FastEthernet interface on TK1 to connect to the new VLAN3. Which approach is the most cost effective solution for this problem?

A. Purchase a new FastEthernet module and install it on TK1.
B. Replace TK1 with a new router that has at least three FastEthernet interfaces.
C. Configure a second switch to support VLAN3 with a VLAN trunk between SW1 and the new switch.
D. Configure a single VLAN trunk between TK1 and SW1 and configure a subinterface on the TK1 interface for each VLAN.
E. Connect another router to a serial interface of TK1. Use a FastEthernet interface on the new router for VLAN3.
F. None of the above

Answer: D
Explanation:
A Router is a Layer 3 device that plays the vital role for inter-VLAN communication. For inter-VLAN communication either we require multiple interfaces or we can create subinterfaces on the router for each VLAN.
Example router configuration for this scenario:
(config)# interface fa0.1
(config-if)#ip address 192.168.1.1 255.255.255.0
(config-if)#no shutdown
(config)#interface fa0.2
(config-if)#ip address 192.168.2.1 255.255.255.0
With this configuration, the switch can connect to the router's FastEthernet Interface by trunking, so one port of switch can carry the information of multiple VLANs.

QUESTION NO: 4
The Testking Network consists of a router, switch, and hub as shown below:

TestKing.com



In accordance with the above diagram; which of the statements below correctly describe the switch port configuration and the router port configurations? (Select three answer choices)

A. The Testking1 WAN port is configured as a trunking port.
B. The Testking1 port connected to Switch1 is configured using subinterfaces.
C. The Testking1 port connected to Switch1 is configured as 10 Mbps.
D. The Switch1 port connected to Testking1 is configured as a trunking port.
E. The Switch1 port connected to Host B is configured as an access port.
F. The switch1 port connected to Hub1 is configured as full duplex.

Answer: B, D, E
Explanation:

B is correct because the diagram and the function match the description of a subinterface. Subinterfaces are needed because for inter-vlan communication, routing needs to take place. D is correct because all 3 VLAN's are trunked to reach the router. E is correct because access ports are correct in this case.

Incorrect Answers:

A. This is incorrect because trunks only work between switches, and not between a router and a WAN.

C, F. Although these may be true, we are not given enough information in this diagram to confirm it.

QUESTION NO: 5

Testking.com

A TestKing router is configured as shown in the graphic above. The switch is connected to the router over a VLAN trunk. The switch has been configured with three VLANs: VLAN1, VLAN2, and VLAN3. In addition, the IP address of the switch is 192.168.1.2. A host is being added to the switch on VLAN 2.
What is the correct default gateway for this computer?

A. 192.168.1.1
B. 192.168.1.2

C. 192.168.2.1
D. 192.168.2.2
E. 192.168.3.1
F. 192.168.3.2
G. None of the above

Answer: C
Explanation:
The default gateway for this host should be the IP address of the local router on that VLAN. Based on the router configuration, this IP address is 192.168.2.1. In the router configuration, the number that follows the "encapsulation dot1q" command is the VLAN that is assigned to it. In this case, the PC host belongs to VLAN 2, so the subinterface fast Ethernet 0/0.2 is the one that should be chosen.
Incorrect Answers:
A. This is the IP address that hosts in VLAN 1 should use as their default gateway.
B. Even though this is the IP address of the switch itself as stated in the question, it should not be chosen as the default gateway for any of the hosts in any of the VLANs. This IP address would be used only to administer and make changes to the switch.
D, F. These are incorrect choices.
E. This is the IP address that hosts in VLAN 3 should use as their default gateway.

QUESTION NO: 6
A portion of the TestKing network is displayed below:

```
TK1(config)# interface FastEthernet 0/0.2
TK1(config-subif)# encapsulation dot1q 1
TK1(config-subif)# ip address 192.1.1.129 255.255.255.240
TK1(config)# interface FastEthernet 0/0.3
TK1(config-subif)# encapsulation dot1q 2
TK1(config-subif)# ip address 192.1.1.65 255.255.255.192
```

Host A in the graphic is connected to a switch port assigned to VLAN 1.
Which two settings on host A are required to allow connectivity with Host B on VLAN 2? (Choose two)

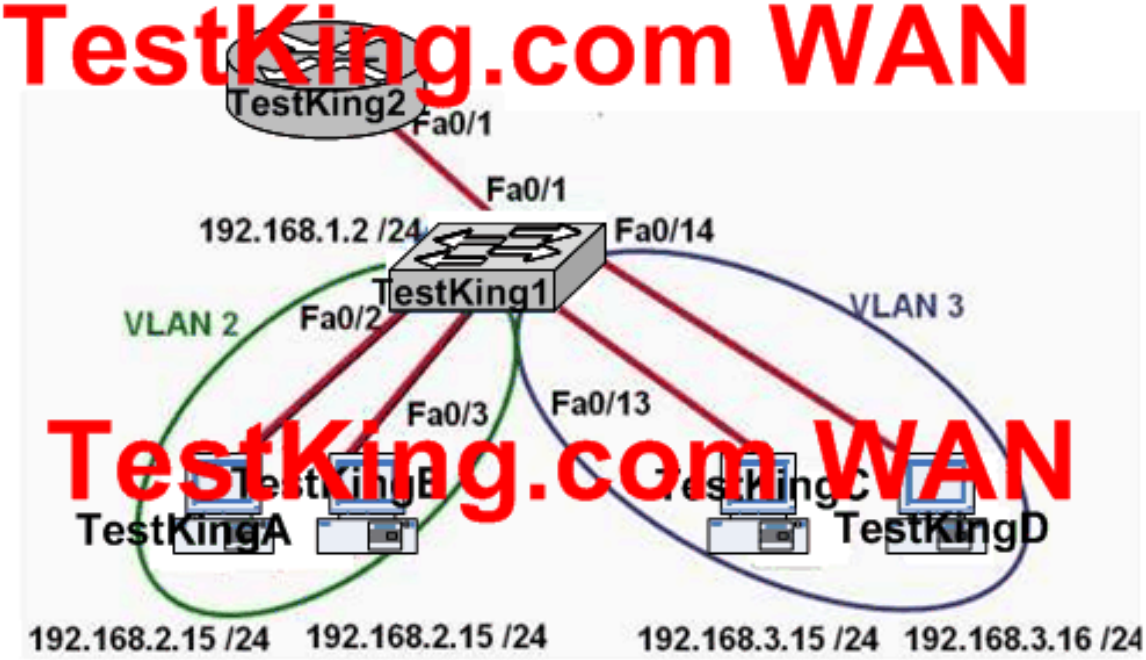
A. IP address: 192.1.1.66 255.255.255.240
B. IP address: 192.1.1.130 255.255.255.192
C. IP address: 192.1.1.142 255.255.255.240
D. Default gateway: 192.1.1.129
E. Default gateway: 192.1.1.65
F. Default gateway: 192.1.1.1

Answer: C, D
Explanation:
Sub-interface Fast Ethernet 0/0.2 was created for VLAN 1 through the use of the "encapsulation dot1q 1" command. Therefore, since host A resides in VLAN 1 it must be configured with an IP address in the 192.1.1.128/28 subnet and it must be configured with the IP address of the default gateway, which is the IP address assigned to the corresponding sub-interface of the router.
Incorrect Answers:
A. This IP address is not in the same subnet as the Fast Ethernet 0/0.2 sub-interface.
B. The subnet mask is incorrect in this choice.
E, F. The default gateway needs to be set as the IP address for the sub-interface created in the router for VLAN 1.

QUESTION NO: 7
Part of the TestKing WAN is shown below:

TestKing.com

TestKing.com WAN



TestKing.com WAN

TestKing2 configuration exhibit:

```
TestKing2 # show ip route
C   192.168.1.0 /24 is directly connected to Fa0/1.1
C   192.168.2.0 /24 is directly connected to Fa0/1.2
```

TestKing.com

In this network segment, the TestKing network administrator has created a new VLAN on TestKing1 and added host TestKingC and host TestKingD. This administrator has properly configured switch interfaces FastEthernet0/13 through FastEthernet0/24 to be members of the new VLAN. However, after the network administrator completed the configuration, host TestKingA could communicate with host TestKingB, but host TestKingA could not communicate with host TestKingC or host TestKingD. Which commands are required to resolve this problem?

A. TestKing2(config)# router rip
TestKing2(config-router)# network 192.168.1.0

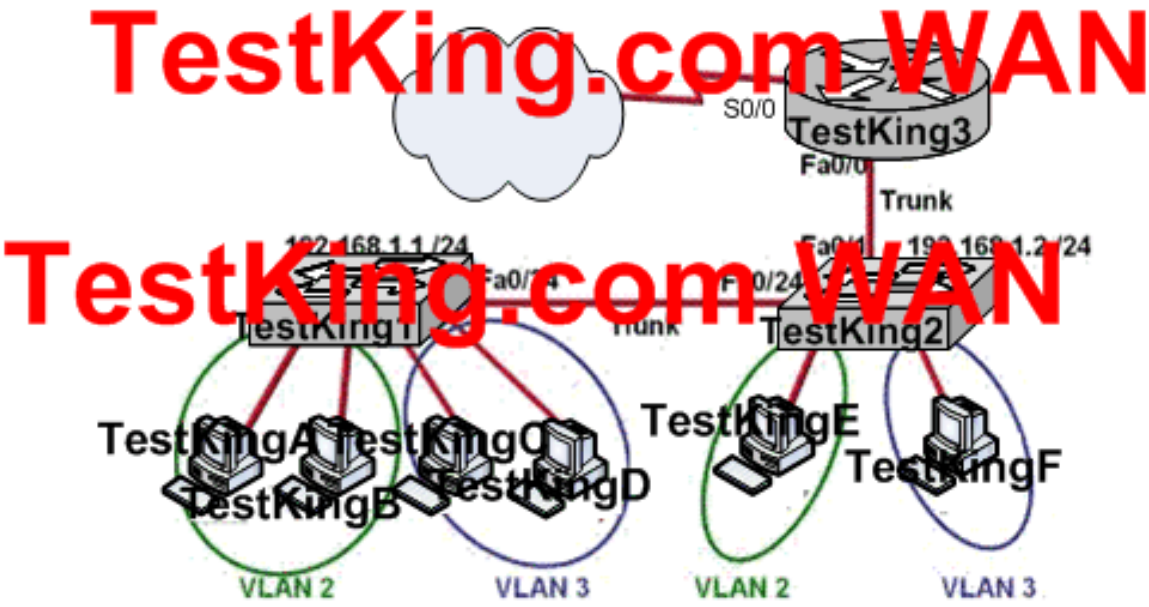
TestKing2(config-router)# network 192.168.2.0
TestKing2(config-router)# network 192.168.3.0
B. TestKing2(config)# interface fastethernet 0/1.3
TestKing2(config-if)# encapsulation dot1q 3
TestKing2(config-if)# ip address 192.168.3.1 255.255.255.0
C. TestKing1(config)# interface fastethernet 0/1
TestKing1(config-if)# switchport mode trunk
TestKing1(config-if)# switchport trunk encapsulation isl
D. TestKing1# vlan database
TestKing1(vlan)# vtp v2-mode
TestKing1(vlan)# vtp domain testking
TestKing1(vlan)# vtp server
E. None of the above

Answer: B
Explanation:

Here is the example of configuring the router for inter-vlan communication
RouterA(config)#int f0/0.1
RouterA(config-subif)#encapsulation ?
dot1Q IEEE 802.1Q Virtual LAN
RouterA(config-subif)#encapsulation dot1Q or isl VLAN ID
RouterA(config-subif)# ip address x.x.x.x y.y.y.y

QUESTION NO: 8
Part of the TestKing network is shown below:

TestKing.com



Based on the information provided above, which two statements are true about interVLAN routing in this TestKing network segment? (Choose two)

A. Router TestKing3 and Switch TestKing2 should be connected via a crossover cable.
B. Host TestKingE and host TestKingF use the same IP gateway address.
C. The FastEthernet 0/0 interface on Router TestKing3 and Switch TestKing2 trunk ports must be configured using the same encapsulation type.
D. Router TestKing3 will not play a role in communications between host TestKingA and host TestKingD.
E. Router TestKing3 needs more LAN interfaces to accommodate the VLANs that are shown in the exhibit.
F. The FastEthernet 0/0 interface on Router TestKing3 must be configured using subinterfaces.

Answer: C, F
Explanation:
By default, only hosts that are members of the same VLAN can communicate. To change this and allow inter-VLAN communication, you need a router or a layer 3 switch.

Here is the example of configuring the router for inter-vlan communication
RouterA(config)#int f0/0.1

RouterA(config-subif)#encapsulation ?
dot1Q IEEE 802.1Q Virtual LAN
RouterA(config-subif)#encapsulation dot1Q or isl VLAN ID
RouterA(config-subif)# ip address x.x.x.x y.y.y.y

Section 13: Configure, verify, and troubleshoot VTP (12 questions)

QUESTION NO: 1
The TestKing network administrator has issued the "VTP password TESTKING" command on a Cisco device. What is the purpose of this command?

A. It allows two VTP servers to exists in the same domain, each configured with different passwords
B. It is the password required when promoting a switch from VTP client mode to VTP server mode
C. It is used to access the VTP server to make changes to the VTP configuration
D. It is used to validate the sources of VTP advertisements sent between switches
E. None of the above

Answer: D
Explanation:
When you create the VTP domain, you have a bunch of options, including setting the domain name, password, operating mode, and pruning capabilities of the switch. Use the vtp global configuration mode command to set all this information.
The purpose of setting password on VTP is to validate the sources of VTP advertisements sent between switches belonging to same VTP domain.

QUESTION NO: 2
The VTP status of two TestKing devices is displayed below:

TestKing.com
TestKing.com

You work as a network technician at TestKing and you have configured two switches, named TestKing1 and TestKing2 to use VTP. However, the switches are not sharing VTP messages. Given the command output shown in the graphic above, why are these switches not sharing VTP messages?

A. The VTP domain name is not correctly configured
B. VTP traps generation is disabled
C. VTP V2 mode is disabled
D. VTP pruning mode is disabled
E. The VTP operating mode is not correctly configured
F. The VTP version is not correctly configured
G. VTP has not been enabled on one of the TestKing devices
H. None of the above

Answer: A
Explanation:
When you create the VTP domain, you have a bunch of options, including setting the domain name, password, operating mode, and pruning capabilities of the switch. Use the vtp global configuration mode command to set all this information.

To share the VTP messages switches should have same domain name and password. Mode can be either Server, Transparent, Client.

In the Exhibit one switch has London and another has Madrid domain name, so to exchange VTP message both should have same domain name.

QUESTION NO: 3
The VTP status of switch TestKing1 is shown below:

```
TestKing1# show vtp status
VTP Version                     : 2
Configuration Revision          : 1
Maximum VLANs supported locally : 250
Number of existing VLANs        : 8
VTP Operating Mode              : Client
VTP Domain Name                 : XYZ
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Disabled
VTP Traps Generation            : Disabled
```

TestKing.com

Given the output of the TestKing1 switch shown above, which statement best describes the operation of this switch?

```
Floor3# show vtp status
VTP Version                     : 2
Configuration Revision          : 1
Maximum VLANs supported locally : 250
Number of existing VLANs        : 8
VTP Operating Mode              : Client
VTP Domain Name                 : XYZ
VTP Pruning Mode                : Disabled
VTP V2 Mode                     : Disabled
VTP Traps Generation            : Disabled
```

A. VTP is disabled on this switch
B. The switch can create, change and delete VLANs
C. The switch learns VLAN information but does not have save it to NVRAM
D. The switch can create VLANs locally but will not forward this information to other switches
E. The switch learns VLAN information and updates the local VLAN database in NVRAM

F. None of the above

Answer: C
Explanation:
This switch is operated on client VTP mode.
In client mode, switches receive information from VTP servers, but they also send and receive updates, so in this way, they behave like VTP servers. The difference is that they can't create, change, or delete VLANs. Plus, none of the ports on a client switch can be added to a new VLAN before the VTP server notifies the client switch of the new VLAN. Also good to know is that VLAN information sent from a VTP server isn't stored in NVRAM, which is important because it means that if the switch is reset or reloaded, the VLAN information will be deleted. Here's a hint: If you want a switch to become a server, first make it a client so it receives all the correct VLAN information, then change it to a server.

QUESTION NO: 4
Which VTP mode should a Cisco switch be set to if this switch is to add or delete VLANs to a management domain?

A. Transparent
B. Server
C. Auto
D. Client
E. User

Answer: B
Explanation:
VTP Modes:
If you intend to make a switch part of a VTP management domain, each switch must be configured in one of three possible VTP modes. The VTP mode assigned to a switch will determine how the switch interacts with other VTP switches in the management domain. The three VTP modes that can be assigned to a Cisco switch include server mode, client mode, and transparent mode. Each of these roles is outlined below:
Server Mode Once VTP is configured on a Cisco switch, the default mode used is Server Mode. In any given VTP management domain, at least one switch must be in Server Mode. When in Server Mode, a switch can be used to add, delete, and modify VLANs, and this information will be passed to all other switches in the VTP management domain.

Client Mode When a switch is configured to use VTP Client Mode, it is simply the recipient of any VLANs added, deleted, or modified by a switch in Server Mode within the same management domain. A switch in VTP client mode cannot make any changes to VLAN information.
Transparent Mode A switch in VTP Transparent Mode will pass VTP updates received by switches in Server Mode to other switches in the VTP management domain, but will not actually process the contents of these messages. When individual VLANs are added, deleted, or modified on a switch running in transparent mode, the changes are local to that particular switch only, and are not passed to other switches in the VTP management domain.
Based on the roles of each VTP mode, the use of each should be more or less obvious. For example, if you had 15 Cisco switches on your network, you could configure each of them to be in the same VTP management domain. Although each could theoretically be left in the default Server Mode, it would probably be easier to leave only one switch in this configuration, and then configure all remaining switches for VTP Client Mode. Then, when you need to add, delete, or modify a VLAN, that change can be carried out on the VTP Server Mode switch and passed to all Client Mode switches automatically. In cases where you need a switch to act in a relatively standalone manner, or do not want it to propagate information about its configured VLANs, use Transparent Mode.
Incorrect Answers:
A. A switch in VTP Transparent Mode will pass VTP updates received by switches in Server Mode to other switches in the VTP management domain, but will not actually process the contents of these messages.
C, E. These are not valid VTP modes.
D. Client mode merely accepts changes made by the switch that is connected and in SERVER mode.

QUESTION NO: 5
Refer to the following output shown on router TestKing2:

Testking.com

The "show vtp status" command is executed on the TestKing2 switch as shown above. Based on this information, which statement is true for this switch?

A. The VLAN database is updated when VTP information is received from other switches.
B. The configuration revision number increments each time the VLAN database is updated.
C. The switch forwards its VLAN database to other switches in the ICND VTP domain.
D. The switch forwards VTP updates that are sent by other switches in the ICND domain.
E. None of the above.

Answer: D
Explanation:
Switches in transparent mode don't participate in the VTP domain or share its VLAN database, but they'll still forward VTP advertisements through any configured trunk links.

QUESTION NO: 6
What are two results of entering the TKSwitch(config)# vtp mode client command on a Catalyst switch in the TestKing LAN? (Choose two.)

A. The switch will ignore VTP summary advertisements
B. The switch will forward VTP summary advertisements
C. The switch will process VTP summary advertisements

D. The switch will originate VTP summary advertisements
E. The switch will create, modify and delete VLANs for the entire VTP domain

Answer: B, C
Explanation :
Server mode-VTP servers have full control over VLAN creation and modification for their domains. All VTP information is advertised to other switches in the domain, while all received VTP information is synchronized with the other switches. By default, a switch is in VTP server mode. Note that each VTP domain must have at least one server so that VLANs can be created, modified, or deleted, and VLAN information can be propagated.
Client mode-VTP clients do not allow the administrator to create, change, or delete any VLANs. Instead, they listen to VTP advertisements from other switches and modify their VLAN configurations accordingly. In effect, this is a passive listening mode. Received VTP information is forwarded out trunk links to neighboring switches in the domain, so the switch also acts as a VTP relay.
Transparent mode-VTP transparent switches do not participate in VTP. While in transparent mode, a switch does not advertise its own VLAN configuration, and a switch does not synchronize its VLAN database with received advertisements. In VTP version 1, a transparent-mode switch does not even relay VTP information it receives to other switches, unless its VTP domain names and VTP version numbers match those of the other switches. In VTP version 2, transparent switches do forward received VTP advertisements out of their trunk ports, acting as VTP relays. This occurs regardless of the VTP domain name setting.

QUESTION NO: 7
Exhibit:

TestKing.com

TestKingA # show vtp status

VTP Version	: 2
Configuration Revision	: 232
Maximum VLANs supported locally :	: 64
Number of existing VLANs	: 5
VTP Operating Mode	: Server
VTP Domain Name	: Tokyo
VTP Pruning Mode	: Enabled
VTP V2 Mode	: Disabled
VTP Traps Generation	: Disabled

<output omitted>

TestKingB # show vtp status

VTP Version	: 2
Configuration Revision	: 234
Maximum VLANs supported locally :	: 64
Number of existing VLANs	: 7
VTP Operating Mode	: Client
VTP Domain Name	: Tokyo
VTP Pruning Mode	: Disabled
VTP V2 Mode	: Disabled
VTP Traps Generation	: Disabled

<output omitted>

Study the Exhibit carefully. Switch TestKingA sends a VTP advertisement and Switch TestKingB receives it. Which statement accurately describes how Switch TestKingB will respond?

A. Switch TestKingB will add 2 VLANs to its VLAN database and change the configuration revision number to 232
B. Switch TestKingB will remove 2 VLANs from its VLAN database and change the configuration revision number to 232
C. Switch TestKingB will enable VTP pruning, add two VLANs, and increment the configuration revision number to 233
D. Switch TestKingB will ignore the VTP advertisement
E. None of the above

Answer: D
Explanation:

Switches advertise VTP management domain information, as well as a configuration revision number and all known VLANs with any specific parameters. There's also something called VTP transparent mode; in it, you can configure switches to forward VTP information through trunk ports, but not to accept information updates or update their VTP databases. If you find yourself having problems with users adding switches to your VTP domain, you can include passwords, but don't forget that every switch must be set up with the same password-this can get ugly.
Switches detect the additional VLANs within a VTP advertisement and then prepare to receive information on their trunk ports with the newly defined VLAN in tow. This information would be VLAN ID, 802.10 SAID fields, or LANE information. Updates are sent out as revision numbers that are the notification plus 1. Any time a switch sees a higher revision number, it knows the information that it's receiving is more current, and it will overwrite the current database with that new information.
The Client synchronizes with the vtp server on every 5 minutes, if revision number is updated then client copy the configuration.
The client has a revision number of 234, but would receive an update number of 232 from the VTP server.

QUESTION NO: 8
Given the output of the London switch displayed in the graphic below, what VTP functions will this switch perform?

TestKing.com

A. It will pass on information about the VTP configuration
B. VTP is disabled on this device
C. It will learn and save VTP configuration in the running configuration but does not save it to NVRAM

D. It will create, change and delete VLANs
E. None of the above

Answer: C
Explanation:
The 3 VTP Modes are:
1. Server: By default, a Catalyst switch is in the VTP server mode and in the "no management domain" state until the switch receives an advertisement for a domain over a trunk link or a VLAN management domain is configured. A switch that has been put in VTP server mode and had a domain name specified can create, modify, and delete VLANs. VTP servers can also specify other configuration parameters such as VTP version and VTP pruning for the entire VTP domain. VTP information is stored in NVRAM.
2. Client: The VTP client maintains a full list of all VLANs within the VTP domain, but it does not store the information in NVRAM. VTP clients behave the same way as VTP servers, but it is not possible to create, change, or delete VLANs on a VTP client. Any changes made must be received from a VTP server advertisement.
3. Transparent: VTP transparent switches do not participate in VTP. A VTP transparent switch does not advertise its VLAN configuration, and does not synchronize its VLAN configuration based on received advertisements. However, in VTP Version 2, transparent switches do forward VTP advertisements that the switches receive out their trunk ports. VLANs can be configured on a switch in the VTP transparent mode, but the information is local to the switch (VLAN information is not propagated to other switches) and is stored in NVRAM.
As can be seen by the output above, this switch is running in VTP client mode, making choice C correct.

QUESTION NO: 9
Study the Exhibit below carefully:

```
London#show vtp
VTP Version: 2
Configuration Revision: 0
Maximum VLANs supported locally: 64
Number of existing VLANs: 5
VTP Operating Mode: Client
VTP Domain Name: London
VTP Pruning Mode: Disabled
VTP V2 Mode: Disabled
```

```
VTP Traps Generation: Disabled
```

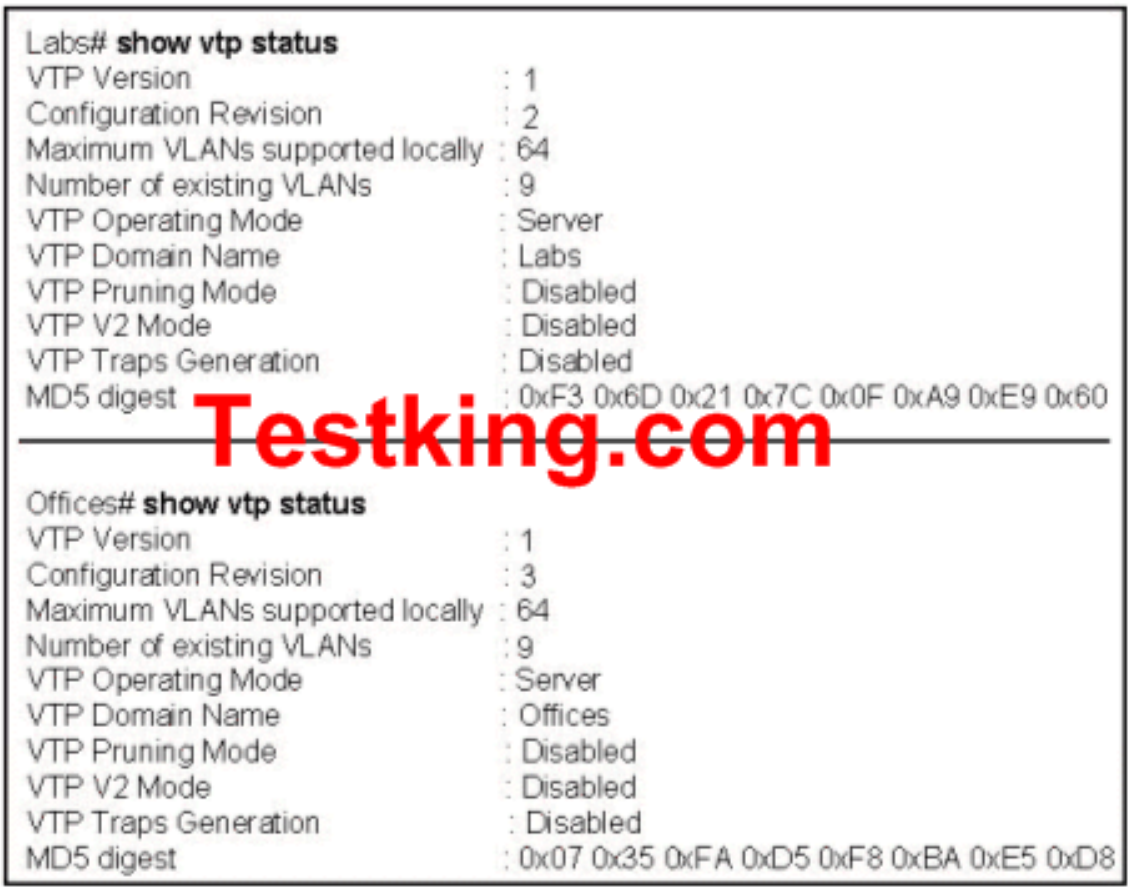
Based on the information given above, what is the VTP function of this particular switch?

A. Learn and save VTP configuration in the running configuration.
B. Create and change VLANs.
C. Forwards information about VTP configuration.
D. VTP is disabled on this device.
E. VTP is not saved to NVRAM.

Answer: C
Explanation:
From the output this switch is operating merely as VTP client, so it basically does as the VTP server says, and passes on information about VTP configuration to the next switch in line.
Incorrect Answers:
A. This is incorrect because the function is redundant.
B. This incorrect because the switch must be in server or transparent mode to create and change VLANs.
D. This is incorrect because if VTP would be disabled, it wouldn't appear on the command output.
E. If this were true, the VTP configuration information would not be displayed after being powered on.

QUESTION NO: 10
Exhibit:

TestKing.com



Study the Exhibit carefully. The network administrator has configured the switches in the school network to use VTP. The switches are not sharing VLAN information. Which sequence of commands should be issued to correct this problem?

A. Offices(config)# vtp mode client
Labs(config)# vtp mode client
B. Offices(config)# vtp domain School
Labs(config)# vtp domain School
C. Offices(config)# vtp pruning
Labs(config)# vtp pruning
D. Offices(config)# vtp version 2
Labs(config)# vtp version 2

Answer: B
Explanation:
For switched to share vlan information, there VTP domain names must be same. In the Output shown, VTP domain name of LABS router is Labs and VTP domain name of Offices router is Offices. As the domain names are different, they are unable to communicate with each other. In order to correct this problem, we have to change their names to a single common name.

QUESTION NO: 11
Two TestKing switches are connected together as shown below:

TestKing.com

TK1#show vtp status

VTP Version	: 2
Configuration Revision	: 5
Maximum VLANs supported locally	: 68
Number of existing VLANs	: 8
VTP Operating Mode	: Server
VTP Domain Name	: JAX
VTP Pruning Mode	: Disabled
VTP V2 Mode	: Disabled
VTP Traps Generation	: Disabled
MD5 digest	: 0x2D 0x88 0xA9 0x2A 0xC4 0xF8 0x77 0xEF
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00	

Testking.com

TK2#show vtp status

VTP Version	: 2
Configuration Revision	: 3
Maximum VLANs supported locally	: 68
Number of existing VLANs	: 8
VTP Operating Mode	: Server
VTP Domain Name	: JAK
VTP Pruning Mode	: Disabled
VTP V2 Mode	: Disabled
VTP Traps Generation	: Disabled
MD5 digest	: 0xA8 0x67 0xF9 0xA8 0x92 0xE9 0x30 0x6B
Configuration last modified by 0.0.0.0 at 0-0-00 00:00:00	

Switches TK1 and TK2 have been configured with a trunked line that has been verified as working correctly. However, VTP is not propagating VLANs from one switch to the other. Based on the command output shown, what is the problem?

A. The revision number is not the same on both switches.
B. Only one switch can be in server mode.
C. The VTP domain name is not correctly configured.
D. VLANs have not been configured on the VTP server.
E. The VTP pruning mode is not correctly configured.

Answer: C
Explanation:
VTP messages are exchanged between switches within a common VTP domain. In the output shown, VTP domain name of switch TK1 is JAX and domain name of switch TK2 is JAK. As the VTP domain names are different so these two switches will not exchange the VTP Information.
Reference: http://www.ciscopress.com/articles/article.asp?p=29803&seqNum=4&rl=1

QUESTION NO: 12
Network topology exhibit:

TestKing1 exhibit:

```
TestKing1# show vtp status
VTP Version: 2
Configuration Revision: 240
Maximum VLANs supported locally: 1005
Number of existing VLANs: 33
VTP Operating Mode: Server
VTP Domain Name: Lab_Network
VTP Pruning Mode: Enabled
<output omitted>
```

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TestKing2 exhibit:

TestKing3 exhibit:

Study the exhibits carefully. You are told by your boss, Mrs. Tess King, that the VLAN configuration of switch TestKing3 is not synchronized with the other parts of the network. She tells you that you need to find out why TestKing3 is not receiving VTP updates. What should you tell her?

A. TestKing1 supports a greater number of VLANs than does switch TestKing3.
B. TestKing2 is not relaying VTP advertisements to TestKing3.
C. TestKing2 should be operating in VTP server or client mode to relay VTP updates.
D. TestKing3 has fewer existing VLANs than does TestKing1.
E. TestKing3 should be operating in VTP mode to relay VTP updates.
F. TestKing3 has a revision number higher than that being advertised.

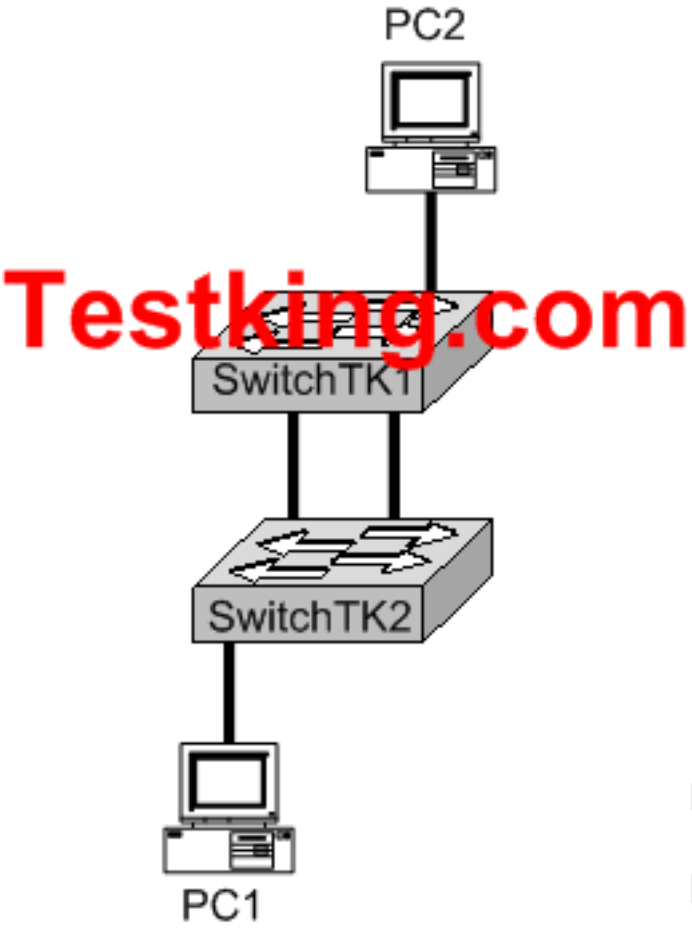
Answer: F
Explanation:
The configuration revision number is a 32-bit number that indicates the level of revision for a VTP packet. Each VTP device tracks the VTP configuration revision number that is assigned to it. Most of the VTP packets contain the VTP configuration revision number of the sender.

This information is used in order to determine whether the received information is more recent than the current version. Each time that you make a VLAN change in a VTP device, the configuration revision is incremented by one. In this case, TestKing3 is configured as a client but the revision number is higher than the other switches, so it will ignore the updates. In order to reset the configuration revision of a switch, change the VTP domain name, and then change the name back to the original name.
Reference:
http://www.cisco.com/en/US/tech/tk389/tk689/technologies_tech_note09186a0080094c52.shtml

Section 14: Configure, verify, and troubleshoot RSTP operation (5 questions)

QUESTION NO: 1
A simple TestKing network is displayed in the diagram below:

TestKing.com



Testking.com

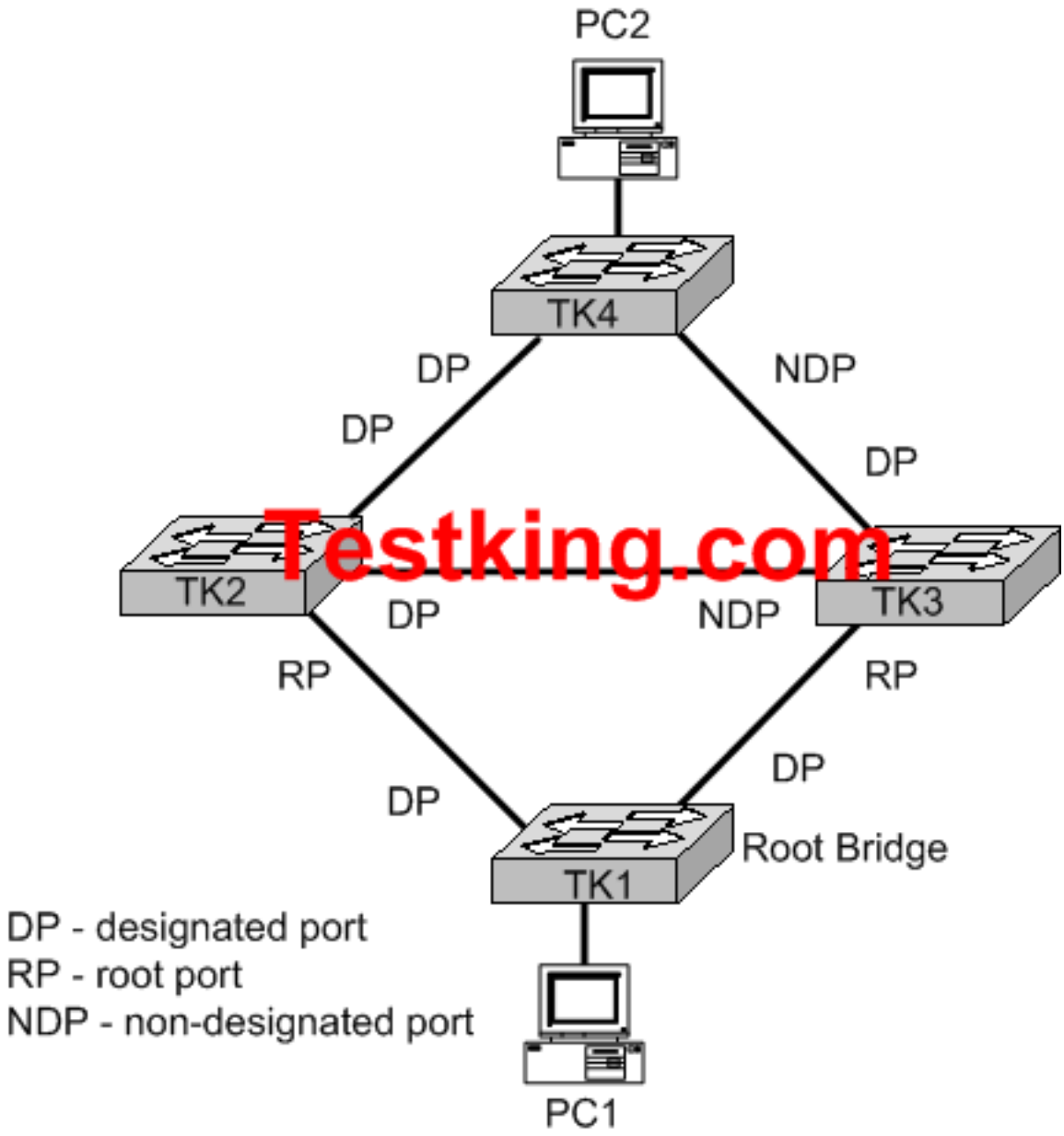
When PC1 sends an ARP requests for the MAC address of PC2, network performance slows dramatically, and the TestKing switches detect an unusually high number of broadcast frames. What is the most likely cause of this?

A. The portfast feature is not enabled on all switch ports.
B. The PCs are in two different VLANS.
C. Spanning Tree Protocol is not running on the switches.
D. PC2 is down and is not able to respond to the request.
E. The VTP version running on the two switches do not match.
F. None of the above

Answer: C
Explanation:

As the switches TK1 and TK2 are connected with each other via two links, spanning tree must be enabled on both switches to avoid switching loops and broadcast storms. An ARP request is a broadcast message. If Spanning tree is not running, broadcast loops will form reducing the performance of the network.

QUESTION NO: 2
Four TestKing switches are connected together as shown in the network below:

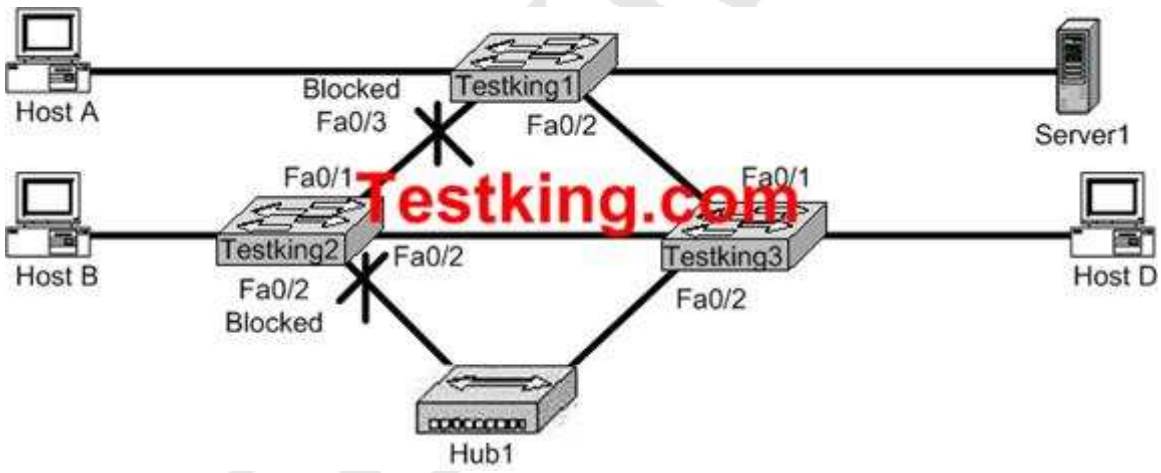


Study the Exhibit carefully. Based on the Spanning Tree Protocol port states shown, over which path will frames flow when set from PC1 to PC2?

A. TK1-TK3-TK4
B. TK1-TK2-TK4
C. TK1-TK2-TK3-TK4
D. TK1-TK3-TK2-TK4
E. None of the above

Answer: B
Explanation:
As shown in the diagram, port connecting TK3 to TK4 and TK2 to TK3 are non-designated ports. It means that spanning tree has blocked these ports temporarily so; frames will not flow through these ports. The communication will be done via TK1 to TK2 to TK4 through ROOT and DESIGNATED ports.

QUESTION NO: 3
The TestKing LAN network for one of the offices is displayed below:

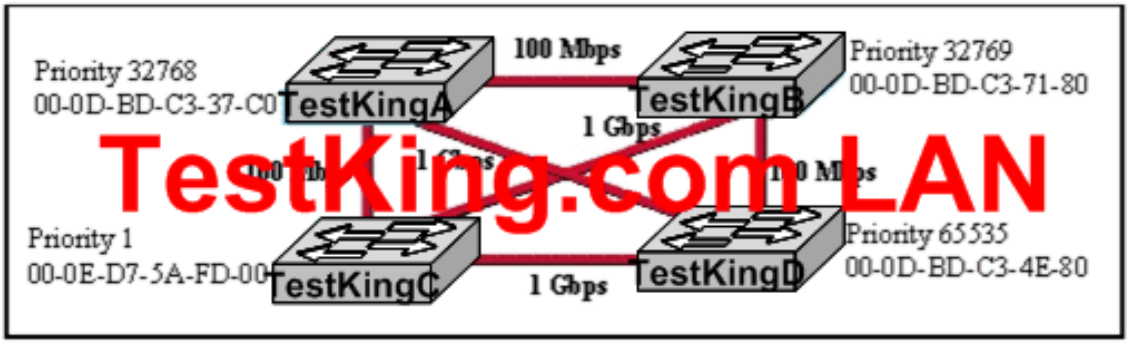


Assuming there is only one VLAN in this network, which switch is acting as the root bridge?

A. Testking1
B. Testking2
C. Testking3
D. A root bridge is not required in this network.
E. None of the above

Answer: C
Explanation:
A root switch has all ports in non-blocking mode. Based on the diagram above, Testking1 and Testking2 contain ports that have been blocked by the STP process, so Testking3 must be the root bridge.

QUESTION NO: 4
Four TestKing switches are connected as shown in the exhibit below:



Refer to the exhibit above. Based on the information given, which switch will be elected root bridge and why?

A. Switch A, because it has the lowest MAC address
B. Switch A, because it is the most centrally located switch
C. Switch B, because it has the highest MAC address
D. Switch C, because it is the most centrally located switch
E. Switch C, because it has the lowest priority
F. Switch D, because it has the highest priority

Answer: E
Explanation:
To elect the root bridge in the LAN, first check the priority value. The switch having the lowest priority will win the election process. If Priority Value is the same then it checks the MAC Address; the switch having the lowest MAC Address will become the root bridge. In this case, switch C has the lowest MAC Address so it becomes the root bridge.

QUESTION NO: 5
TestKing is experiencing network delays. The network administrator discovers that a worker in a location far from the MDF has connected an old 10BASE-T switch with redundant links to the existing network. How could this action be responsible for the impaired network performance?

A. Connecting a host to the old switch has created a broadcast storm.
B. The 10BASE-T switch forced the entire network to be reduced to 10 Mbps operation.
C. The old switch does not support VLANs, which has disabled the VLAN configuration of the entire the network.
D. The old switch does not support full-duplex operation, effectively forcing half-duplex operation throughout the network.
E. Spanning Tree Protocol has elected the old switch as the root bridge, creating inefficient data paths through the switched network.
F. None of the above

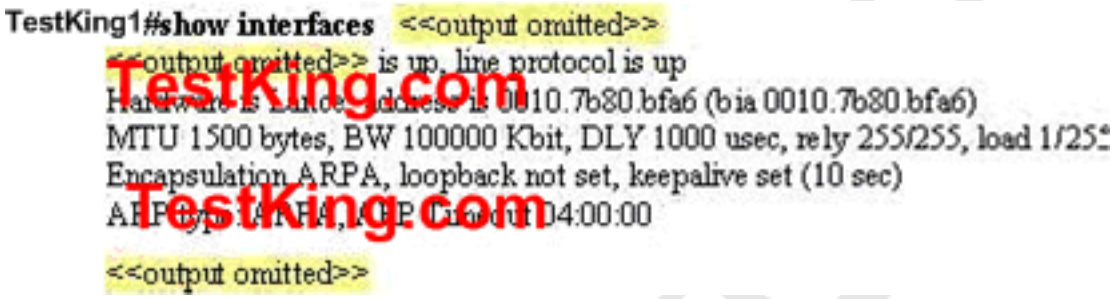
Answer: E
Explanation:
Without the Spanning Tree Protocol (STP), frames would loop for an indefinite period of time in networks with physically redundant links. To prevent looping frames, STP blocks some ports from forwarding frames so that only one active path exists between any pair of LAN segments (collision domains). The result of STP is good: Frames do not loop infinitely, which makes the LAN usable. However, the network uses some redundant links in case of a failure, but not for balancing traffic.

To avoid loops, all bridging devices, including switches, use STP. STP causes each interface on a bridging device to settle into a blocking state or a forwarding state. Blocking means that the interface cannot forward or receive data frames. Forwarding means that the interface can send and receive data frames. By having a correct subset of the interfaces blocked, a single currently active logical path will exist between each pair of LANs. STP behaves identically for a transparent bridge and a switch. So, the terms bridge, switch, and bridging device all are used interchangeably when discussing STP.

Root bridge The root bridge is the bridge with the best bridge ID. With STP, the key is for all the switches in the network to elect a root bridge that becomes the focal point in the network. All other decisions in the network-like which port is to be blocked and which port is to be put in forwarding mode-are made from the

Section 15: Interpret the output of various show and debug commands to verify the operational status of a Cisco switched network. (3 questions)

QUESTION NO: 1
The "show interfaces" command was issued on a TestKing router as shown below:



Assume that the router is configured with the default settings. Based on the information shown above, what type of router interface is this?

A. Ethernet
B. Gigabit Ethernet
C. FastEthernet
D. Synchronous Serial
E. Asynchronous Serial

Answer: C
Explanation:
See the output of a serial interface shown below and compare:

RouterA#show interfaces serial 0
Serial0 is down, line protocol is down
Hardware is HD64570
Internet address is 192.168.0.1/24
MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec,

reliability 255/255, txload 1/255, rxload 1/255
Encapsulation HDLC, loopback not set
Keepalive set (10 sec)
Last input never, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue :0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
0 packets input, 0 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
0 packets output, 0 bytes, 0 underruns
0 output errors, 0 collisions, 2 interface resets
0 output buffer failures, 0 output buffers swapped out
0 carrier transitions
DCD=down DSR=down DTR=up RTS=up CTS=down

In this exhibit the BW=10000Kbit and the encapsulation type is ARPA which means it could only be a Fast Ethernet interface.

QUESTION NO: 2
The following output was displayed on a TestKing device:

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```
TestKing1# show mac address-table
  Dynamic Addresses Count:                   3
  Secure Addresses (User-defined) Count:     0
  Static Addresses (User-defined) Count:     0
  System Self Addresses Count:               41
  Total Mac addresses:                       50
  Non-static Address Table:
  Destination Address  Address Type  VLAN  Destination Port
  -------------------  ------------  ----  --------------------
  0010.0de0.e289       Dynamic       1     FastEthernet0/1
  0010.7b00.1540       Dynamic       2     FastEthernet0/3
  0010.7b00.1545       Dynamic       2     FastEthernet0/2
```

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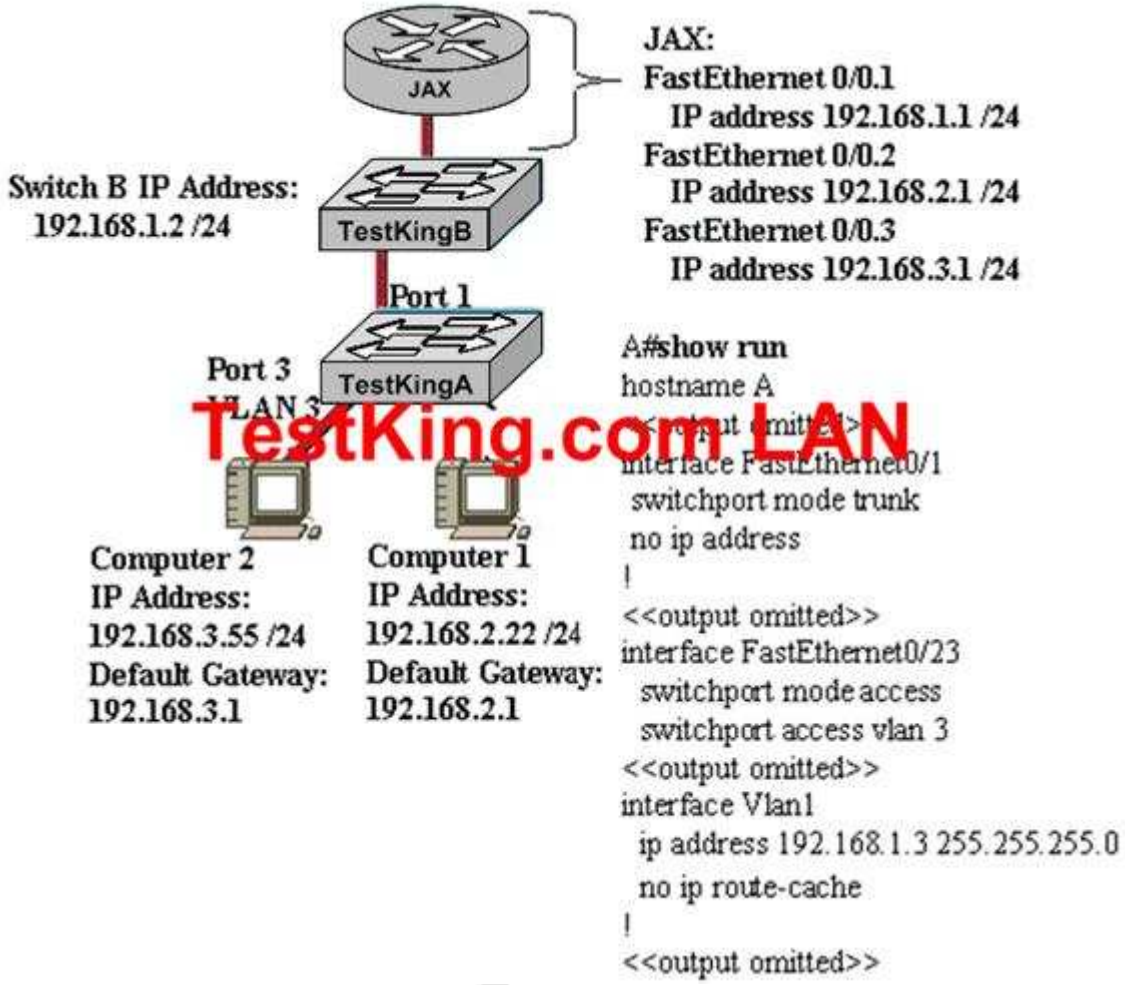
Study the exhibit above. Switch-TestKing1 needs to send data to host with a MAC address of 00b0.d056.efa4. What will Switch-TestKing1 do with this data?

A. Switch-TestKing1 will send an ARP request out all its ports except the port from which the data originated
B. Switch-TestKing1 will drop the data because it does not have an entry for the MAC address
C. Switch-TestKing1 will forward the data to its default gateway
D. Switch-TestKing1 will flood the data out all of its ports except the port from which the data originated
E. None of the above

Answer: D
Explanation:
Switches work as follows:
 Switches learn the MAC addresses of PCs or workstations that are connected to their switch ports by examining the source address of frames that are received on that port.
 Machines may have been removed from a port, turned off, or moved to another port on the same switch or a different switch.
 This could cause confusion in frame forwarding.
 The MAC address entry is automatically discarded or aged out after 300 seconds
 If there is not MAC address of destination host in MAC table, switch sends broadcast to all ports except the source to find out the destination host.

In output there is no MAC address of give host so switch floods to all ports except the source port.

QUESTION NO: 3
Some TestKing devices are connected as shown below:



The router shows the FastEthernet port as being up, and the computer on VLAN 3 can ping all of the FastEthernet IP addresses on the router.

Computer 1 is used to console into switch TestKingA. From the command prompt of switch TestKingA, the switch cannot ping the computer on VLAN 3. The switch configuration shown in the exhibit lists only the commands that are different from the default configuration. What is the problem, based on the information shown?

A. Computer 1 must be connected to a switch port in order to communicate with a device located on VLAN 3.
B. Switch TestKing A does not have a default gateway assigned.
C. The router is not routing VLAN 3 information.
D. The computer on VLAN 3 is assigned an incorrect IP address.
E. Switch A does not have an IP address assigned to the management VLAN.

Answer: B
Explanation:
This scenario requires inter-VLAN routing, which requires a layer three device. Based on the information above, a trunk has indeed been set up to route traffic between VLAN's so the problem is that default gateway has been specified in the switch, so traffic will not be forwarded to the router from the switch from one VLAN to the other.

Section 16: Implement basic switch security (including: port security, trunk access, management vlan other than vlan1, etc.) (6 questions)

QUESTION NO: 1
The TestKing network administrator wants to ensure that only a single web server can connect to pot Fa0/1 on a catalyst switch. The server is plugged into the switch's Fast Eth. 0/1 port and the network administrator is about to bring the server online. What can the administrator do to ensure that only the MAC address of this server is allowed by switch port Fa0/1? (Choose two)

A. Configure port Fa0/1 to accept connections only from the static IP address of the server
B. Configure the MAC address of the server as a static entry associated with port Fa0/1

C. Employ a proprietary connector type on Fa0/1 that is incomputable with other host connectors
D. Configure port security on Fa0/1 to reject traffic with a source MAC address other than that of the server
E. Bind the IP address of the server to its MAC address on the switch to prevent other hosts from spoofing the server IP address

Answer: B, D
Explanation:
You can use port security to block input to an Ethernet, Fast Ethernet, or Gigabit Ethernet port when the MAC address of the station attempting to access the port is different from any of the MAC addresses specified for that port.
When a secure port receives a packet, the source MAC address of the packet is compared to the list of secure source addresses that were manually configured or autoconfigured (learned) on the port. If a MAC address of a device attached to the port differs from the list of secure addresses, the port either shuts down permanently (default mode), shuts down for the time you have specified, or drops incoming packets from the insecure host. The port's behavior depends on how you configure it to respond to a security violation. When a security violation occurs, the Link LED for that port turns orange, and a link-down trap is sent to the Simple Network Management Protocol (SNMP) manager. An SNMP trap is not sent if you configure the port for restrictive violation mode. A trap is sent only if you configure the port to shut down during a security violation.

QUESTION NO: 2
The network administrator has configured port security on a TestKing switch. Why would a network administrator configure port security on this TestKing device?

A. To prevent unauthorized hosts from getting access to the LAN
B. To limit the number of Layer 2 broadcasts on a particular switch port
C. To prevent unauthorized Telnet or SSH access to a switch port
D. To prevent the IP and MAC address of the switch and associated ports
E. None of the above

Answer: A
Explanation:
You can use the port

security feature to restrict input to an interface by limiting and identifying MAC addresses of the stations allowed to access the port. When you assign secure MAC addresses to a secure port, the port does not forward packets with source addresses outside the group of defined addresses. If you limit the number of secure MAC addresses to one and assign a single secure MAC address, the workstation attached to that port is assured the full bandwidth of the port.
If a port is configured as a secure port and the maximum number of secure MAC addresses is reached, when the MAC address of a station attempting to access the port is different from any of the identified secure MAC addresses, a security violation occurs. Also, if a station with a secure MAC address configured or learned on one secure port attempts to access another secure port, a violation is flagged.
Reference:
http://www.cisco.com/en/US/products/hw/switches/ps628/products_configuration_guide_chapter09186a0(

QUESTION NO: 3
The network security policy for TestKing requires that only one host be permitted to attach dynamically to each switch interface. If that policy is violated, the interface should be automatically disabled. Which two commands must the TestKing network administrator configure on the 2950 Catalyst switch to meet this policy? (Choose two)

A. SWTestKing1(config-if)# switchport port-security maximum 1
B. SWTestKing1(config)# mac-address-table secure
C. SWTestKing1(config)# access-list 10 permit ip host
D. SWTestKing1(config-if)# switchport port-security violation shutdown
E. SWTestKing1(config-if)# ip access-group 10

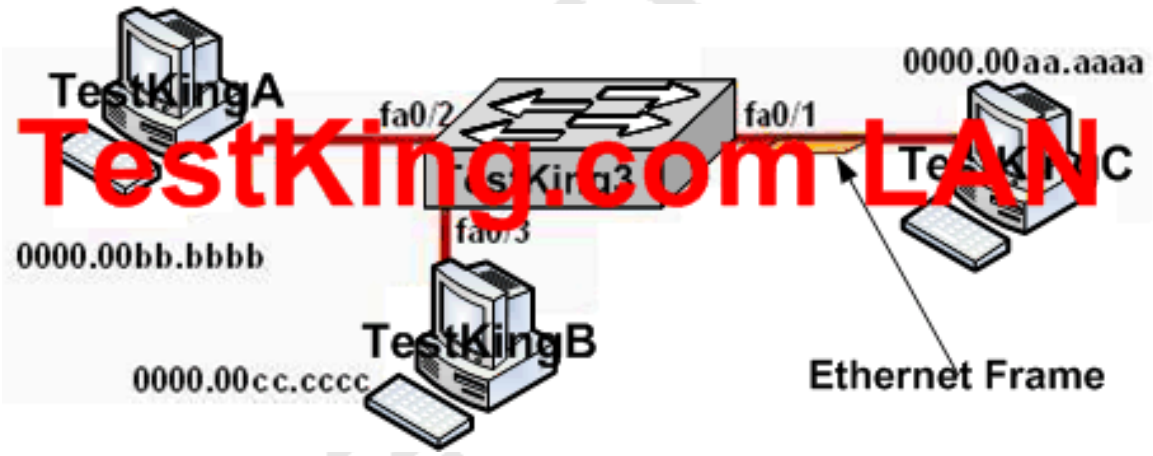
Answer: A, D
Explanation
Catalyst switches offer the port security feature to control port access based on MAC addresses. To configure port security on an access layer switch port, begin by enabling it with the following interface configuration command:
Switch(config-if)# switchport port-security
Next, you must identify a set of allowed MAC addresses so that the port can grant them access. You can explicitly configure addresses or they can be dynamically learned from port traffic. On each interface that uses port security, specify the maximum number of MAC addresses that will be allowed access using the following interface configuration command:

Switch(config-if)# switchport port-security maximum max-addr

Finally, you must define how each interface using port security should react if a MAC address is in violation by using the following interface configuration command:
Switch(config-if)# switchport port-security violation {shutdown | restrict | protect}

A violation occurs if more than the maximum number of MAC addresses are learned, or if an unknown (not statically defined) MAC address attempts to transmit on the port. The switch port takes one of the following configured actions when a violation is detected:
shutdown-The port is immediately put into the errdisable state, which effectively shuts it down. It must be re-enabled manually or through errdisable recovery to be used again.
restrict-The port is allowed to stay up, but all packets from violating MAC addresses are dropped. The switch keeps a running count of the number of violating packets and can send an SNMP trap and a syslog message as an alert of the violation.
protect-The port is allowed to stay up, as in the restrict mode. Although packets from violating addresses are dropped, no record of the violation is kept.

QUESTION NO: 4
Three hosts connect to a TestKing switch as shown below:



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TestKing3 Mac Address Table Exhibit:

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Ethernet FrameExhibit:

TestKing.com

You work as a network technician at TestKing and are working on the network shown above. You are administering the 2950 Cisco switch named TestKing3 and you enter the following commands on interface fa0/1 of the switch.

TestKing3(config-if)# switchport port-security
TestKing3(config-if)# switchport port-security mac-address sticky
TestKing3(config-if)# switchport port-security maximum 1

The Ethernet frame that is shown arrives on interface fa0/1. Based on the information provided, what two functions will occur when this frame is received by TestKing3? (Choose two)

A. All frames arriving on TestKing3 with a destination of 0000.00aa.aaaa will be forwarded out fa0/1.
B. Hosts B and C may forward frames out fa0/1 but frames arriving from other switches will not be forwarded out fa0/1.
C. Only frames from source 0000.00bb.bbbb, the first learned MAC address of TestKing3, will be forwarded out fa0/1.
D. This frame will be discarded when it is received by TestKing3.
E. Only host TestKingA will be allowed to transmit frames on fa0/1.
F. The MAC address table will now have an additional entry of fa0/1 FFFF.FFFF.FFFF.

Answer: A, E
Explanation:

The configuration shown here is an example of port security, specifically port security using sticky addresses. You can use port security with dynamically learned and static MAC addresses to restrict a port's ingress traffic by limiting the MAC addresses that are allowed to send traffic into the port. When you assign secure MAC addresses to a secure port, the port does not forward ingress traffic that has source addresses outside the group of defined addresses. If you limit the number of secure MAC addresses to one and assign a single secure MAC address, the device attached to that port has the full bandwidth of the port.
Port security with sticky MAC addresses provides many of the same benefits as port security with static MAC addresses, but sticky MAC addresses can be learned dynamically. Port security with sticky MAC addresses retains dynamically learned MAC addresses during a link-down condition.
If you enter a write memory or copy running-config startup-config command, then port security with sticky MAC addresses saves dynamically learned MAC addresses in the startup-config file and the port does not have to learn addresses from ingress traffic after bootup or a restart.
Since the maximum number of MAC addresses has been configured to 1, only host TestKingA will be able to send frames on interface fa 0/1, making choice E correct.

QUESTION NO: 5
You have configured a TestKing switch as shown below:

TestKing3(config-if)# switchport port-security
TestKing3(config-if)# switchport port-security mac-address sticky

Select the action below that results from executing these commands.

A. A dynamically learned MAC address is saved in the VLAN database.
B. A dynamically learned MAC address is saved in the startup-configuration file.
C. Statically configured MAC addresses are saved in the startup-configuration file if frames from that address are received.
D. A dynamically learned MAC address is saved in the running-configuration file.
E. Statically configured MAC addresses are saved in the running-configuration file if frames from that address are received.
F. None of the above

Answer: D
Explanation:
With port security, the switch supports these types of secure MAC addresses:

□

Static secure MAC addresses-These are manually configured by using the switchport port-security mac-address mac-address interface configuration command, stored in the address table, and added to the switch running configuration.

□

Dynamic secure MAC addresses-These are dynamically configured, stored only in the address table, and removed when the switch restarts.

□

Sticky secure MAC addresses-These are dynamically configured, stored in the address table, and added to the running configuration. If these addresses are saved in the configuration file, when the switch restarts, the interface does not need to dynamically reconfigure them.

You can configure an interface to convert the dynamic MAC addresses to sticky secure MAC addresses and to add them to the running configuration by enabling sticky learning. To enable sticky learning, enter the switchport port-security mac-address sticky interface configuration command. When you enter this command, the interface converts all the dynamic secure MAC addresses, including those that were dynamically learned before sticky learning was enabled, to sticky secure MAC addresses. The interface adds all the sticky secure MAC addresses to the running configuration.

The sticky secure MAC addresses do not automatically become part of the configuration file, which is the startup configuration used each time the switch restarts. If you save the sticky secure MAC addresses in the configuration file, when the switch restarts, the interface does not need to relearn these addresses. If you do not save the sticky secure addresses, they are lost.

Reference:

http://www.cisco.com/en/US/docs/switches/lan/catalyst2950/software/release/12.1_11_ea1/configuration/g

QUESTION NO: 6

Why would the TestKing network administrator configure port security on a new TestKing switch?

A. To prevent unauthorized Telnet access to a switch port.
B. To limit the number of Layer 2 broadcasts on a particular switch port.
C. To prevent unauthorized hosts from accessing the LAN.
D. To protect the IP and MAC address of the switch and associated ports.
E. To block unauthorized access to the switch management interfaces over common TCP ports.
F. None of the above

Answer: C
Explanation:
You can use the port security feature to restrict input to an interface by limiting and identifying MAC addresses of the stations allowed to access the port. When you assign secure MAC addresses to a secure port, the port does not forward packets with source addresses outside the group of defined addresses. If you limit the number of secure MAC addresses to one and assign a single secure MAC address, the workstation attached to that port is assured the full bandwidth of the port.
If a port is configured as a secure port and the maximum number of secure MAC addresses is reached, when the MAC address of a station attempting to access the port is different from any of the identified secure MAC addresses, a security violation occurs. Also, if a station with a secure MAC address configured or learned on one secure port attempts to access another secure port, a violation is flagged.
Reference:
http://www.cisco.com/en/US/products/hw/switches/ps628/products_configuration_guide_chapter09186a0(

Topic 3, IMPLEMENT AN IP ADDRESSING SCHEME AND IP SERVICES TO MEET NETWORK REQUIREMENTS IN A MEDIUM-SIZE ENTERPRISE BRANCH OFFICE NETWORK (83 questions)

Section 1: Describe the operation and benefits of using private and public IP addressing (5 questions)

QUESTION NO: 1
TestKing is using private IP addressing in their network. Which of the following IP addresses is a private IP address? (Select all that apply)

A. 12.0.0.1
B. 168.172.19.39

C. 172.20.14.36
D. 172.33.194.30
E. 192.168.42.34
F. 11.11.11.1

Answer: C, E
Explanation:
RFC 1918 Private Address Space:

Range of IP Addresses	Class of Networks	Number of Network
10.0.0.0 to 10.255.255.255.255	A	1
172.16.0.0 to 172.31.255.255	B	16
192.168.0.0 to 192.168.255.255	C	256

QUESTION NO: 2
TestKing is migrating to a private IP addressing scheme. Which of the following describe the use of private IP addresses? (Choose two)

A. Addresses chosen by TestKing.com to communicate with the Internet.
B. Addresses that cannot be routed through the public Internet.
C. Addresses that can be routed through the public Internet.
D. A scheme to conserve public addresses.
E. Addresses licensed to enterprise or ISPs by an Internet registry organization.

Answer: B, D
Explanation:
Private IP address space has been allocated via RFC 1918. This means the addresses are available for any use by anyone and therefore the same private IP addresses can be reused. However they are defined as not routable on the public Internet. They are used extensively in private networks due to the shortage of publicly registered IP address space and therefore network address translation is required to connect those networks to the Internet.

QUESTION NO: 3
TestKing is using IP addressing according to RFC 1918. Which three address ranges are used for internal private address blocks as defined by RFC 1918? (Choose all that apply)

A. 0.0.0.0 to 255.255.255
B. 10.0.0.0 to 10.255.255.255
C. 172.16.0.0 to 172.16.255.255
D. 172.16.0.0 to 172.31.255.255
E. 127.0.0.0. to 127.255.255.255
F. 192.168.0.0 to 192.168.255.255
G. 224.0.0.0 to 239.255.255.255

Answer: B, D, F
Explanation:
RFC 1918 defines three different IP address ranges as private, meaning that they can be used by any private network for internal use, and these ranges are not to be used in the Internet. The class A private range is 10.0.0.0 to 10.255.255.255. The class B address range is 172.16.0.0 to 172.31.255.255. The class C private IP address range is 192.168.0.0 to 192.168.255.255.
Incorrect Answers:
A. The 0.0.0.0 network address is invalid and can not be used.
C. The correct address range is 172.16.X.X through 172.31.X.X
E. The 127.0.0.1 address is reserved for the internal loopback IP address, but the entire 127.X.X.X range is not defined in RFC 1918 as a private address range for networks.
G. This address range describes the class D multicast address range.

QUESTION NO: 4
TestKing needs to ensure their IP network can be reached from the Internet. Which of the following host addresses are members of networks that can be routed across the public Internet? (Choose three.)

A. 10.172.13.65
B. 172.16.223.125
C. 172.64.12.29
D. 192.168.23.252
E. 198.234.12.95
F. 212.193.48.254

Answer: C, E, F
Explanation:
In Internet terminology, a private network is a network that uses RFC 1918 IP address space. Computers may be allocated addresses from this address space when it's necessary for them to communicate with other computing devices on an internal (non-Internet) network but not directly with the Internet.
Three blocks of IP addresses are reserved for private use and are not routed over the Internet. Companies can assign these addresses to nodes on their private LANs at any time without conflict.

CIDR		
From	To	Representation
10.0.0.0	10.255.255.255	10/8
172.16.0.0	172.31.255.255	172.16/12
192.168.0.0	192.168.255.255	192.168/16

QUESTION NO: 5
From where does a small network typically get its IP network addresses or IP block?

A. From the Internet Domain Name Registry (IDNR)
B. From the Internet Assigned Numbers Authority (IANA)
C. From the Internet Service Provider (ISP)
D. From the Internet Architecture Board (IAB)
E. None of the above

Answer: C
Explanation:
Normally a small network will be assigned a number of IP addresses from their ISP, or in some cases, such as DSL and cable modem, a single dynamic IP address will be assigned by the ISP. Only very large networks requiring a large IP block (normally more than a /20) will register with IANA, RIPE, or ARIN (American Registry of Internet Numbers) to obtain their IP addresses.

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Section 2: Explain the operation and benefits of using DHCP and DNS (4 questions)

QUESTION NO: 1
Which protocol automates all of the following functions for hosts on a network: IP configuration, IP addresses, subnet masks, default gateways, and DNS server information?

A. CDP
B. SNMP
C. DHCP
D. ARP
E. DNS
F. None of the above

Answer: C
Explanation:
DHCP uses the concept of the client making a request and the server supplying the IP address to the client, plus other information such as the default gateway, subnet mask, DNS IP address, and other information.
Incorrect Answers:
A. CDP is the Cisco Discovery Protocol. It is used by Cisco devices at the data link layer to obtain information about their directly connected neighbors.
B. SNMP is the Simple Network Management Protocol. This is used for the maintenance, management, and monitoring of network devices.
D. ARP is the Address Resolution Protocol, which is used to resolve layer 2 MAC addresses to layer 3 IP addresses.
E. DNS is the Domain Name Service. It is used to resolve domain names (for example, www.testking.com) to IP addresses. The IP address location of primary and secondary DNS resolver servers can be obtained for hosts using DHCP.

QUESTION NO: 2
Regarding DHCP (dynamic host configuration protocol), which two of the following choices below are true? (Select two answer choices)

A. The DHCP Discover message uses FF-FF-FF-FF-FF-FF as the Layer 2 destination address.

B. The DHCP Discover message uses UDP as the transport layer protocol.
C. The DHCP Discover message uses a special Layer 2 multicast address as the destination address.
D. The DHCP Discover message uses TCP as the transport layer protocol.
E. The DHCP Discover message does not use a Layer 2 destination address.
F. The DHCP Discover message does not require a transport layer protocol.

Answer: A, B
Explanation:
DHCP uses UDP as its transport protocol. DHCP messages from a client to a server are sent to the DHCP server port (UDP port 67), and DHCP messages from a server to a client are sent to the DHCP client port (UDP port 68).The client broadcasts a DHCPDISCOVER message on its local physical subnet. The DHCPDISCOVER message may include options that suggest values for the network address and lease duration. BOOTP relay agents may pass the message on to DHCP servers not on the same physical subnet.
Each server may respond with a DHCPOFFER message that includes an available network address in the "ipaddr" field (and other configuration parameters in DHCP options). Servers need not reserve the offered network address, although the protocol will work more efficiently if the server avoids allocating the offered network address to another client. The server unicasts the DHCPOFFER message to the client (using the DHCP/BOOTP relay agent if necessary) if possible, or may broadcast the message to a broadcast address (preferably 255.255.255.255) on the client's subnet.Incorrect Answers:
C. DHCP messages are broadcast to the "all hosts" address. IP multicast addresses are not used.
D. UDP is used, not TCP.
E. Since DHCP is used so that a client can obtain an IP address, a layer two destination address must be used, as the layer 3 IP address does not yet exist on the client for the return traffic.
F. DHCP, along with nearly every other type of traffic, requires the use of a transport layer protocol.

QUESTION NO: 3
Which one of the following protocols uses both UDP and TCP ports for the transport layer operation?

A. FTP
B. TFTP
C. SMTP

D. Telnet
E. DNS

Answer: E
Explanation:
TCP and UDP must use port numbers to communicate with the upper layers. Port numbers keep track of different conversations crossing the network simultaneously. Originating-source port numbers are dynamically assigned by the source host, which will be some number starting at 1024. 1023 and below are defined in RFC 1700, which discusses what is called well-known port numbers.
Virtual circuits that do not use an application with a well-known port number are assigned port numbers randomly chosen from within a specific range instead. These port numbers identify the source and destination host in the TCP segment. Only DNS uses both UDP and TCP port 53.

QUESTION NO: 4
Your TestKing trainee Tess is curious about the function of a DHCP Server. In particular she wants to know how the process of dynamically assigning IP addresses to hosts work. What should you tell her?

A. Adresses are allocated after a negotiation between the server and the host to determine the length of the agreement.
B. Addresses are permanently assigned so that the hosts uses the same address at all times.
C. Addresses are assigned for a fixed period of time. At the end of the period, a new request for an address must be made, and another address is then assigned.
D. Addresses are leased to hosts. A host will usually keep the same address by periodically contacting the DHCP server to renew the lease.
E. None of the answer choices are correct.

Answer: D
Explanation:
As you know, DHCP clients lease their IP addresses from DHCP servers. When this lease expires, that IP address can no longer be utilized by the DHCP client. For that reason, DHCP client must periodically renew their IP address leases, preferably before the lease has expired or is about to expire.
TDHCP client passes through the renewing and rebinding states to renew its IP address lease.

Renewing state: The DHCP client first attempts to renew its lease when 50 percent of the lease time has expired. To renew its lease, the DHCP client sends a directed DHCPREQUEST message to the DHCP server that provided the original lease. If renewal is allowed, the DHCP server automatically renews the lease by responding with a DHCPACK message. This new IP address lease contains not only the original IP address if still available (or another IP address otherwise) but any TCP/IP client configuration information.
Rebinding state: If, for whatever reason, the DHCP client is not able to communicate with the original DHCP server the executed its lease, it attempts another approach called rebinding. Here the DHCP client attempts to contact any available DHCP server when 87.5 percent of the lease time has expired. The leasing process is akin to that detailed over the last several pages.
Reference: http://www.windowsitlibrary.com/Content/329/08/5.html

Section 3: Configure, verify and troubleshoot DHCP and DNS operation on a router. (including: CLI/SDM) (2 questions)

QUESTION NO: 1
You work as a network technician at TestKing.com. Study the exhibit carefully.

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Based on the output shown above, what should you do to allow the TestKing workstations connected to the fastethernet0/0 interface to obtain an IP Address?

A. Apply access-group 14 to interface FastEthernet 0/0
B. Add access-list 14 permit any any to the access list configuration
C. Configure the IP address of interface FastEthernet 0/0 to 10.90.201.1
D. Add an interface description to the FastEthernet 0/0 interface configuration.
E. None of the above

Answer: C
Explanation:
According to question and exhibit:

Router is configured for DHCP, which can provide the IP Address to host. And Host is connected on fastethernet0/0 interface. IP Address is not assigned on host connected interface. Until assigning the same subnet of pool on interface, host unable to obtain IP Address from Router.

QUESTION NO: 2
Network Topology Exhibit:

TestKing2 Fa0/0 exhibit:

TestKing2 Fa0/1 exhibit:

On this TestKing network segment, the DHCP settings have recently been changed on the DHCP server and the client is no longer able to reach network resources. What should be done to correct this situation?

A. Issue the ipconfig command with the /release and /renew options in a command window.
B. Use the tracert command on the DHCP client to first determine where the problem is located.
C. Verify that the DNS server address is correct in the DHCP pool.
D. Ping the default gateway to populate the ARP cache.
E. Clear all DHCP leases on the router to prevent address conflicts.

Answer: A
Explanation:
ipconfig is a command line utility available on all versions of Microsoft Windows starting with Windows NT. ipconfig is designed to be run from the Windows command prompt. This utility allows you to get the IP address information of a Windows computer. It also allows some control over active TCP/IP connections. ipconfig is an alternative to the older 'winipcfg' utility. Using the release and renew options will force the PC to try to obtain an IP address again from the DHCP server.
ipconfig /release
This option terminates any active TCP/IP connections on all network adapters and releases those IP addresses for use by other applications. 'ipconfig /release" can be used with specific Windows connection names. In this case, the command will affect only the specified connections and not all. The command accepts either full connection names or wildcard names.
ipconfig /renew
This option re-establishes TCP/IP connections on all network adapters. As with the release option, ipconfig /renew takes an optional connection name specifier.
Both /renew and /release options only work on clients configured for dynamic (DHCP) addressing.
Reference: http://compnetworking.about.com/od/workingwithipaddresses/a/ipconfig.htm

Section 4: Implement static and dynamic addressing services for hosts in a LAN environment (15 questions)

QUESTION NO: 1
Exhibit:

You need to configure an IP address for workstation TestKingA. Based on the information shown above, what IP address should be assigned to this host?

A. 192.168.1.159/28
B. 192.168.1.145/28
C. 192.168.1.160/28
D. 192.168.1.144/28
E. 192.168.1.143/28

Answer: B
Explanation:
The available subnets and IP ranges that are available using a /28 (255.255.255.240) subnet mask is shown below:

/28 IP Bit Mask			
Dotted Decimal Mask: 255.255.255.240 **Hexadecimal Mask:** FF.FF.FF.F0 **Effective Hosts:** 224 **Effective Subnets:** 16			
Network Number	**Broadcast**	**Usable IP Range**	**Usable IPs /subnet**
0	15	1 - 14	14
16	31	17 - 30	14
32	47	33-46	14
48	63	49-62	14
64	79	65-78	14
80	95	81-94	14
96	111	97-110	14
112	127	113-126	14
128	143	129-142	14
144	159	145-158	14
160	175	161-174	14
176	191	177-190	14
192	207	193-206	14
208	223	209-222	14
224	239	225-238	14
240	255	241-254	14

Based on this information, we need to choose an IP address within the 145-158 range, since the IP address of the Fa0/0 on the router is 192.168.1.158, leaving only answer choice C as feasible.
Reference: http://www.more.net/technical/netserv/tcpip/subnet.html#28

QUESTION NO: 2
You are a systems administrator and you are about to assign static IP addresses to various servers on your network. For the network 192.168.20.24/29 the router is assigned to the first usable host address, while the last usable host address goes to your Sales server. Which one of the following commands would you enter into the IP properties box of the sales server?

A. IP address: 192.168.20.14 Subnet Mask: 255.255.255.248 Default Gateway: 192.168.20.9
B. IP address: 192.168.20.254 Subnet Mask: 255.255.255.0 Default Gateway: 192.168.20.1
C. IP address: 192.168.20.30 Subnet Mask 255.255.255.248 Default Gateway: 192.168.20.25
D. IP address: 192.168.20.30 Subnet Mask 255.255.255.240 Default Gateway: 192.168.20.17
E. IP address: 192.168.20.30 Subnet Mask 255.255.255.240 Default Gateway: 192.168.20.25

Answer: C
Explanation
A subnet mask uses 29 bits. This means that it uses 5 bits in the 4th octet. This equates to 255.255.255.248. This network has 3 bits for hosts. Using the 2n-2 formula (23-2) in this case), we are left with 6 (2*2*2 - 2 = 6) host addresses. 192.168.20.24 is the network address. Therefore the next address (192.168.20.25) would be the first host address. This address must be assigned to the router, which serves as the gateway for the network. The last available host address would be 192.168.20.30 (192.168.20.24+6). This address is assigned to the server. The broadcast address is 192.168.20.31.

QUESTION NO: 3

You've been assigned a single Class C address. From this, you need 8 subnets, and your subnet mask is 255.255.255.224. Which one of the following configuration commands would you have to use before you begin?

A. Router(config)# ip classless
B. Router(config)# ip subnet-zero
C. Router(config)# ip version 6
D. Router(config)# no ip classful
E. Router(config)# ip unnumbered
F. Router(config)# ip all-nets

Answer: B
Explanation:To get 8 subnets from a class C address, and a mask of 255.255.255.224 use the reserved subnet space. To do this, you need the command 'ip subnet-zero.' This will allow the router to use the very first subnet, which is normally reserved and unused as the network address.Prior to Cisco IOS® Software Release 12.0, Cisco routers, by default, did not allow an IP address belonging to subnet zero to be configured on an interface. However, if a network engineer working with a Cisco IOS software release older than 12.0 finds it safe to use subnet zero, the ip subnet-zero command in the global configuration mode can be used to overcome this restriction. As of Cisco IOS Software Release 12.0, Cisco routers now have ip subnet-zero enabled by default, but if the network engineer feels that it is unsafe to use subnet zero, the no ip subnet-zero command can be used to restrict the use of subnet zero addresses.
In versions prior to Cisco IOS Software Release 8.3, the service subnet-zero command was used.
It should be noted that even though it was discouraged, the entire address space including subnet zero and the all-ones subnet have always been usable. The use of the all-ones subnet was explicitly allowed and the use of subnet zero is explicitly allowed since Cisco IOS Software Release 12.0. Even prior to Cisco IOS Software Release 12.0, subnet zero could be used by entering the ip subnet-zero global configuration command.
On the issue of using subnet zero and the all-ones subnet, RFC 1878 states, "This practice (of excluding all-zeros and all-ones subnets) is obsolete. Modern software will be able to utilize all definable networks." Today, the use of subnet zero and the all-ones subnet is generally accepted and most vendors support their use. However, on certain networks, particularly the ones using legacy software, the use of subnet zero and the all-ones subnet can lead to problems.

QUESTION NO: 4

Three TestKing routers are connected as shown below:

Taking the information shown above, which command line below would correctly configure serial port0 on the TestKing2 router with the LAST usable host addresses on the 192.216.32.32 subnet?

A. TestKing2(config-if)# ip address 192.216.32.63 255.255.255.248
B. TestKing2(config-if)# ip address 192.216.32.38 255.255.255.240
C. TestKing2(config-if)# ip address 192.216.32.39 255.255.255.248
D. TestKing2(config-if)# ip address 192.216.32.63 255.255.255.248 no shut
E. TestKing2(config-if)# ip address 192.216.32.39 255.255.255.248 no shut
F. TestKing2(config-if)# ip address 192.216.32.38 255.255.255.248

Answer: F
Explanation:
F is the correct answer, as the last usable IP address on this subnet is 192.216.32.38. The subnet mask for a /29 is 255.255.255.248

Mask/29 11111111.11111111.11111111.11111000 255.255.255.248
Subnet 11000000.11011000.00100000.00100000 192.216.32.32
Broadcast 11000000.11011000.00100000.00100111 192.216.32.39
Address range = 192.216.32.33 - 192.216.32.38

QUESTION NO: 5
The Testking Network is displayed as follows:

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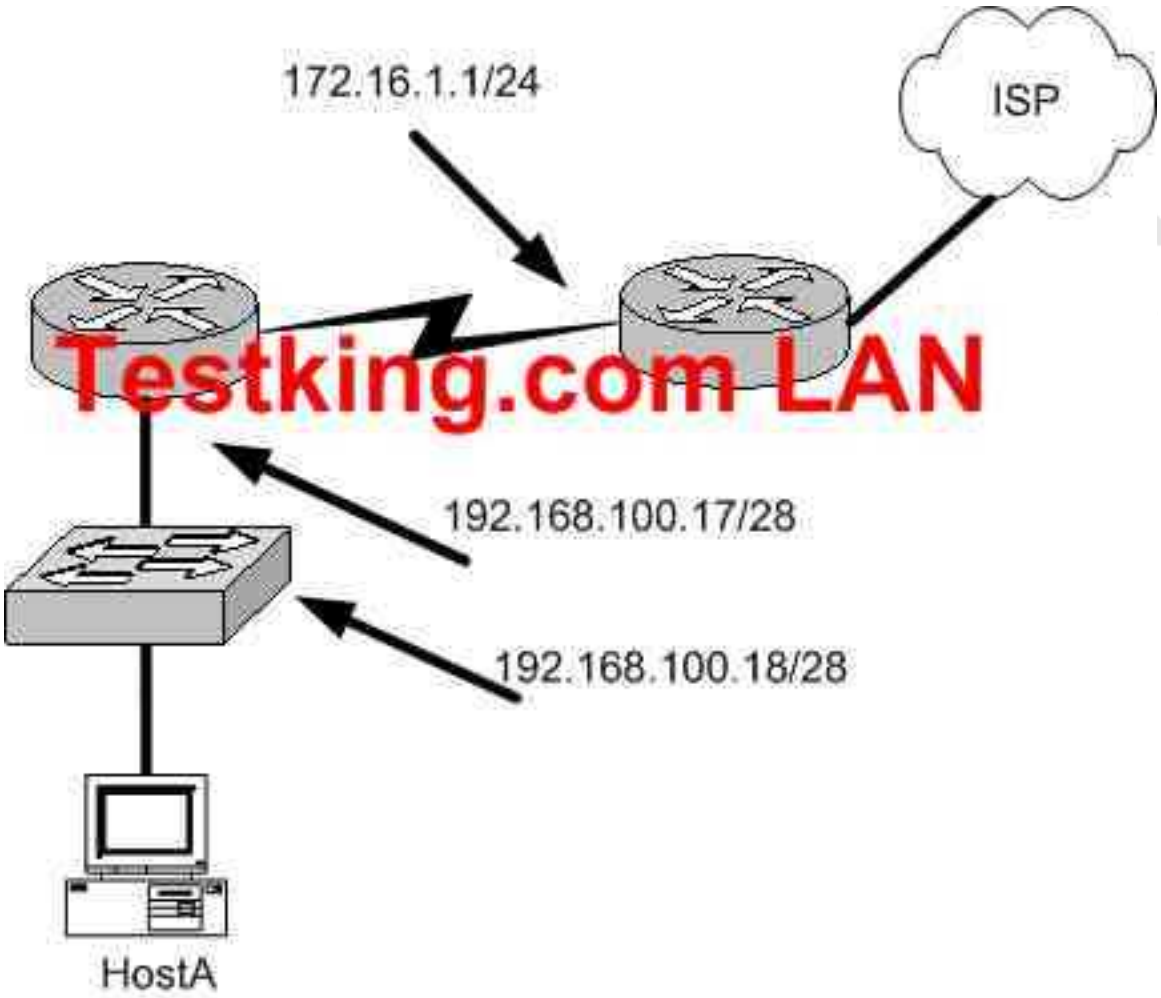


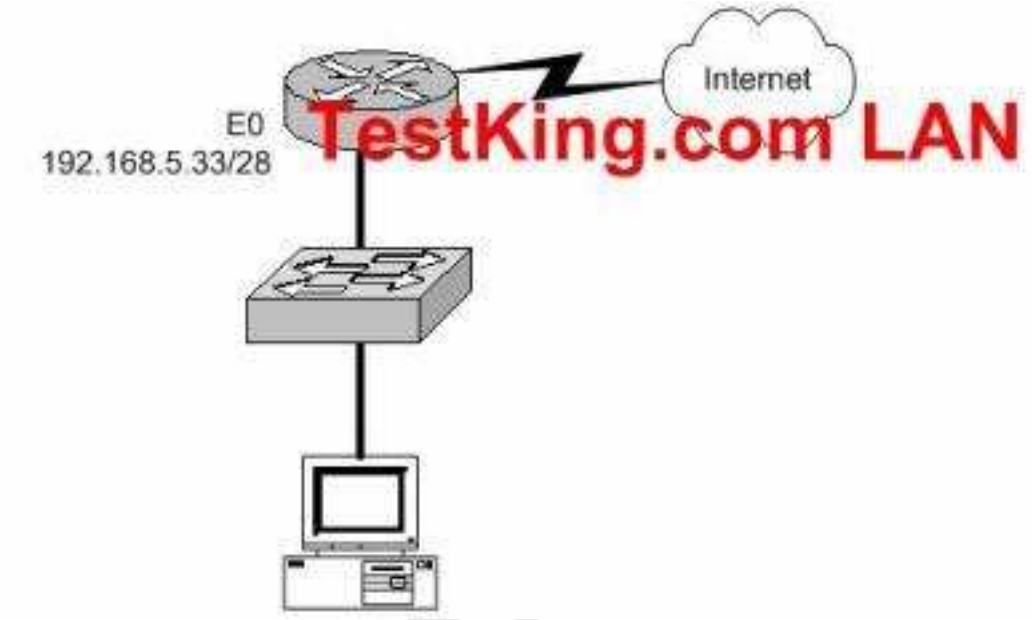
What is a valid possible IP address configuration for Host A?

A. IP 192.168.100.31 255.255.255.240 default-gateway 192.168.100.18
B. IP 192.168.100.30 255.255.255.240 default-gateway 172.16.1.1
C. IP 192.168.100.20 255.255.255.240 default-gateway 192.168.100.17
D. IP 192.168.100.21 255.255.255.248 default-gateway 192.168.100.17
E. IP 192.168.100.19 255.255.255.248 default-gateway 172.16.1.1

Answer: C
Explanation:
The network mask for a /28 is 255.255.255.240. The default gateway is always the IP address of the router on the local subnet, and the valid IP range for this network is 192.168.100.17 - 192.168.100.30. Choice C is the only one that meets all of these.
Incorrect Answers:

A. The IP address 192.168.100.31 is the broadcast address. It cannot be used for the host.
B. The default gateway should be the fist exit point for the network that the host is on. In this case it should be the router interface address 192.168.100.17.
D. The network uses a 28 bit subnet mask (11111111.11111111.11111111.11110000). This equates to 255.255.255.240, not 255.255.255.248.
E. The network uses a 28 bit subnet mask (11111111.11111111.11111111.11110000). This equates to 255.255.255.240, not 255.255.255.248. Also, the default gateway should be the fist exit point for the network that the host is on. In this case it should be the router interface address 192.168.100.17.

QUESTION NO: 6
A simple TestKing network is shown below:



Based on the information above, which of the following would be a valid IP address of the PC?

A. 192.168.5.55
B. 192.168.5.47
C. 192.168.5.40
D. 192.168.5.32
E. 192.168.5.14

Answer: C

Explanation:

The network uses a 28bit subnet (255.255.255.240). This means that 4 bits are used for the networks and 4 bits for the hosts. This allows for 14 networks and 14 hosts (2n-2). The last bit used to make 240 is the 4th bit (16) therefore the first network will be 192.168.5.16. The network will have 16 addresses (but remember that the first address is the network address and the last address is the broadcast address). In other words, the networks will be in increments of 16 beginning at 192.168.5.16/28. The router interface E0 has the IP address 192.168.5.33. Therefore it is on the 2nd network (192.169.5.32/28). The host must also be on this network. Valid IP addresses for hosts on this network are: 192.168.5.33-192.168.5.46.

Incorrect Answers:

A. 192.168.5.55 is on network 192.168.5.48. It is not on the same network as the router interface.

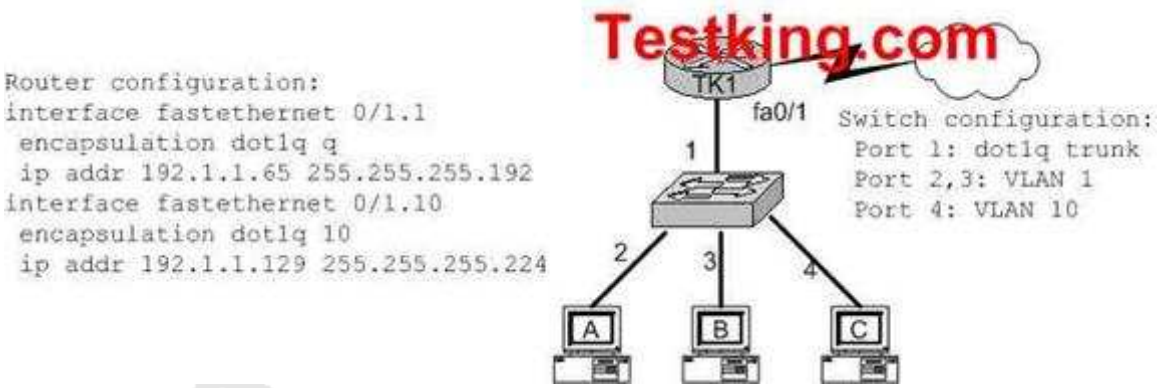
B. This is the broadcast address.

D. This is the network address.

E. This is not a valid address for a 28 bit subnet mask. The first network address should be 192.168.5.16.

QUESTION NO: 7

An 802.1Q trunk is configured between a TestKing switch and router TK1 as shown below:



Which of the following are valid configuration values for the host shown in the graphic? (Choose three)

A. host A IP address: 192.1.1.65
B. host A subnet mask: 255.255.255.224
C. host B IP address: 192.1.1.125
D. host B default gateway: 192.1.1.65
E. host C IP address: 192.1.1.166
F. host C subnet mask: 255.255.255.224

Answer: C, D, F
Explanation:
Host B resides on port 3, which is configured for VLAN 1. As shown in the configuration, the default gateway for VLAN is the IP address associated with the Fast Ethernet 0/1.1 sub-interface. Valid IP hosts for the VLAN 1 subnet is 192.1.1.65-192.1.1.126.
Incorrect Answers:
A. The 192.1.1.65 IP address is already assigned to the router.
B. Host A is in VLAN 1, so the subnet mask should be 255.255.255.192
E. Host C belongs to VLAN 10, and this IP address is not in the 192.1.1.128/27 subnet.

QUESTION NO: 8
Which of the following addresses can be assigned to a host when using a subnet mask of 255.255.254.0? (Select three)

A. 113.10.4.0
B. 186.54.3.0
C. 175.33.3.255
D. 26.35.2.255
E. 152.135.7.0
F. 17.35.36.0

Answer: B, D, E
Explanation:
These are all valid host IP addresses within the /23 subnet.
Incorrect Answers:
A. This is the network address for the 113.10.4.0/23 subnet.
C. This is the broadcast address for the 175.33.2.0/23 subnet.

F. This is the network address for the 17.35.36.0/23 subnet.

QUESTION NO: 9
The TestKing network topology is depicted below:

Based on the diagram above, which of the following are valid configuration values for the hosts? Select three

A. Host TestKingA IP address: 192.1.1.85
B. Host TestKingA subnet mask: 255.255.255.224
C. Host TestKingB IP address: 192.1.1.125
D. Host TestKingB default gateway: 192.1.1.85
E. Host TestKingC IP address: 192.1.1.166
F. Host TestKingC subnet mask: 255.255.255.224

Answer: A, C, F
Explanation:
The answers A and C are right, because the ip address 192.1.1.85 and 192.1.1.125 are in the same subnet 192.1.1.64 as the ip address of the subinterface 0/1.1.

Incorrect Answers:
E. This answer is wrong because the network address of the IP address 192.1.1.166 is 192.1.1.160.

QUESTION NO: 10
Which command on router TestKingA will assign the last usable IP address from the 192.168.32.128/28 subnetwork to a router interface?

A. TestKingA(config-if)# ip address 192.168.32.142 255.255.255.240
B. TestKingA(config-if)# ip address 192.168.32.143 255.255.255.240
C. TestKingA(config-if)# ip address 192.168.32.158 255.255.255.240
D. TestKingA(config-if)# ip address 192.168.32.145 255.255.255.240
E. TestKingA(config-if)# ip address 192.168.32.144 255.255.255.240
F. TestKingA(config-if)# ip address 192.168.32.158 255.255.255.240
G. None of the above

Answer: A
Explanation:
The last usable IP address would be 128 + (16-2) = 142 because only the last 4 bits of the last octet are used for host addressing.

QUESTION NO: 11
The TestKing LAN is shown below:

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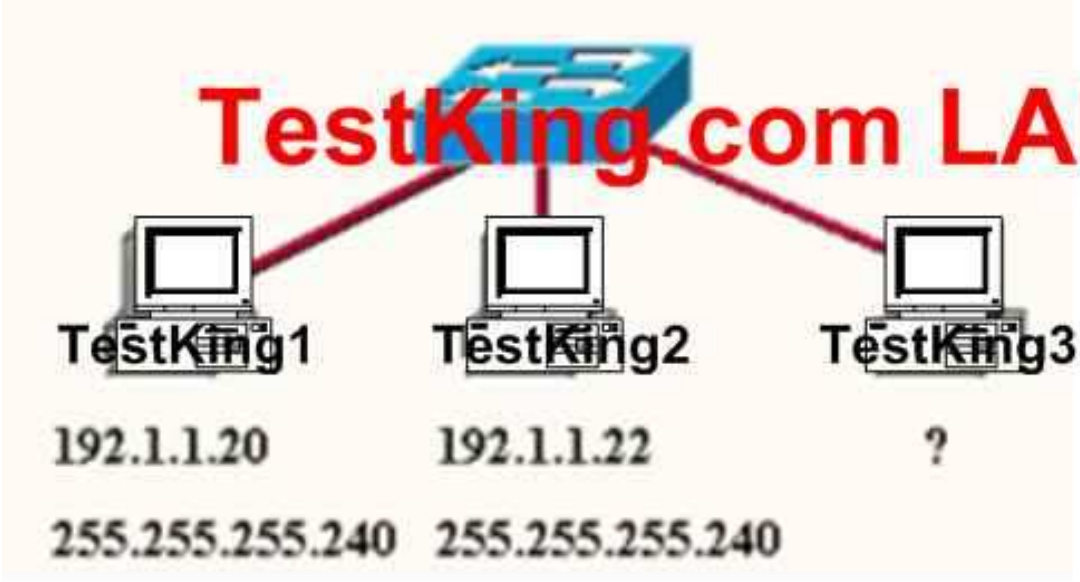


A TestKing.com network administrator is adding host TestKing3 to the network shown in the exhibit. Which IP address can be assigned this host on this network?

A. 192.1.1.14
B. 192.1.1.18
C. 192.1.1.20
D. 192.1.1.30
E. 192.1.1.31
F. 192.1.1.36

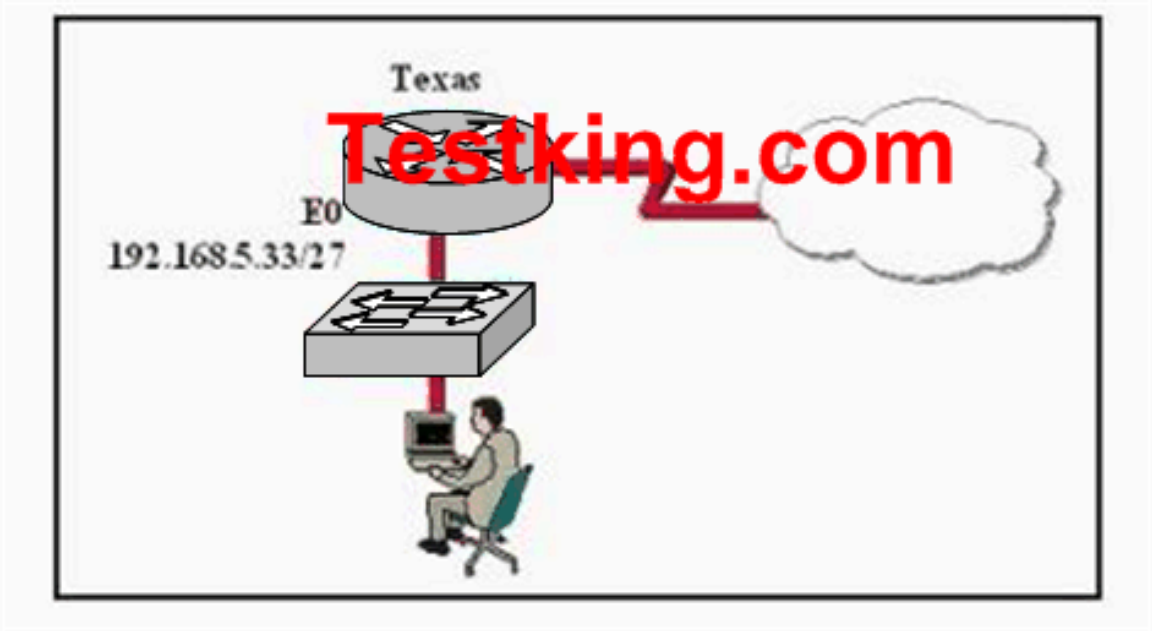
Answer: B, D
Explanation:
Subnet Mask of 255.255.255.240 means 4-bits of subnetting. When we do 4-bits of subnetting, we have a total of 16 subnets having 16 hosts each. Subnets will be

192.1.1.0 ----- 191.1.1.15 (0-15)
192.1.1.16 ---- 191.1.1.31 (16-31)
192.1.1.32 ---- 191.1.1.47 (32-47)

192.1.1.240---- 192.1.1.255 (240-255)

Only choices B and D are possible as 192.1.1.20 is already used by host TestKing1

QUESTION NO: 12
A diagram depicting a TestKing user is shown below:



Based on the information above, which IP address should be assigned to the host?

A. 192.168.5.5
B. 192.168.5.32
C. 192.168.5.40
D. 192.168.5.63
E. 192.168.5.75
F. None of the above

Answer: C
Explanation:
Host address should be in same subnet of Connected Router's Interface. In exhibit Router's ethernet address is in 192.168.5.33/27 subnet then host address should be also in same subnet.

27 bits used for network and 5 bits for host.
So Network Address=256-224=32
First Subnet 32-64
So Host address should be between 32-64 but 32, 64, 63 can't e sued in a host address, as they are the network and broadcast addresses for the subnet, so only answer C is correct.

QUESTION NO: 13
TestKing is opening a new branch office. Assuming a subnet mask of 255.255.248.0, which three addresses are valid host IP addresses that could be used in this office? (Choose three.)

A. 172.16.20.0
B. 172.16.24.0
C. 172.16.8.0
D. 172.16.16.0
E. 172.16.31.0
F. 172.16.9.0

Answer: A, E, F
Explanation:
For the 255.255.248.0 subnet mask the following is true.
1. 2-2=30 subnets
2. 2-2=2,046 hosts per subnet
3. 256-248=8.0, 16.0, 24.0, 32.0, 40.0, 48.0, 56.0, 64.0, etc.
4. Broadcast for the 8.0 subnet is 15.255. Broadcast for the 16.0 subnet is 23.255, etc.
5. The valid hosts are:

Subnet	8.0	16.0	24.0	32.0	40.0	48.0	56.0	64.0
first host	8.1	16.1	24.1	32.1	40.1	48.1	56.1	64.1
last host	15.254	23.254	31.254	39.254	47.254	55.254	63.254	71.254
broadcast	15.255	23.255	31.255	39.255	47.255	55.255	63.255	71.255

Reference: http://articles.techrepublic.com.com/5100-6350-5033673.html

QUESTION NO: 14
A small office TestKing network is shown below:

ipconfig exhibit:

The output shown above is from host TestKingA. What value should be displayed for the Default Gateway of the ipconfig output for this host?

A. 172.18.14.6
B. 192.168.1.11
C. 192.168.1.10
D. 192.168.1.254
E. 192.168.1.250
F. 172.18.14.5
G. None of the above

Answer: D
Explanation:
The default gateway setting, which creates the default route in the IP routing table, is a critical part of the configuration of a TCP/IP host. The role of the default gateway is to provide the next-hop IP address and interface for all destinations that are not located on its subnet. Without a default gateway, communication with remote destination is not possible, unless additional routes are added to the IP routing table. The default gateway must be the router's interface that is on the same IP subnet as the hosts. In this case it router TestKing2 is the default gateway router, and it's LAN interface with IP address 192.168.1.254 would be used.

QUESTION NO: 15
The TestKing network administrator has subnetted the 172.16.0.0 network using a subnet mask of 255.255.255.192. A duplicate IP address of 172.16.2.121 has accidentally been configured on workstation TK1 in this network. The technician must assign this workstation a new IP address within that same subnetwork. Which address should be assigned to TK1?

A. 172.16.1.64
B. 172.16.1.80
C. 172.16.2.80
D. 172.16.2.64
E. 172.16.2.127
F. 172.16.2.128
G. None of the above

Answer: C
Explanation:
A subnet mask of 255.255.255.192 (/26) will provide us with 4 subnet (2 usable) each with 62 usable hosts per network. So in our example the four networks will be:

172.16.2.1-62
172.16.2.65-126
172.16.2.129-190
172.16.2.193-254

Since we know that the host must be in the same IP subnet as 172.16.2.120, only choice C is correct.

Section 5: Calculate and apply an addressing scheme including VLSM IP addressing design to a network (21 questions)

QUESTION NO: 1 DRAG DROP
TestKing has three locations and has plans to redesign the network accordingly. The networking team received 192.168.151.0 to use as the addressing for entire network from the administrator. After subnetting the address, the team is ready to assign the address.

The administrator plans to configure "ip subnet-zero" and use RIP v2 as the routing protocol. As a member of the networking team, you must address the network and at the same time converse unused addresses for future growth.

Being mindful of these goals, drag the host addresses on the left to the correct router interface. One of the routers is partially configured. Move the mouse over a router to view its configuration (This information is missing**). Not all of the host address choices will be used.**

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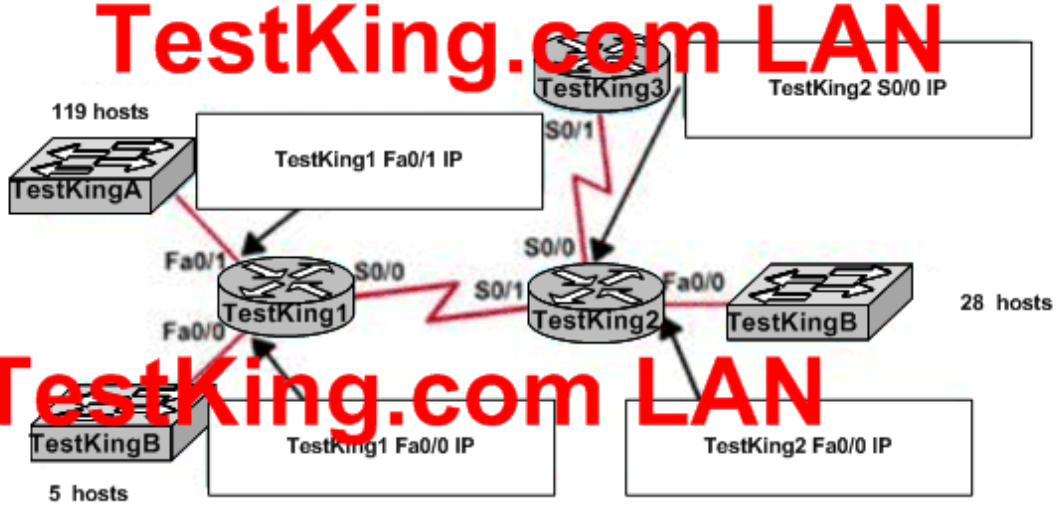
TestKing.com LAN



TestKing.com LAN

Select from these

192.168.151.240/30
192.168.151.252/29
192.168.151.239/28
192.168.151.241/30
192.168.151.207/27
192.168.151.121/25

Answer:

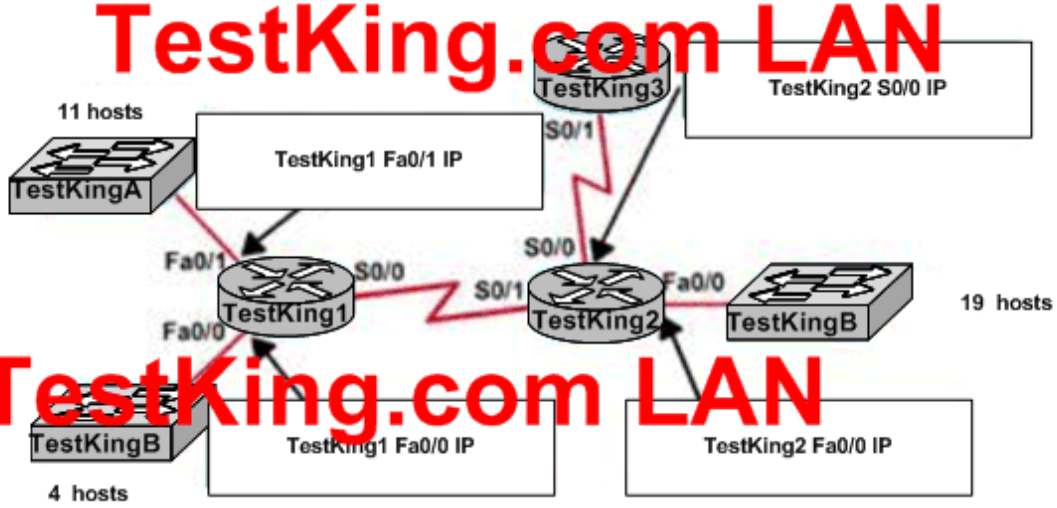
Explanation:

QUESTION NO: 2 DRAG DROP
TestKing has three locations and has plans to redesign the network accordingly. The networking team received 192.168.151.0 to use as the addressing for entire network from the administrator. After subnetting the address, the team is ready to assign the address.

The administrator plans to configure ip subnet-zero and use RIP v2 as the routing protocol. As a member of the networking team, you must address the network and at the same time converse unused addresses for future growth.

Being mindful of these goals, drag the host addresses on the left to the correct router interface. One of the routers is partially configured. Move the mouse over a router to view its configuration (This information is missing**). Not all of the host addresses on the left will be used.**

TestKing.com LAN

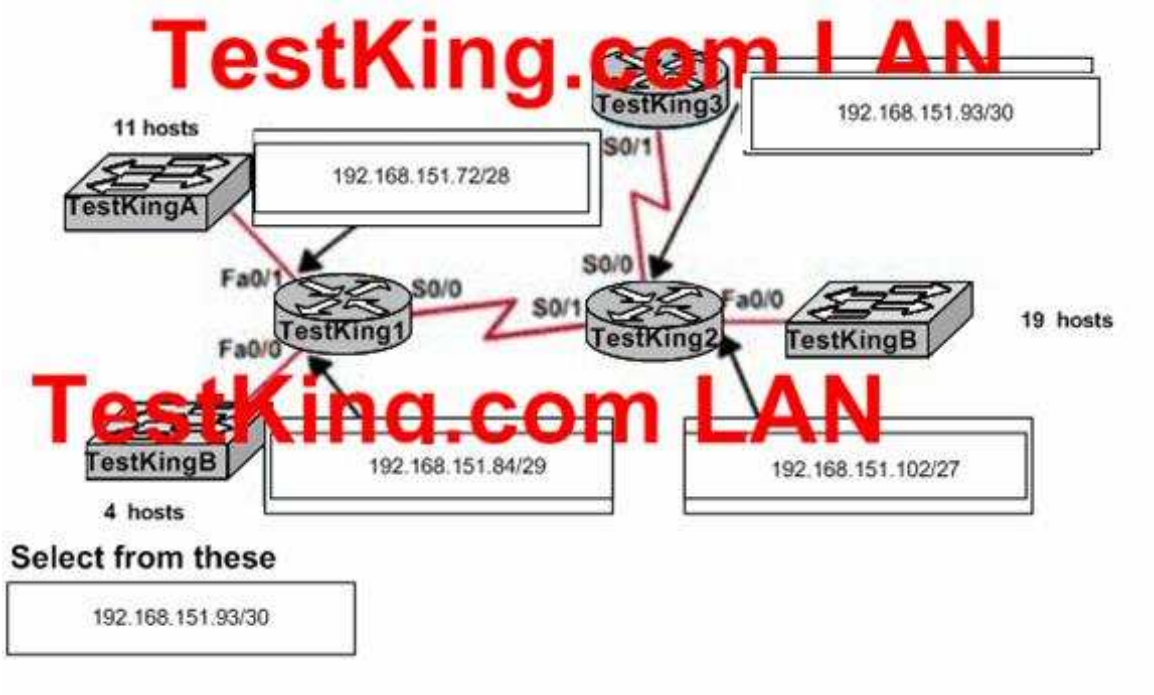


TestKing.com LAN

Select from these

192.168.151.93/30
192.168.151.102/27
192.168.151.92/30
192.168.151.255/25
192.168.151.84/29
192.168.151.72/28

Answer:
Explanation:



QUESTION NO: 3
If a host on a network has the address 172.16.45.14/30, what is the address of the subnetwork to which this host belongs?

A. 172.16.45.0
B. 172.16.45.4
C. 172.16.45.8
D. 172.16.45.12
E. 172.16.45.18

Answer: D
Explanation:
The last octet in binary form is 00001110. Only 6 bits of this octet belong to the subnet mask. Hence, the subnetwork is 172.16.45.12.

QUESTION NO: 4
Which two of the addresses below are available for host addresses on the TestKing subnet 192.168.15.19/28? (Select two answer choices)

A. 192.168.15.17
B. 192.168.15.14
C. 192.168.15.29
D. 192.168.15.16
E. 192.168.15.31
F. None of the above

Answer: A, C
Explanation:
The network uses a 28bit subnet (255.255.255.240). This means that 4 bits are used for the networks and 4 bits for the hosts. This allows for 14 networks and 14 hosts (2n-2). The last bit used to make 240 is the 4th bit (16) therefore the first network will be 192.168.15.16. The network will have 16 addresses (but remember that the first address is the network address and the last address is the broadcast address). In other words, the networks will be in increments of 16 beginning at 192.168.15.16/28. The IP address we are given is 192.168.15.19. Therefore the other host addresses must also be on this network. Valid IP addresses for hosts on this network are: 192.168.15.17-192.168.15.30.
Incorrect Answers:
B. This is not a valid address for this particular 28 bit subnet mask. The first network address should be 192.168.15.16.
D. This is the network address.
E. This is the broadcast address for this particular subnet.

QUESTION NO: 5
TestKing has a Class C network and you need ten subnets. You wish to have as many addresses available for hosts as possible. Which one of the following subnet masks should you use?

A. 255.255.255.192
B. 255.255.255.224
C. 255.255.255.240
D. 255.255.255.248

E. None of the above

Answer: C
Explanation:
Using the 2n-2 formula, we will need to use 4 bits for subnetting, as this will provide for 24-2 = 14 subnets. The subnet mask for 4 bits is then 255.255.255.240.
Incorrect Answers:
A. This will give us only 2 bits for the network mask, which will provide only 2 networks.
B. This will give us 3 bits for the network mask, which will provide for only 6 networks.
D. This will use 5 bits for the network mask, providing 30 networks. However, it will provide for only for 6 host addresses in each network, so C is a better choice.

QUESTION NO: 6
You have a single Class C IP address and a point-to-point serial link that you want to implement VLSM on. Which subnet mask is the most efficient for this point to point link?

A. 255.255.255.0
B. 255.255.255.240
C. 255.255.255.248
D. 255.255.255.252
E. 255.255.255.254
F. None of the above

Answer: D
Explanation:
For a single point to point link, only 2 IP addresses are required, one for the serial interface of the router at each end. Therefore, the 255.255.255.252 subnet mask is often used for these types of links, as no IP addresses are wasted.

QUESTION NO: 7
You have a network that supports VLSM and you need to reduce IP address waste in your point to point WAN links. Which of the masks below would you use?

A. /38

B. /30
C. /27
D. /23
E. /18
F. /32

Answer: B
Explanation:
For a single point to point link, only 2 IP addresses are required, one for the serial interface of the router at each end. Therefore, the 255.255.255.252 subnet mask is often used for these types of links because no IP addresses are wasted. The subnet mask 255.255.255.252 is a /30, so answer B is correct.
Incorrect Answers:
A. The largest mask that can be used is the single IP host mask, which is /32. It is not possible to use a /38 mask, unless of course IPv6 is being used.
C, D, E. These masks will provide for a larger number of host addresses, and since only 2 IP addresses are needed for a point to point link, these extra addresses are wasted.
F: No available host addresses with a /32 mask

QUESTION NO: 8
What is the maximum number of IP addresses that can be assigned to hosts on a TestKing subnet that uses the 255.255.255.224 subnet mask?

A. 14
B. 15
C. 16
D. 30
E. 31
F. 32

Answer: D
Explanation:
The subnet mask 255.255.255.224 means that there are 27 network bits. The remaining 5 bits are the host bits. The maximum possible combinations with 5 bits are 25 = 32. As all zero's and all one's hosts are not allowed so, maximum number of valid hosts with the mask 255.255.255.224 are 25 -2 =32-2 = 30 Hosts

QUESTION NO: 9
In a TestKing network that supports VLSM, which network mask should be used for point-to-point WAN links in order to reduce waste of IP addresses?

A. /24
B. /30
C. /27
D. /26
E. /32
F. None of the above

Answer: B
Explanation:
A 30-bit mask is used to create subnets with two valid host addresses. This is the exact number needed for a point-to-point connection.

QUESTION NO: 10
The network 172.25.0.0 has been divided into eight equal subnets. Which of the following IP addresses can be assigned to hosts in the third subnet if the ip subnet-zero command is configured on the router? (Choose three)

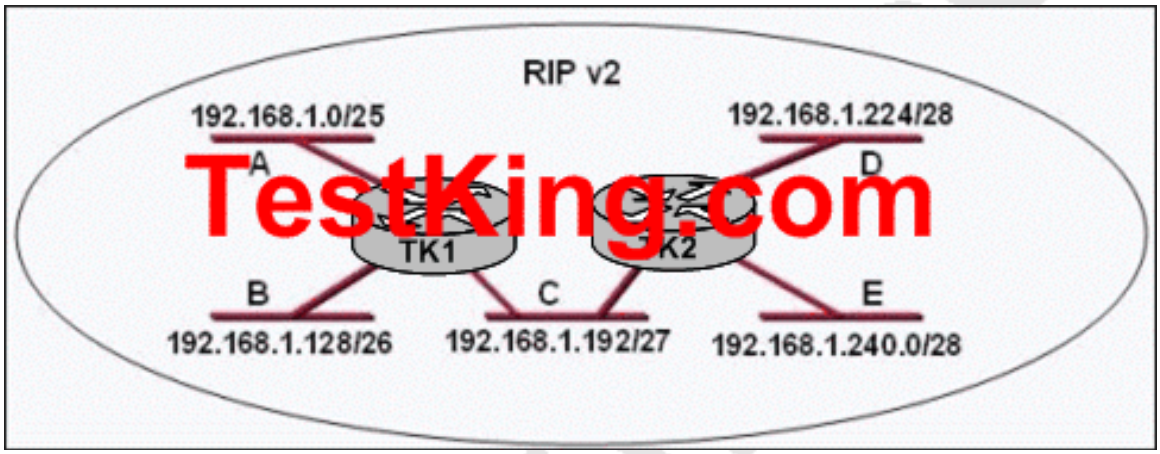
A. 172.25.78.243
B. 172.25.98.16
C. 172.25.72.0
D. 172.25.94.255
E. 172.25.96.17
F. 172.25.100.16

Answer: A, C, D
Explanation:
If we divide the address 172.25.0.0 in 8 subnets, the resulting subnets will be
1. 172.25.0.0
2. 172.25.32.0
3. **172.25.64.0 This is the third subnet**
4. 172.25.96.0
5. 172.25.128.0
6. 172.25.160.0

7. 172.25.192.0
8. 172.25.224.0

Addresses that fall in the 3rd subnet will be from 172.25.64.0 ---- 172.25.95.255
Choices A, C and D lie in this network range.

QUESTION NO: 11
The TestKing network administrator has designed the IP scheme as shown in the diagram below:



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Based on the information shown above, what effect will this addressing scheme have on the network?

A. IP traffic between subnet A and B will be prevented.
B. Routing information will not be exchanged.
C. The addressing scheme will allow all IP traffic between the LANs.
D. IP traffic between all the LANs will be prevented.
E. None of the above

Answer: C
Explanation:

This scheme will allow for communication between all networks, and uses all IP addresses in the 192.168.1.0/24 IP network with no overlap. Note that RIPv2 is being used instead of RIPv1. RIPv2 carries subnet mask information allowing for VLSM networks like the one shown here.

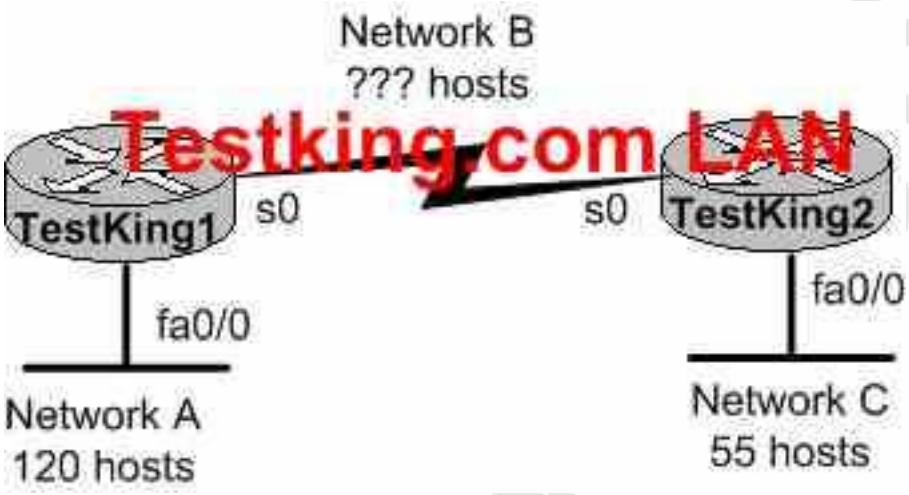
QUESTION NO: 12
The network with the IP address 172.31.0.0/19 is to be configured on the TestKing router with the partial configuration shown in the graphic. Which of the following statements describes the number of available subnets and hosts that will result from this configuration?

Exhibit:

A. There are 7 usable subnets, with 2046 usable host addresses.
B. There are 8 usable subnets, with 30 usable host addresses.
C. There are 7 usable subnets, with 30 usable host addresses.
D. There are 8 usable subnets, with 2046 usable host addresses.
E. There are 7 usable subnets, with 8190 usable host addresses.
F. There are 8 usable subnets, with 8190 usable host addresses.

Answer: F
Explanation:
The 172.31.0.0/19 will have 3 bits in the network portion, and 13 bits in the host portion. This will allow for 2^3 = 8 networks and 2^13 = 8192 hosts available for each network (8190 usable). Since the IP subnet-zero command is used the first network is available, making choice F correct.

QUESTION NO: 13
A portion of he TestKing network is shown in the diagram below:



Consider the 192.1.1.0/24 network in this exhibit. This network uses RIP v2. Which combination of subnetwork assignments will satisfy the requirements for networks A, B, and C of this design? (Select three)

A. Network A = 192.1.1.128/25
B. Network A = 192.1.1.0/25
C. Network B = 192.1.1.252/30
D. Network B = 192.1.1.4/30
E. Network C = 192.1.1.64/26
F. Network C = 192.1.1.224/27

Answer: A, D, E

Explanation:
To properly answer this question, it is best to start from the end, which is network C. Since network C requires at least 55 host addresses, a /26 network must be used. A network mask of /26 will provide for 62 usable IP addresses while a /27 network will only provide for 30 so we must choose E. With choice E taken, hosts within the range of 192.1.1.65-192.1.1.126 will be used.
For network A, both choices A and B are using the correct subnet mask, but we are only limited to choice A since many of the hosts in choice B are already being used in network C. Finally, for network B we are left with choice D since hosts in choice C are already being used by network A.

QUESTION NO: 14
If an ethernet port on router TK1 was assigned an IP address of 172.16.112.1/20, what is the maximum number of hosts allowed on this LAN subnet?

A. 2046
B. 1024
C. 4096
D. 8190
E. 4094
F. None of the above

Answer: E
Explanation:
Since a /20 equates to 12 bits used for the subnet mask, 4094 hosts can be uniquely addressed.

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Number of Bits in the Host or Subnet Field	Maximum number of Hosts or Subnets (2n-2)
1	0
2	2
3	6
4	14
5	30
6	62
7	126
8	254
9	510
10	1022
11	2046
12	4094
13	8190
14	16,382

QUESTION NO: 15
Part of the TestKing WAN is shown below:

A new subnet with 12 hosts has been added to the TestKing network shown above. Which subnet address should this network use to provide enough useable addresses, while wasting the fewest number of IP addresses?

A. 192.168.10.80/29
B. 192.168.10.80/28
C. 192.168.10.96/28
D. 192.168.10.96/29
E. None of the above

Answer: C

QUESTION NO: 16 DRAG DROP
TestKing has three locations and has plans to redesign the network accordingly. The networking team received 192.168.151.0 to use as the addressing for entire network from the administrator. After subnetting the address, the team is ready to assign the address.

The administrator plans to configure ip subnet-zero and use RIP v2 as the routing protocol. As a member of the networking team, you must address the network and at the same time converse unused addresses for future growth.

Being mindful of these goals, drag the host addresses on the left to the correct router interface. One of the routers is partially configured. Move the mouse over a router to view its configuration (This information is missing**). Not all of the host addresses on the left will be used.**

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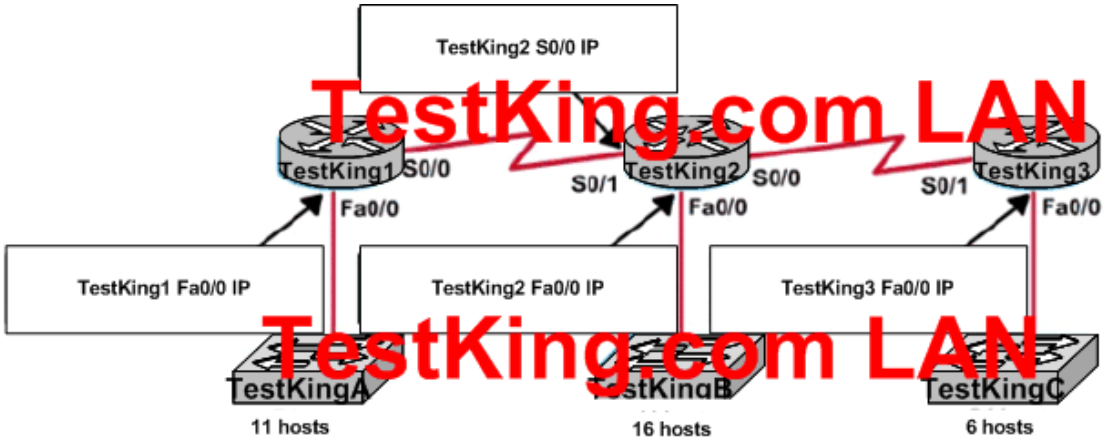

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Select from these

192.168.151.189/30

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192.168.151.166/28

192.168.151.149/27

192.168.151.188/30

192.168.151.178/29

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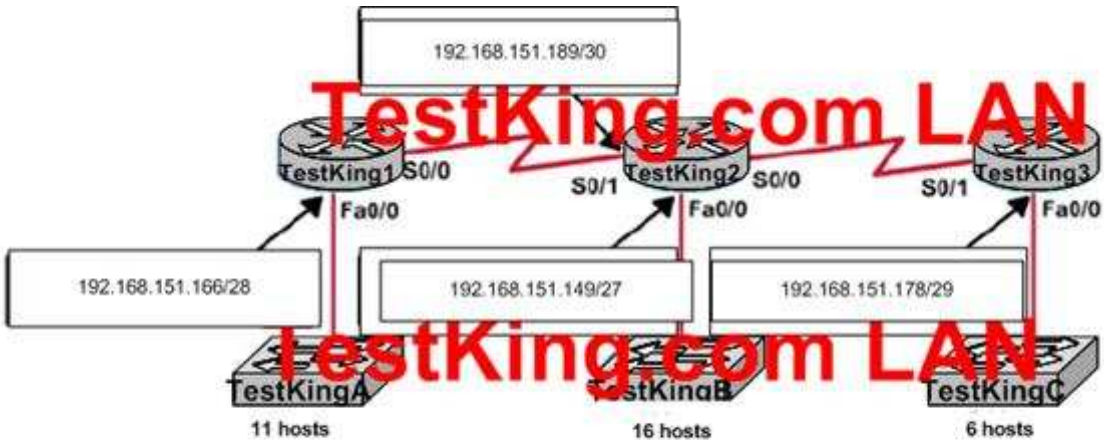
192.168.151.255/26

Answer:
Explanation:



Select from these

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192.168.151.188/30

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192.168.151.255/26

QUESTION NO: 17
Part of the TestKing WAN is shown below:

All of the TestKing routers in this network segment are configured with the "ip subnet-zero" IOS command. Because of this, which network addresses should be used for Link TestKing and Network TestKing shown above? (Choose two.)

A. Network TestKing - 172.16.3.128/25
B. Link TestKing - 172.16.3.40/30
C. Network TestKing - 172.16.3.192/26
D. Link TestKing - 172.16.3.112/30
E. Link TestKing - 172.16.3.0/30
F. Network TestKing - 172.16.3.48/26

Answer: A, E

QUESTION NO: 18 DRAG DROP

TestKing has three locations and has plans to redesign the network accordingly. The networking team received 192.168.151.0 to use as the addressing for entire network from the administrator. After subnetting the address, the team is ready to assign the address.

The administrator plans to configure ip subnet-zero and use RIP v2 as the routing protocol. As a member of the networking team, you must address the network and at the same time converse unused addresses for future growth.

Being mindful of these goals, drag the host addresses on the left to the correct router interface. One of the routers is partially configured. Move the mouse over a router to view its configuration (This information is missing**). Not all of the host addresses on the left will be used.**

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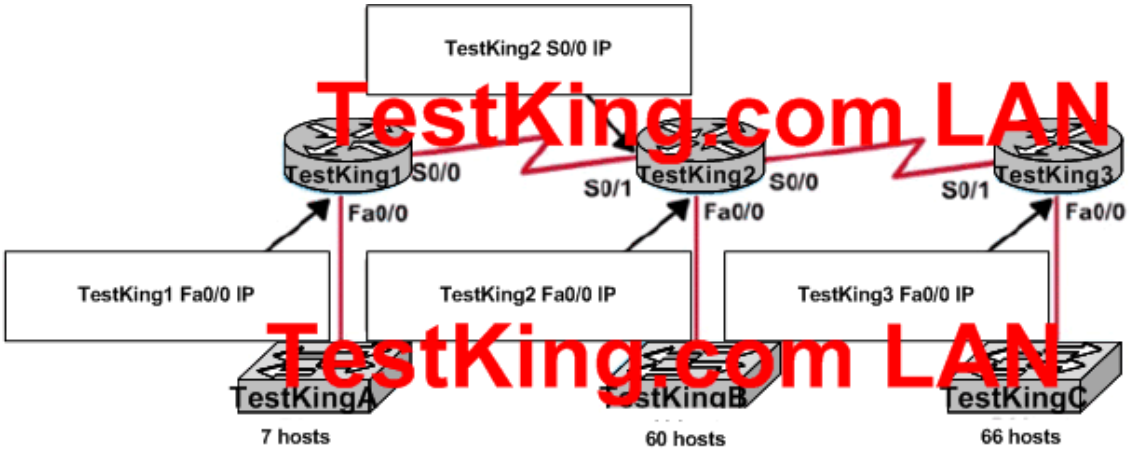

Select from these

192.168.151.249/28

192.168.151.224/30

192.168.151.239/29

192.168.151.30/25

192.168.151.225/29

192.168.151.149/26

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Answer:
Explanation:

QUESTION NO: 19
A host on the TestKing network has been configured with the IP address 10.16.3.66/23. Which two statements describe this IP address? (Choose two)

A. The broadcast address of the subnet is 10.16.3.255 255.255.254.0.
B. This network is not subnetted.
C. The last valid host address in the subnet is 10.16.2.254 255.255.254.0
D. The subnet address is 10.16.3.0 255.255.254.0.
E. The lowest host address in the subnet is 10.16.2.1 255.255.254.0.

Answer: A, E
Explanation:

A subnet mask of /23 translates to 255.255.254.0 and will provide for up to 512 IP addresses.
If we take the 10.16.X.X network using the /23 subnet mask, the first network available is 10.16.0.0/23, which will provide host address from 10.16.0.1 to 10.16.2.254, with 10.16.2.255 being the broadcast address. The next available network in the 10.16.X.X covers our example in this question of 10.16.3.66.
In this case, the first useable IP address is (10.16.2.1 choice E), and the broadcast address is 10.16.3.255 (choice A).

In closing, the partial reference table on IPv4 subnets:

CIDR	Netmask	Addresses
/18	255.255.192.0	16384
/19	255.255.224.0	8192
/20	255.255.240.0	4096
/21	255.255.248.0	2048
/22	255.255.252.0	1024
/23	255.255.254.0	512
/24	255.255.255.0	256
/25	255.255.255.128	128
/26	255.255.255.192	64
/27	255.255.255.224	32
/28	255.255.255.240	16

QUESTION NO: 20
Part of the TestKing network is shown below:

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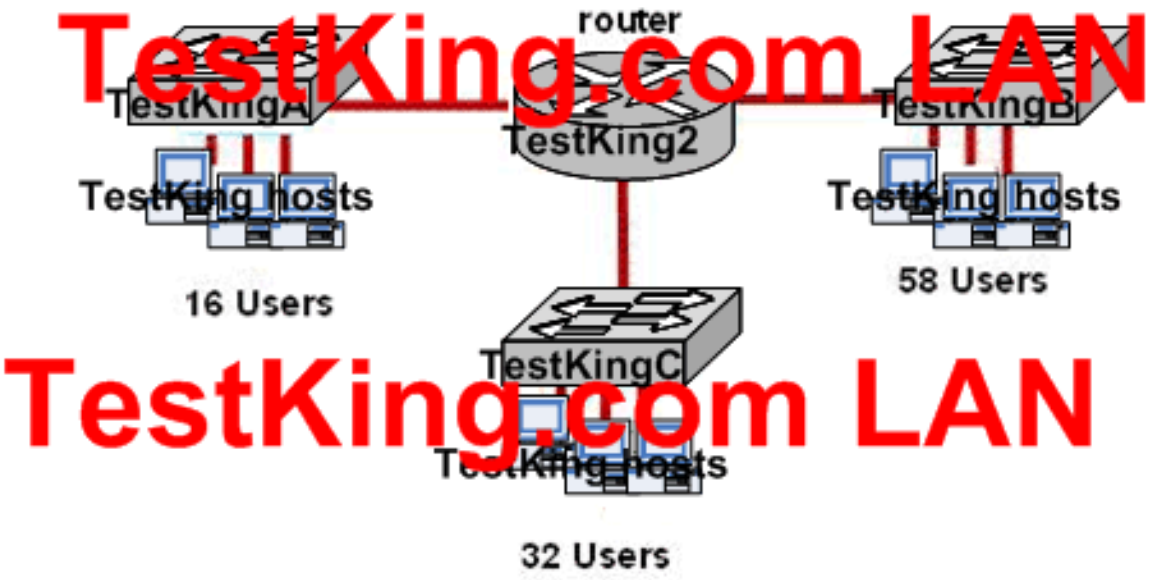

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In the TestKing network shown above the IP address space of 128.107.7.0/24 has been allocated for all devices. All devices must use the same subnet mask and all subnets are usable. Which subnet mask is required to apply the allocated address space to the configuration that is shown?

A. 255.255.255.192
B. 255.255.255.128
C. 255.255.255.0
D. 255.255.255.224
E. 255.255.254.0
F. None of the above

Answer: A
Explanation:
In this example the requirement is that the company needs 3 subnets and at least 58 hosts per subnet. Referring to the following formula we see that 6 bits of subnet masking is needed.

Number of Bits in the Host or Subnet Field	Maximum number of Hosts or Subnets (2n-2)
1	0
2	2
3	6
4	14
5	30
6	62
7	126
8	254

With 6 bits used for the subnet portion, we get will get 4 different subnets with 62 usable IP addresses in each. The subnet mask for this /28 network translates to 255.255.255.192.

QUESTION NO: 21 DRAG DROP
TestKing has three locations and has plans to redesign the network accordingly. The networking team received 192.168.151.0 to use as the addressing for entire network from the administrator. After subnetting the address, the team is ready to assign the address.

The administrator plans to configure ip subnet-zero and use RIP v2 as the routing protocol. As a member of the networking team, you must address the network and at the same time converse unused addresses for future growth.

Being mindful of these goals, drag the host addresses on the left to the correct router interface. One of the routers is partially configured. Move the mouse over a router to view its configuration (This information is missing**). Not all of the host addresses on the left will be used.**

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Answer:
Explanation:

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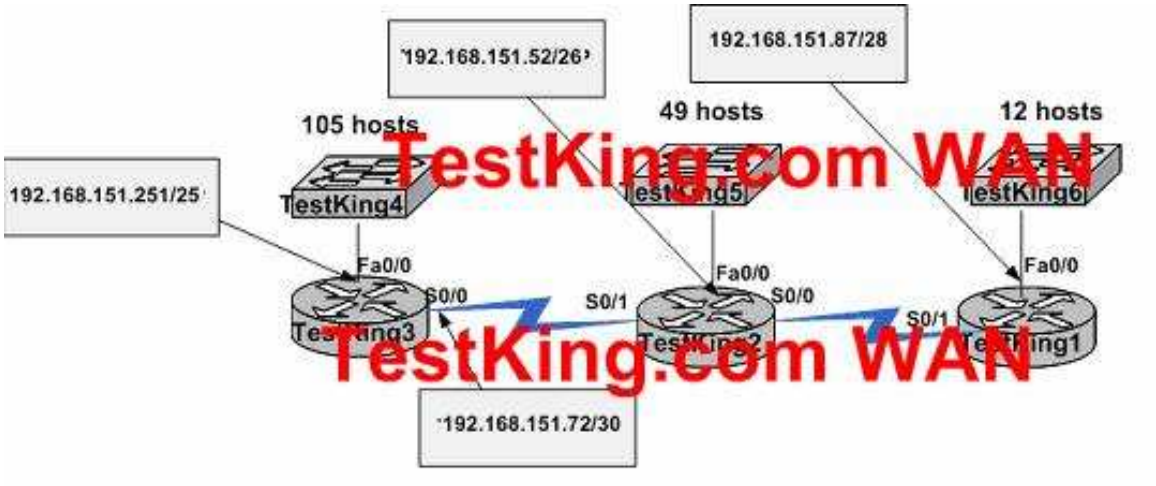
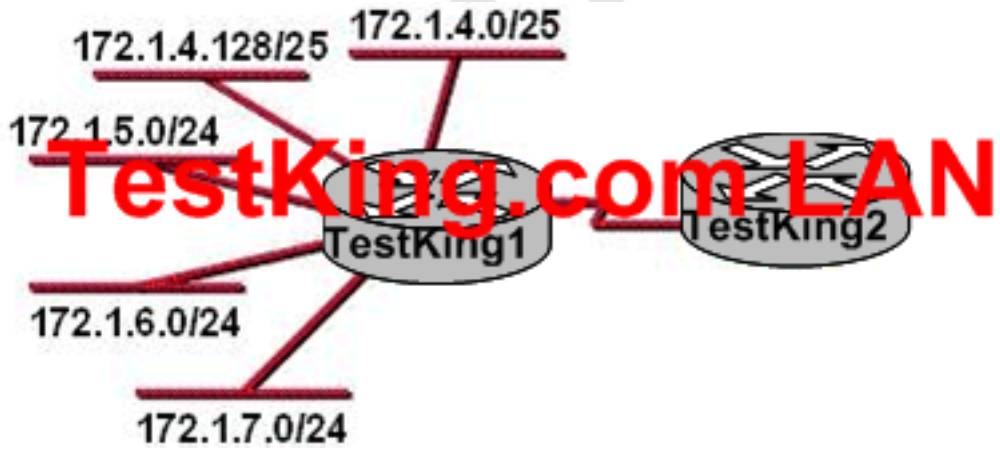


Section 6: Determine the appropriate classless addressing scheme using VLSM and summarization to satisfy addressing requirements in a LAN/WAN environment (24 questions)

QUESTION NO: 1
Part of the TestKing network is shown below:



Based on the information shown above, what is the most efficient summarization that Router TestKing1 can use to advertise its networks to Router TestKing2?

A. 172.1.4.0/24
172.1.5.0./24
172.1.5.0/24
172.1.6.0/24
172.1.7.0/24
B. 172.1.0.0/22
C. 172.1.0.0/21
D. 172.1.4.0/24
172.1.4.128/25
172.1.5.0/24
172.1.6.0/24
172.1.7.0/24
E. 172.1.4.0/22
F. None of the above

Answer: E

QUESTION NO: 2
You need subnet a TestKing network segment. How many subnetworks and hosts are available per subnet if you apply a /28 mask to the 210.10.2.0 class C network?

A. 30 networks and 6 hosts.
B. 6 networks and 30 hosts.
C. 8 networks and 32 hosts.
D. 32 networks and 18 hosts.
E. 16 networks and 14 hosts.
F. None of the above

Answer: E
Explanation:
A 28 bit subnet mask (11111111.11111111.11111111.11110000) applied to a class C network uses a 4 bits for networks, and leaves 4 bits for hosts. Using the 2n-2 formula, we have 24-2 (or 2x2x2x2-2) which gives us 14 for the number of hosts, and the number of networks is 24 = 16.
Incorrect Answers:

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A. This would be the result of a /29 (255.255.255.248) network.
B. This would be the result of a /27 (255.255.255.224) network.
C. This is not possible, as we must subtract two from the subnets and hosts for the network and broadcast addresses.
D. This is not a possible combination of networks and hosts.

QUESTION NO: 3
The TestKing network was assigned the Class C network 199.166.131.0 from the ISP. If the administrator at TestKing were to subnet this class C network using the 255.255.255.224 subnet mask, how may hosts will they be able to support on each subnet?

A. 14
B. 16
C. 30
D. 32
E. 62
F. 64

Answer: C
Explanation:
The subnet mask 255.255.255.224 is a 27 bit mask (11111111.11111111.11111111.11100000). It uses 3 bits from the last octet for the network ID, leaving 5 bits for host addresses. We can calculate the number of hosts supported by this subnet by using the 2n-2 formula where n represents the number of host bits. In this case it will be 5. 25-2 gives us 30.
Incorrect Answers:
A. Subnet mask 255.255.255.240 will give us 14 host addresses.
B. Subnet mask 255.255.255.240 will give us a total of 16 addresses. However, we must still subtract two addresses (the network address and the broadcast address) to determine the maximum number of hosts the subnet will support.
D. Subnet mask 255.255.255.224 will give us a total of 32 addresses. However, we must still subtract two addresses (the network address and the broadcast address) to determine the maximum number of hosts the subnet will support.
E. Subnet mask 255.255.255.192 will give us 62 host addresses.
F. Subnet mask 255.255.255.192 will give us a total of 64 addresses. However, we must still subtract two addresses (the network address and the broadcast address) to determine the maximum number of hosts the subnet will support.

QUESTION NO: 4
What is the subnet for the host IP address 172.16.210.0/22?

A. 172.16.42.0
B. 172.16.107.0
C. 172.16.208.0
D. 172.16.252.0
E. 172.16.254.0
F. None of the above

Answer: C
Explanation:
This question is much easier then it appears when you convert it to binary and do the Boolean operation as shown below:

IP address 172.16.210.0 = 10101100.00010000.11010010.00000000
/22 mask = 11111111.11111111.11111100.00000000
AND result = 11111111.11111111.11010000.00000000
AND in decimal= 172 . 16 . 208 . 0

QUESTION NO: 5
What is the subnet for the host IP address 201.100.5.68/28?

A. 201.100.5.0
B. 201.100.5.32
C. 201.100.5.64
D. 201.100.5.65
E. 201.100.5.31
F. 201.100.5.1

Answer: C
Explanation:
This question is much easier then it appears when you convert it to binary and do the Boolean operation as shown below:

IP address 201.100.5.68 = 11001001.01100100.00000101.01000100

/28 mask = 11111111.11111111.11111111.11000000
AND result = 11001001.01100100.00000101.01000000
AND in decimal= 200 . 100 . 5 . 64

QUESTION NO: 6
Your network uses the172.12.0.0 class B address. You need to support 459 hosts per subnet, while accommodating the maximum number of subnets. Which mask would you use?

A. 255.255.0.0.
B. 255.255.128.0.
C. 255.255.224.0.
D. 255.255.254.0.
E. None of the above

Answer: D
Explanation:
To obtain 459 hosts the number of host bits will be 9. This can support a maximum of 510 hosts. To keep 9 bits for hosts means the last bit in the 3rd octet will be 0. This gives 255.255.254.0 as the subnet mask.

QUESTION NO: 7
Using a subnet mask of 255.255.255.224, which of the IP addresses below can you assign to the hosts on this subnet? (Select all that apply)

A. 16.23.118.63
B. 87.45.16.159
C. 92.11.178.93
D. 134.178.18.56
E. 192.168.16.87
F. 217.168.166.192

Answer: C, D, E
Explanation:

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Since the subnet mask is 255.255.255.224, the number of network hosts that is available is 30. Every network boundary will be a multiple of 32. This means that every subnet will be a multiple (0, 32, 64, 96, 128, 160, 192, 224) and the broadcast address for each of these subnets will be one less this number (31, 63, 95, 127, 159, 191, 223). Therefore, any IP address that does not end in one of these numbers will be a valid host IP address.
C. Valid Host in subnetwork 2 (92.11.178.64 to 92.11.178.95)
D. Valid Host in subnetwork 1 (134.178.18.32 to 134.178.18.63)
E. Valid Host in subnetwork 2 (192.168.16.64 to 192.168.16.95)
Incorrect Answers:
A. This will be the broadcast address for the 16.23.118.32/27 network.
B. This will be the broadcast address for the 87.45.16.128/27 network
F. This will be the network address for the 217.168.166.192/27 network.

QUESTION NO: 8
Your ISP has assigned you the following IP address and subnet mask:

IP address: 199.141.27.0
Subnet mask: 255.255.255.240

Which of the following addresses can be allocated to hosts on the resulting subnet? (Select all that apply)

A. 199.141.27.2
B. 199.141.27.175
C. 199.141.27.13
D. 199.141.27.11
E. 199.141.27.208
F. 199.141.27.112

Answer: A, C, D
Explanation:
IP address = 11001000.10001101.00011011.00000000 = 199.141.27.0
Subnet mask = 11111111.11111111.11111111.11110000 = 255.255.255.240
Subnet # = 11001000.10001101.00011011.00000000 = 199.141.27.0
Broadcast = 11001000.10001101.00011011.00001111 = 199.141.27.15

The valid IP address range = 199.141.27.1 - 199.141.27.14

QUESTION NO: 9
The IP network 210.106.14.0 is subnetted using a /24 mask. How many usable networks and host addresses can be obtained from this?

A. 1 network with 254 hosts
B. 4 networks with 128 hosts
C. 2 networks with 24 hosts
D. 6 networks with 64 hosts
E. 8 networks with 36 hosts

Answer: A
Explanation:
A subnet with 24 bits on would be 255.255.255.0. Since this is a class C network, this subnet can have only 1 network and 254 usable hosts.

QUESTION NO: 10
Given that you have a class B IP address network range, which of the subnet masks below will allow for 100 subnets with 500 usable host addresses per subnet?

A. 255.255.0.0
B. 255.255.224.0
C. 255.255.254.0
D. 255.255.255.0
E. 255.255.255.224

Answer: C
Explanation:
Using the 2n-2 formula for host addresses, 29-2 = 510 host address, so a 9-bit subnet mask will provide the required number of host addresses. If these 9 bits are used for the hosts in a class B network, then the remaining 7 bits are used for the number of networks. Again using the 2n-2 formula, we have 2n-2 = 126 networks that are available.
Incorrect Answers:
A. This will provide for only 1 network with 216-2 = 65534 hosts
B. This will provide for 6 networks with 8190 host addresses.
D. This will provide 254 networks and 254 hosts.
E. This will provide 2046 different networks, but each network will have only 30 hosts.

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QUESTION NO: 11
You have a class C network, and you need to design it for 5 usable subnets with each subnet handling a minimum of 18 hosts each. Which of the following network masks should you use?

A. 225.225.224.0.
B. 225.225.240.0.
C. 225.225.255.0.
D. 255.255.255.224
E. 225.225.255.240

Answer: D
Explanation:
The default subnet mask for class C network is 255.255.255.0. If one has to create 5 subnets, then 3 bits are required. With 3 bits we can create 8 subnets. The remaining 5 bits are used for Hosts. One can create 30 hosts using 5 bits in host field. This matches with the requirement.
Incorrect Answers:
A, B: This is an illegal subnet mask for a class C network, as the third octet can not be divided when using a class C network.
C. This is the default subnet mask for a class C network. It provides for one network, with 254 usable host IP addresses.
E. This subnet mask will provide for 14 separate networks with 14 hosts each. This does not meet the requirement of a minimum of 18 hosts.

QUESTION NO: 12
The 213.115.77.0 network was subnetted using a /28 subnet mask. How many usable subnets and host addresses per subnet were created as a result of this?

A. 2 networks with 62 hosts
B. 6 networks with 30 hosts
C. 16 networks and 16 hosts
D. 62 networks and 2 hosts
E. 14 networks and 14 hosts
F. None of the above

Answer: F
Explanation:
A class C subnet with a 28 bit mask requires 4 bits for the network address, leaving 4 bits for host addresses. Using the 2n-2 formula (24-2 in this case) we have 14 host addresses and 16 network addresses.
Incorrect Answers:
A. This would be the result of a /26 network mask
B. This would be the result of a /27 network mask
C. Remember we need to always subtract two for the network and broadcast addresses, so this answer is incorrect.
D. This would be the result of a /30 network mask.

QUESTION NO: 13
The 201.145.32.0 network is subnetted using a /26 mask. How many networks and IP hosts per network exists using this subnet mask?

A. 4 networks and 64 hosts
B. 64 networks and 4 hosts
C. 4 networks and 62 hosts
D. 62 networks and 2 hosts
E. 6 network and 30 hosts

Answer: C
Explanation:
A class C network with a 26 bit mask requires 2 bits for the network address, leaving 6 bits for host addresses. Using the 2n-2 formula (22 for the network and 26-2for hosts) we have 4 network addresses and 62 host addresses.
Incorrect Answers:
A, B: This is not a possible combination. No network mask will provide for 64 usable hosts, because we must always subtract 2 for the network and broadcast address.
D. This would be the result of a /30 mask.
E. This would be the result of a /27 network mask.

QUESTION NO: 14
You have a class B network with a 255.255.255.0 mask. Which of the statements below are true of this network? (Select all valid answers)

A. There are 254 usable subnets.
B. There are 256 usable hosts per subnet.
C. There are 50 usable subnets.
D. There are 254 usable hosts per subnet.
E. There are 24 usable hosts per subnet.
F. There is one usable network.

Answer: A, D
Explanation:
The default subnet mask for Class B is 255.255.0.0. Thus an extra 8 bits have been used for the network portion, leaving 8 for hosts. The 2n - 2 formula (28 - 2 in this case for both the network and IP hosts) gives us 254 networks and 254 hosts per network.
Incorrect Answers:
B. We must remember to always subtract 2 (one for the network, and one for the broadcast) so the result is 254, not 256.
C, E: No possible network mask would give us this exact number of subnets or hosts.
F. This would be true if this were a class C network, not a class B.

QUESTION NO: 15
How many usable IP addresses can you get from a conventional Class C address?

A. 128
B. 192
C. 254
D. 256
E. 510

Answer: C
Explanation:
Class Caddresses range from 192.0.0.0 through 223.225.225.225 and default subnet maskof 255.255.255.0. In Class C addresses, the first 24 bits are used as for the network IDwhile only the last 8 bits is used for the host ID. Using the 2n-2 formula, we can calculate that Class C addresses can support a maximum of 254 (28-2) hosts.
Incorrect Answers:
D. Note that the question asked for the number of usable addresses, and not the total number of all addresses. We must subtract 2 for the network and broadcast addresses to calculate the number of usable addresses in any subnet.

QUESTION NO: 16
Your ISP assigned you a full class B address space. From this, you need at least 300 sub-networks that can support at least 50 hosts each. Which of the subnet masks below are capable of satisfying your needs? (Select two).

A. 255.255.255.0
B. 255.255.255.128
C. 255.255.252.0
D. 255.255.255.224
E. 255.255.255.192
F. 255.255.248.0

Answer: B, E
Explanation:
Requirement in the question is that the company needs 300 subnets and 50 hosts per subnet.

Number of Bits in the Host or Subnet Field	**Maximum number of Hosts or Subnets (**2n-2)
1	0
2	2
3	6
4	14
5	30
6	62
7	126
8	254
9	510
10	1022
11	2046
12	4094
13	8190
14	16,382

With 9 bits used for the subnet portion, we get 510 subnets and using the remaining 7 bits for the hosts gives us 126 hosts per subnet. The subnet mask will be 255.255.255.128

With 10 bits used for the subnet portion, we get 1022 subnets and then using the remaining 6 bits for hosts provides 62 hosts per subnet. The subnet mask will be 255.255.255.192 in this case which will also fulfill the requirement.

QUESTION NO: 17
A TestKing PC has the IP address 172.16.209.10 /22. What is the subnet of this address?

A. 172.16.42.0
B. 172.16.107.0
C. 172.16.208.0
D. 172.16.252.0
E. 172.16.254.0

Answer: C
Explanation:
172.16.209.10/22 translates to 10101100.00010000.11010001.00001010 in binary form. The network portion is 22 bits, so after the logical AND comparison the network address translates to10101100.00010000.110100001.00001010. Converting the network portion to decimal results in the address 172.16.208.0/22

QUESTION NO: 18
You've been assigned the CIDR (classless inter domain routing) block of 115.64.4.0/22 from your ISP. Which of the IP addresses below can you use for a host? (Select all valid answers)

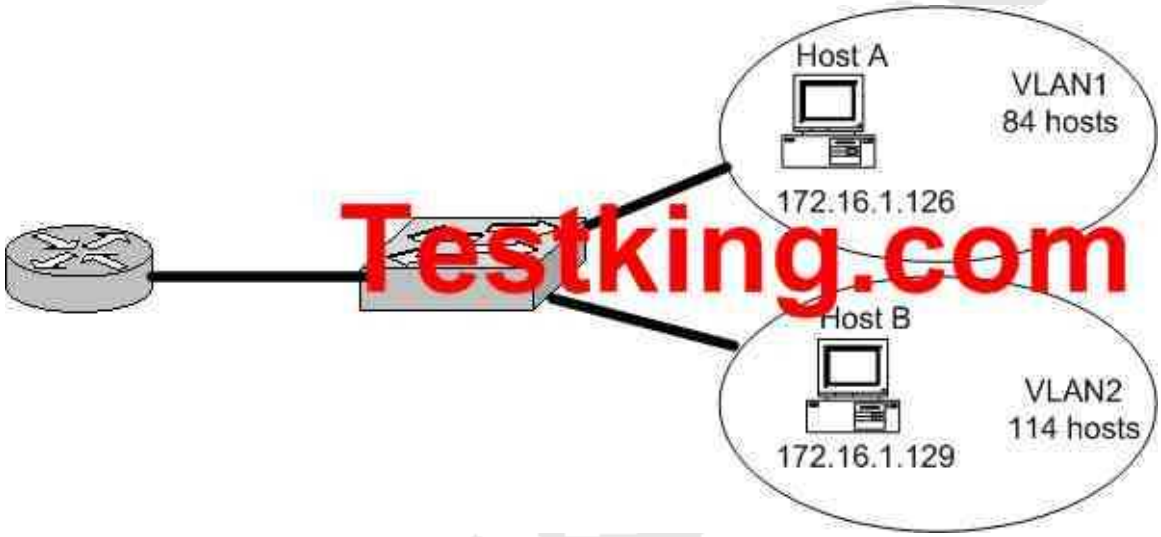
A. 115.64.8.32
B. 115.64.7.64
C. 115.64.6.255
D. 115.64.3.255
E. 115.64.5.128
F. 115.64.12.128

Answer: B, C, E
Explanation:

115.64.4.0 = 01110011.01000000.00000100.00000000
Subnet mask = 11111111.11111111.11111100.00000000= 255.255.252.0
Subnet number = 01110011.01000000.00000100.00000000= 115.64.4.0
Broadcast = 01110011.01000000.00000111.11111111= 115.64.7.255

Valid address range = 115.64.4.1 - 115.64.7.254

QUESTION NO: 19
A TestKing remote office branch is set up as shown in the diagram below:



All of the hosts in the above exhibit are connected with each other via the single Catalyst switch. Which of the following statements correctly describe the addressing scheme of this network? (Select three)

A. The subnet mask in use is 255.255.255.192.
B. The subnet mask in use is 255.255.255.128.
C. The IP address 172.16.1.25 can be assigned to hosts in VLAN1.
D. The IP address 172.16.1.205 can be assigned to hosts in VLAN1
E. The LAN interface of the router is configured with one IP address.

F. The LAN interface of the router is configured with multiple IP addresses.

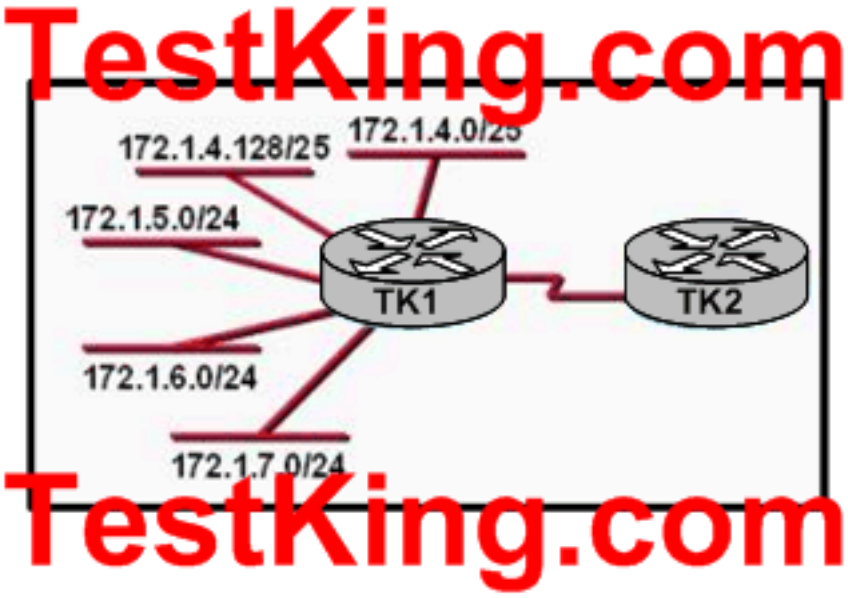
Answer: B, C, F
Explanation:
Based on the diagram above, the subnet mask used for each VLAN is 255.255.255.128. This means that hosts in VLAN 1 will be addressed 172.16.1.1-172.16.1.126, with 172.16.1.127 being used as the broadcast address. Hosts in VLAN 2 will be addressed 172.16.1.129-172.16.1.254. Because there is only one LAN interface on the router, sub interfaces will be used, so the router's LAN interface will be configured with 2 IP addresses, one for VLAN 1 and 1 for VLAN 2.
Incorrect Answers:
A. This subnet mask will only provide 62 host IP addresses, and the diagram shows that as many as 114 host IP addresses are needed.
D. This IP address can be used in VLAN 2, not VLAN 1.
E. Since there are 2 subnets in this network, each separate network will require a distinct default gateway IP address, so 2 IP addresses will be required on the LAN interface of the router.

QUESTION NO: 20
On the topic of VLSM, which one of the following statements best describes the concept of the route aggregation?

A. Deleting unusable addresses through the creation of many subnets.
B. Combining routes to multiple networks into one supernet.
C. Reclaiming unused space by means of changing the subnet size.
D. Calculating the available host addresses in the AS.
E. None of the above

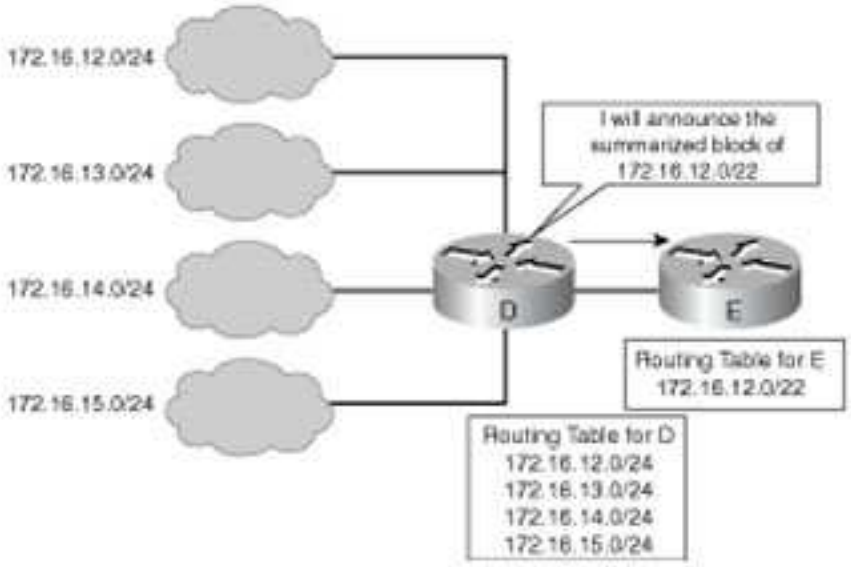
Answer: B
Explanation:
In the networking world route aggregate means combining routes to multiple networks into one. This is also known as route summarization or supernetting. It is normally used to reduce the number of route entries in the routing table by advertising numerous routes into one larger route.
Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 236.

QUESTION NO: 21
In the TestKing network shown below, what is the most efficient summarization that TK1 can use to advertise its networks to TK2?



A. 172.1.4.0/24172.1.5.0/24172.1.6.0/24172.1.7.0/24
B. 172.1.0.0/22
C. 172.1.4.0/25172.1.4.128/25172.1.5.0/24172.1.6.0/24172.1.7.0/24
D. 172.1.0.0/21
E. 172.1.4.0/22

Answer: E
Explanation:
Route Summarization Overview:
In large internetworks, hundreds, or even thousands, of network addresses can exist. It is often problematic for routers to maintain this volume of routes in their routing tables. Route summarization (also called route aggregation or supernetting) can reduce the number of routes that a router must maintain, because it is a method of representing a series of network numbers in a single summary address.



For example, in the figure above, router D can either send four routing update entries or summarize the four addresses into a single network number. If router D summarizes the information into asingle network number entry, the following things happen:

1. Bandwidth is saved on the link between routers D and E.
2. Router E needs to maintain only one route and therefore saves memory.
3. Router E also saves CPU resources, because it evaluates packets against fewer entries in its routing table.

A summary route is announced by the summarizing router as long as at least one specific route in its routing table matches the summary route.

QUESTION NO: 22
Part of the TestKing network is shown below:

TestKing

TestKing.com WAN

The five Ethernet networks connected to router TestKing1 in the graphic have been summarized for router TestKing2 as 192.1.144.0/20. Based on this information, which of the following packet destination addresses will TestKing2 forward to TestKing1, according to this summary? (Choose two.)

A. 192.1.1.144
B. 192.1.159.2
C. 192.1.138.41
D. 192.1.151.254
E. 192.1.160.11
F. 192.1.143.145
G. 0.0.0.0

Answer: B, D

QUESTION NO: 23
Refer to the following exhibit:

TestKing.com

In this network segment, the IP subnets connected to router TestKing2 have been summarized as a 192.18.176.0/21 route and sent to TestKing1. Based on this information, which two packet destination addresses will TestKing1 forward to TestKing2? (Choose two)

A. 192.18.183.255
B. 192.18.159.2
C. 192.18.194.160
D. 192.18.179.4
E. 192.18.183.41
F. 192.18.184.45

Answer: D, E

QUESTION NO: 24
What is the subnet address of the host with an IP address of 172.16.159.159/22?

A. 172.16.128.0

B. 172.16.156.0
C. 172.16.159.128
D. 172.16.159.0
E. 172.16.192.0
F. 172.16.0.0
G. None of the above

Answer: B
Explanation:
In this question there are a total of 6 bits borrowed from the host portion with the subnet mask 255.255.252.0. This will leave us 64 networks with 1022 and the IP subnets for each will be a multiple of 4. Some of the networks are as follows:

/22 172.16.148.0 - 255.255.252.0 - 1022 hosts
/22 172.16.152.0 - 255.255.252.0 - 1022 hosts
/22 172.16.156.0 - 255.255.252.0 - 1022 hosts
/22 172.16.160.0 - 255.255.252.0 - 1022 hosts
/22 172.16.164.0 - 255.255.252.0 - 1022 hosts
/22 172.16.168.0 - 255.255.252.0 - 1022 hosts
/22 172.16.172.0 - 255.255.252.0 - 1022 hosts
/22 172.16.176.0 - 255.255.252.0 - 1022 hosts

Section 7: Describe the technological requirements for running IPv6 in conjunction with IPv4 (including: protocols, dual stack, tunneling, etc). (0 questions)

Section 8: Describe IPv6 addresses (1 question)

QUESTION NO: 1
TestKing is migrating to an IPv6 addressing scheme. Identify the four valid IPv6 addresses below that could be used in this network. (Choose four)

A. ::192:168:0:1

B. 2002:c0a8:101::42
C. 2000::
D. ::
E. 2001:3452:4952:2837::
F. 2003:dead:beef:4dad:23:46:bb:101

Answer: A, B, D, F
Explanation:
From RFC 1884: IP Version 6 Addressing Architecture

There are three conventional forms for representing IPv6 addresses as text strings:

1. The preferred form is x:x:x:x:x:x:x:x, where the 'x's are the hexadecimal values of the eight 16-bit pieces of the address. Examples:

FEDC:BA98:7654:3210:FEDC:BA98:7654:3210

1080:0:0:0:8:800:200C:417A

Note that it is not necessary to write the leading zeros in an individual field, but there must be at least one numeral in every field (except for the case described in 2.).

2. Due to the method of allocating certain styles of IPv6 addresses, it will be common for addresses to contain long strings of zero bits. In order to make writing addresses

containing zero bits easier a special syntax is available to compress the zeros. The use of "::" indicates multiple groups of 16-bits of zeros. The "::" can only appear once in an address. The "::" can also be used to compress the leading and/or trailing zeros in an address.

For example the following addresses:

1080:0:0:0:8:800:200C:417A a unicast address
FF01:0:0:0:0:0:0:43 a multicast address
0:0:0:0:0:0:0:1 the loopback address
0:0:0:0:0:0:0:0 the unspecified addresses

may be represented as:

1080::8:800:200C:417A a unicast address
FF01::43 a multicast address
::1 the loopback address
:: the unspecified addresses

3. An alternative form that is sometimes more convenient when dealing with a mixed environment of IPv4 and IPv6 nodes is x:x:x:x:x:x:d.d.d.d, where the 'x's are the hexadecimal values of the six high-order 16-bit pieces of the address, and the 'd's are the decimal values of the four low-order 8-bit pieces of the address (standard IPv4 representation). Examples:

0:0:0:0:0:0:13.1.68.3

0:0:0:0:0:FFFF:129.144.52.38

or in compressed form:

::13.1.68.3

::FFFF:129.144.52.38

Reference: http://www.faqs.org/rfcs/rfc1884.html

Section 9: Identify and correct common problems associated with IP addressing and host configurations (11 questions)

QUESTION NO: 1
The TestKing network topology exhibit is shown below:

TestKing.com

TestKing.com WAN
TestKing.com WAN

Configuration exhibit:

Switch TestKingA configuration:

Port1: dot1q trunk
VLAN 1: Ports 2, 3, 4
VLAN 10: Ports 5, 6, 7
VLAN 20: Ports 8, 9, 10, 11, 12

TestKing.com

Router TestKing2 configuration:

```
interface fa0/0.1
  encapsulation dot1q 1
  ip address 192.168.1.14 255.255.255.248
interface fa0/0.10
 encapsulation dot1q 10
 ip address 192.168.1.78 255.255.255.224
interface fa0/0.20
 encapsulation dot1q 20
 ip address 192.168.1.130 255.255.255.192
```

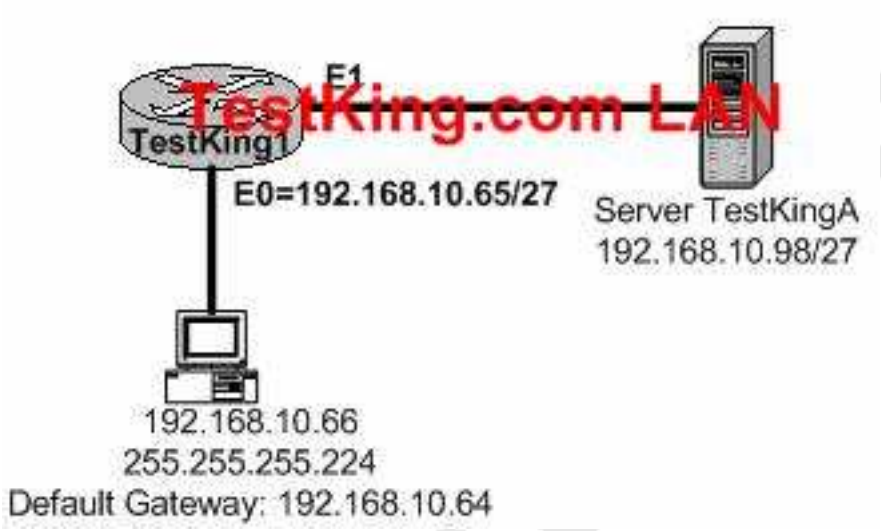
TestKing.com

The TestKing network administrator is adding two new hosts to switch TestKingA. Of the following choices, which values could be used for the configuration of these hosts? (Choose three.)

A. Host TestKingB IP Address: 192.168.1.128
B. Host TestKingA default gateway: 192.168.1.78
C. Host TestKingA IP Address: 192.168.1.64
D. Host TestKingB IP Address: 192.168.1.190
E. Host TestKingA IP address: 192.168.1.79
F. Host TestKingB default gateway: 192.168.1.129

Answer: B, D, E

QUESTION NO: 2
The new Testking location is displayed below:



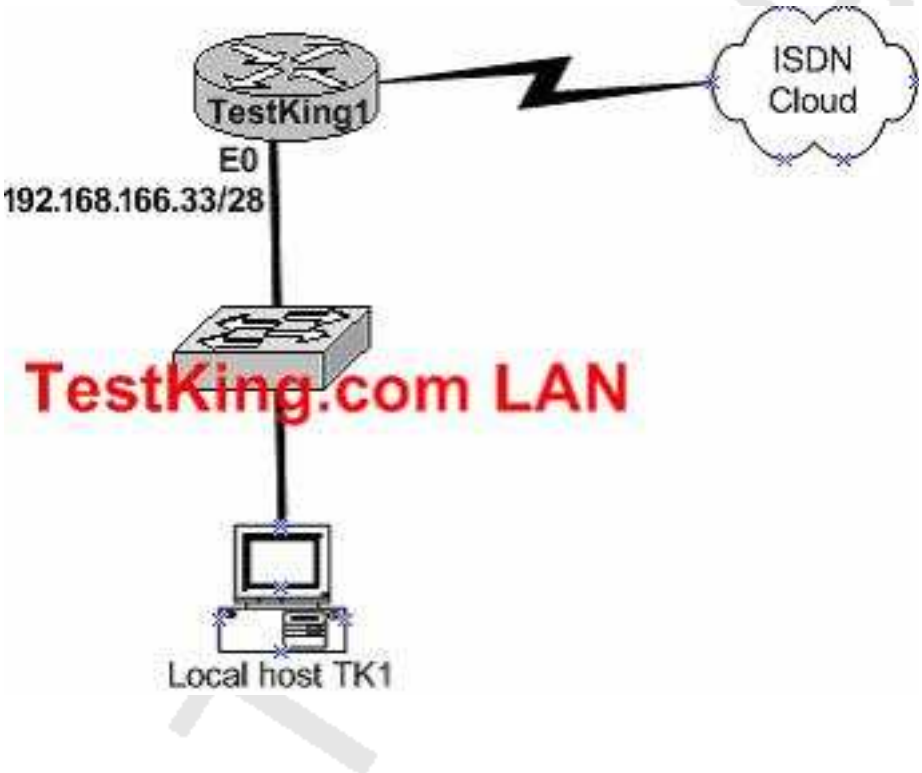
A new PC is installed on the LAN of the Testking1 router as shown above. This PC is unable to connect to the TestKingA server located on the Ethernet 1 network. What is the cause of this?

A. IP address of the Ethernet 0 router interface is wrong
B. Server is using an invalid IP address
C. Workstation default gateway is set incorrectly
D. Workstation subnet mask is incorrect
E. Workstation IP address is invalid

F. None of the above

Answer: C
Explanation:
The default gateway of the host (192.168.10.64) is wrong. 192.168.10.64 is the network address of the host's network in this question. The default gateway should be the address of the local interface of the router. In this case: 192.168.10.65.
Incorrect Answers:
A: The IP address of the Eternet0 interface is valid.
B: The IP address of the server is valid.
D: The network uses a 27 bit subnet mask which equates to 255.255.255.224.
E: The IP host address 192.168.10.66 is a valid host address on the subnet.

QUESTION NO: 3
A new LAN is being implemented on the TestKing1 network as shown below:



The local host TK1 can't access any of the resources on the other networks. The configuration of TK1 is as follows:

```
host address: .....192.168.166.45
subnet mask: ......255.255.255.240
default gateway: ..192.168.166.32
```

What is the underlying cause of this problem?

A. The default gateway is a network address.
B. The default gateway is on a different subnet address as the host.
C. The IP address of the host is on a different subnet.
D. The host subnet mask is incompatible to the subnet mask of the attached router interface.

Answer: A
Explanation:
The range of the subnet used in this question is 192.168.166.32 to 192.168.166.47. 192.168.166.32 is the network address and 192.168.166.47 is the broadcast. This leaves the usable host address range of 192.168.166.33 to 192.168.166.46.
The default gateway for the host should be 192.168.166.33.
Incorrect Answers:
B: The default gateway is on the same network but it is a network address.
C: The host address is correct.
D: The subnet mask 255.255.255.240 uses 28 bits and is therefore correct.

QUESTION NO: 4
While troubleshooting a connectivity issue from a PC you obtain the following information:

Local PC IP address: 190.0.3.35/24
Default Gateway: 190.0.3.1
Remote Server: 190.0.5.250/24

You then conduct the following tests from the local PC:

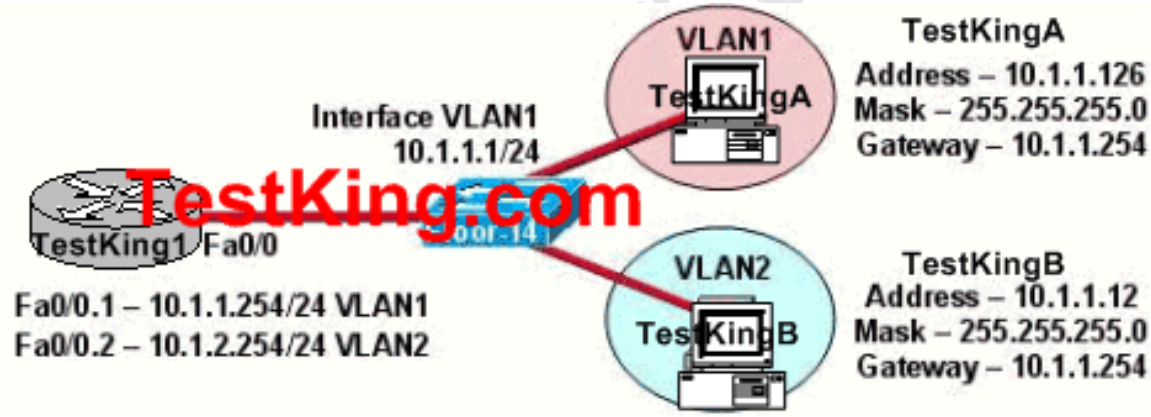
Ping 127.0.0.1 - Unsuccessful
Ping 190.0.3.35 - Successful
Ping 190.0.3.1 - Unsuccessful
Ping 190.0.5.250 - Unsuccessful

What is the underlying cause of this problem?

A. TCP/IP not correctly installed
B. Local physical layer problem
C. NIC not functioning
D. Remote physical layer problem
E. None of the above

Answer: A
Explanation:
Every Windows based PC uses the 127.0.0.1 as the local loopback IP address. Every PC will respond to this local IP address if the TCP/IP stack is correctly installed and running on the machine. If you cannot ping the loopback address of 127.0.0.1, then something is wrong with the TCP/IP protocol stack.

QUESTION NO: 5
A TestKing network is shown below:



The network shown in the exhibit above is experiencing connectivity problems. Which of the following will correct the problems? (Select two)

A. Configure the gateway on TestKingA as 10.1.1.1.
B. Configure the gateway on TestKingB as 10.1.2.254.
C. Configure the IP address of TestKingA as 10.1.2.2.
D. Configure the IP address of TestKingB as 10.1.2.2.

E. Configure the masks on both hosts to be 255.255.255.224.
F. Configure the masks on both hosts to be 255.255.255.240.

Answer: B, D
Explanation:
All devices must have their default gateways set to an IP address that is in the same IP network that the station is in. Based on the diagram above, TestKing B is in VLAN2, so the default gateway for this device should be the IP address of the VLAN 2 interface on the router. In addition, the IP addresses of both devices reside within the same IP subnet. Since they belong to different VLANs, the best method to ensure proper connectivity would be to give TestKingB an IP address within the same IP range as the VLAN that it belongs to, which is VLAN2 in this example.

QUESTION NO: 6
Part of the TestKing network is shown below:

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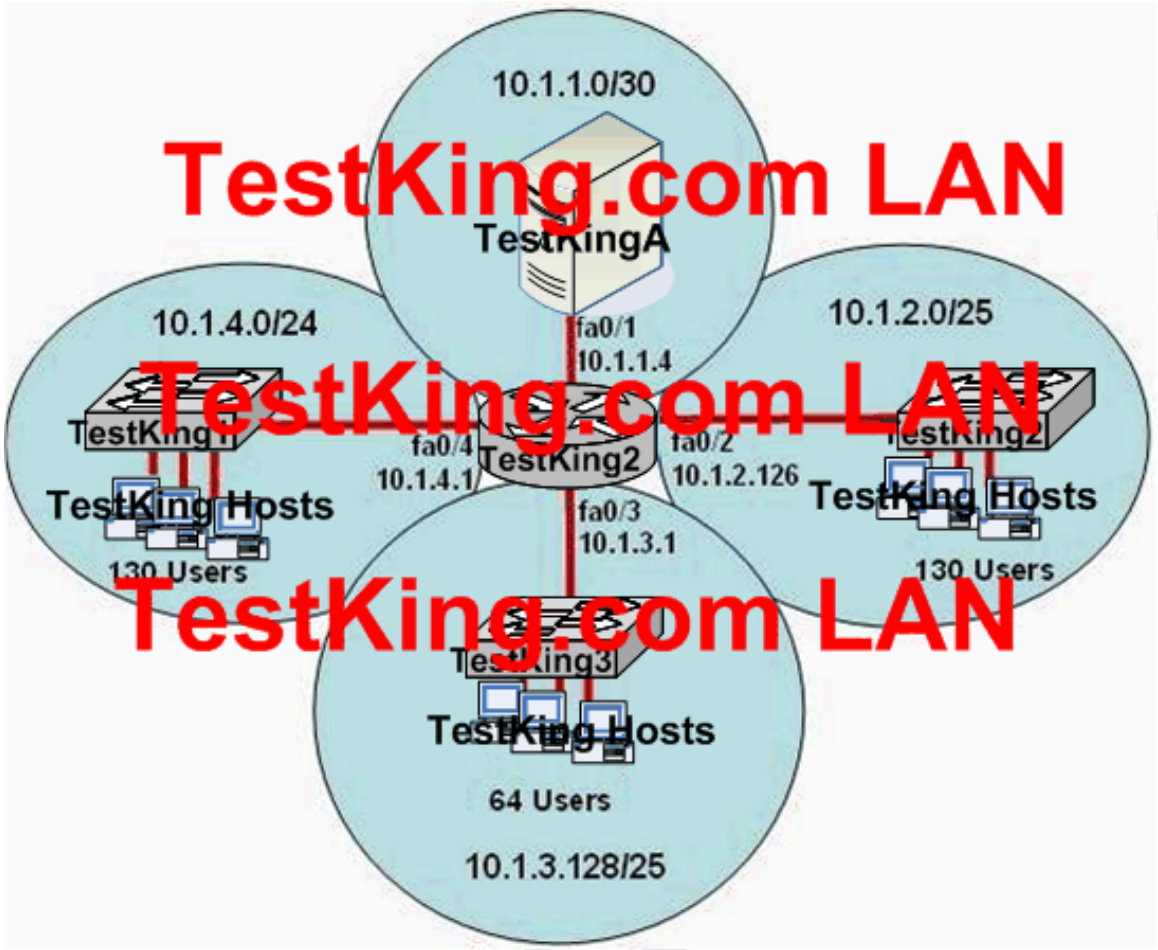


TestKing.com LAN
TestKing.com LAN
TestKing.com LAN

A junior network associate has created the network design shown above. The goal of this network design is to provide the most efficient use of IP address space in a network expansion. Each circle defines a network segment and the number of users required on that segment. An IP subnet number and default gateway address are shown for each segment.

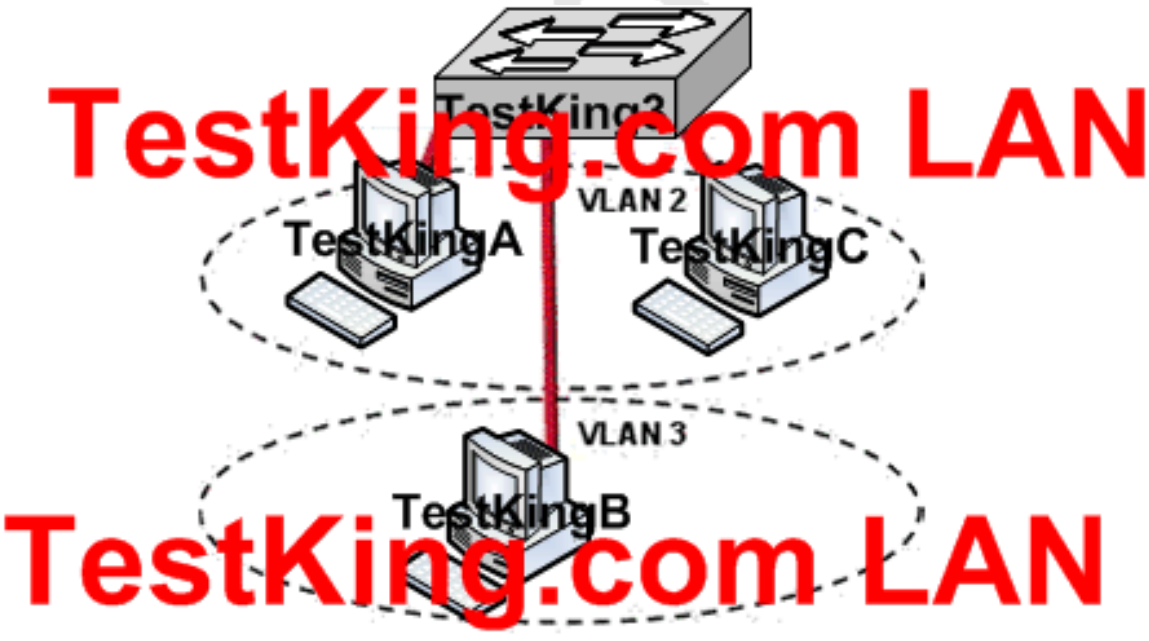
Based on the information shown above, what are three problems with the network design as shown? (Choose three)

A. The IP subnet 10.1.1.0/30 is invalid for a segment with a single server.

B. Network 10.1.3.128/25 requires more user address space.
C. Network 10.1.2.0/25 requires more user address space.
D. Interface fa0/2 has an invalid IP address for the subnet on which it resides.
E. Interface fa0/1 has an invalid IP address for the subnet on which it resides.
F. Interface fa0/3 has an incorrect IP address

Answer: C, E, F
Explanation:
C: A /25 will provide for 128 IP addresses (126 usable) so a larger subnet mask should be used. A /24 will provide for up to 254 usable addresses.
E: The 10.1.1.0/30 network will allow for only 2 usable IP addresses. In this network, 10.1.1.0 is reserved for the network address, and 10.1.1.3 is the broadcast address, so only 10.1.1.1 or 10.1.1.2 can be used for the fa0/1 IP address.
F: The 10.1.3.1 IP address is in the 10.1.3.0/25 network, not the 10.1.3.0/25 network. A more appropriate IP address for this interface would be 10.1.3.129

QUESTION NO: 7
Part of the TestKing LAN is shown below:



TestKing.com LAN
TestKing.com LAN

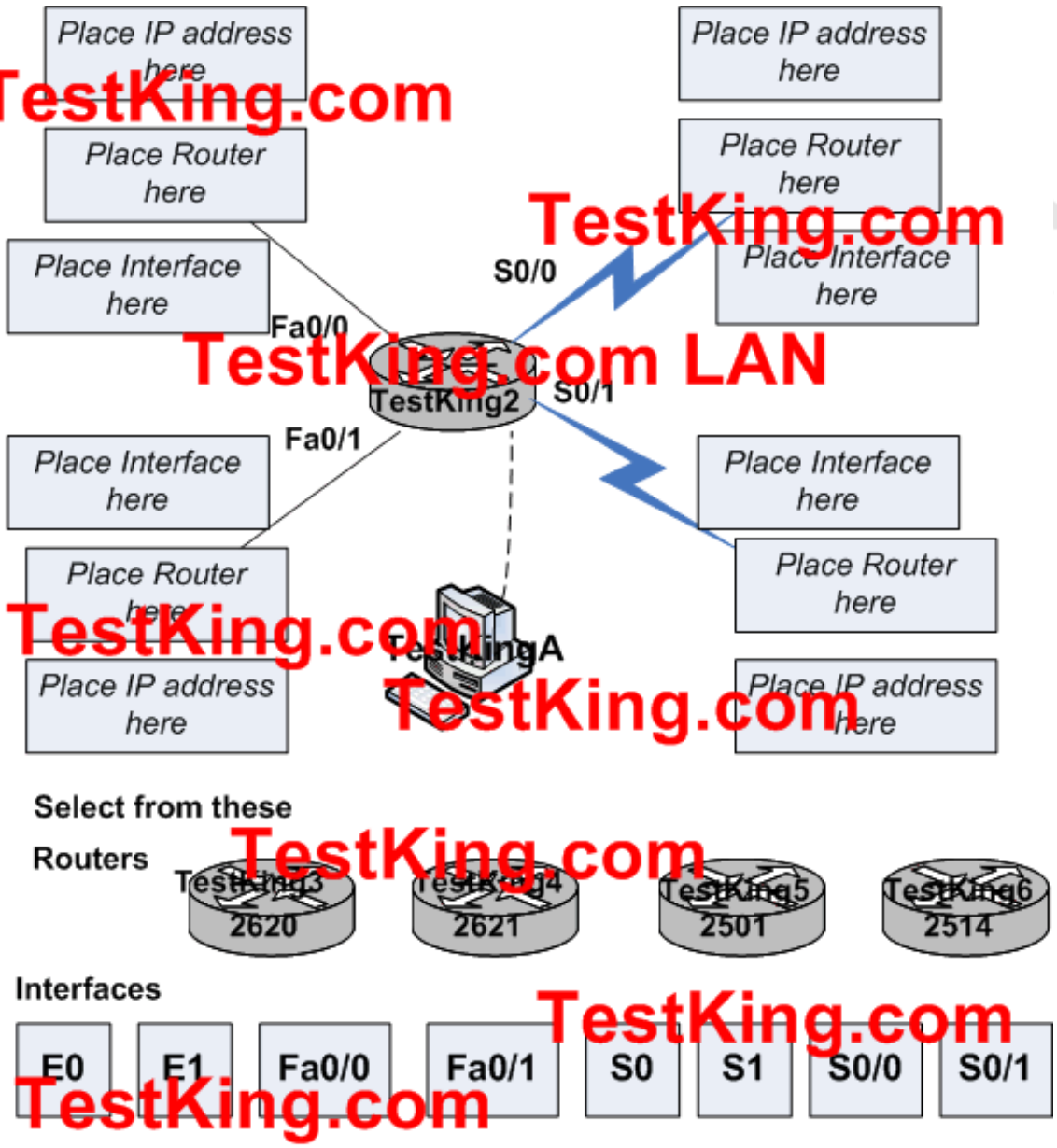
Based on the diagram shown above, which of the following IP addressing schemes could be used for this TestKing LAN segment?

A. Host TestKingA - 192.168.10.22/24; Host TestKingB - 192.168.11.23/24; Host TestKingC - 192.168.10.23/24
B. Host TestKingA - 192.168.10.22/24; Host TestKingB - 192.168.10.23/24; Host TestKingC - 192.168.11.23/24
C. Host TestKingA - 192.168.10.22/24; Host TestKingB - 192.168.10.23/24; Host TestKingC - 192.168.10.24/24
D. Host TestKingA - 192.168.11.22/24; Host TestKingB - 192.168.11.23/24; Host TestKingC - 192.168.10.24/24
E. None of the above

Answer: A
Explanation:
Hosts in the same VLAN must belong to the same IP subnet. In this case, hosts A and C should have IP addresses in one subnet, and host B should have an IP address in a separate subnet. Only choice A is correct.
Incorrect Answers:
B: In this case, hosts A and B are both in the 192.168.10.0/24 subnet, but they are in different VLANs
C: In this case, all three hosts are in the same 192.168.10.0/24 subnet, even though there are 2 different VLANs
D: Here hosts A and B are both in the 192.168.11.0/24 subnet even though they are in different VLANs.

QUESTION NO: 8 DRAG DROP
Network topology exhibit:

Testking.com



TestKing.com
TestKing.com
TestKing.com LAN
TestKing.com
TestKing.com
TestKing.com
TestKing.com
TestKing.com

You work as a network technician at TesttKing.com. Study the network topology exhibit carefully. The network is incomplete. Your task is to complete the TestKing.com network. You need to select the correct router types, IP addresses and interface types respectively.

Use the TestKingII PC connected to the TestKing1 router to access further information that is required to complete the task.

Note: The console information is missing in this scenario.

Answer:
Explanation: Pending. Send your suggestion to feedback@testking.com

QUESTION NO: 9
Exhibit:

After the router interfaces shown in the diagram have been configured, it is discovered that hosts in the TestKIng1 LAN cannot access the Internet. Further testing reveals additional connectivity issues. What will fix this problem?

A. Change the subnet mask of the TestKing2 router LAN interface.
B. Change the address of the TestKing1router WAN interface.
C. Change the address of the TestKing2 router interface to the Internet.

D. Change the address of the TestKing1 router LAN interface.
E. Change the address of the TestKing2 router LAN interface.
F. Change the subnet mask of the TestKing2 router interface to the Internet.
G. None of the above

Answer: B
Explanation:
In order for two routers to be able to send and receive traffic across a point to point serial link, the IP addresses of the two serial interfaces across this link needs to be in the same IP subnet. Since we are using a /30 in this case, only 2 valid IP addresses are usable but as we can see in this example the 192.168.10.82/30 and 192.168.10.85/30 IP addresses reside in two different subnets.

QUESTION NO: 10
Exhibit:

```
TestKing3# configure terminal
TestKing3(config)# interface fastethernet 0/0
TestKing3 (config-if)# ip address 192.168.1.17 255.255.255.0
TestKing3 (config-if)# no shutdown
TestKing3 (config-if)# interface serial 0/0
TestKing3 (config-if)# ip address 192.168.1.65 255.255.255.240
TestKing3 (config-if)# no shutdown
%  192.168.1.0 overlaps with FastEthernet0/0
```

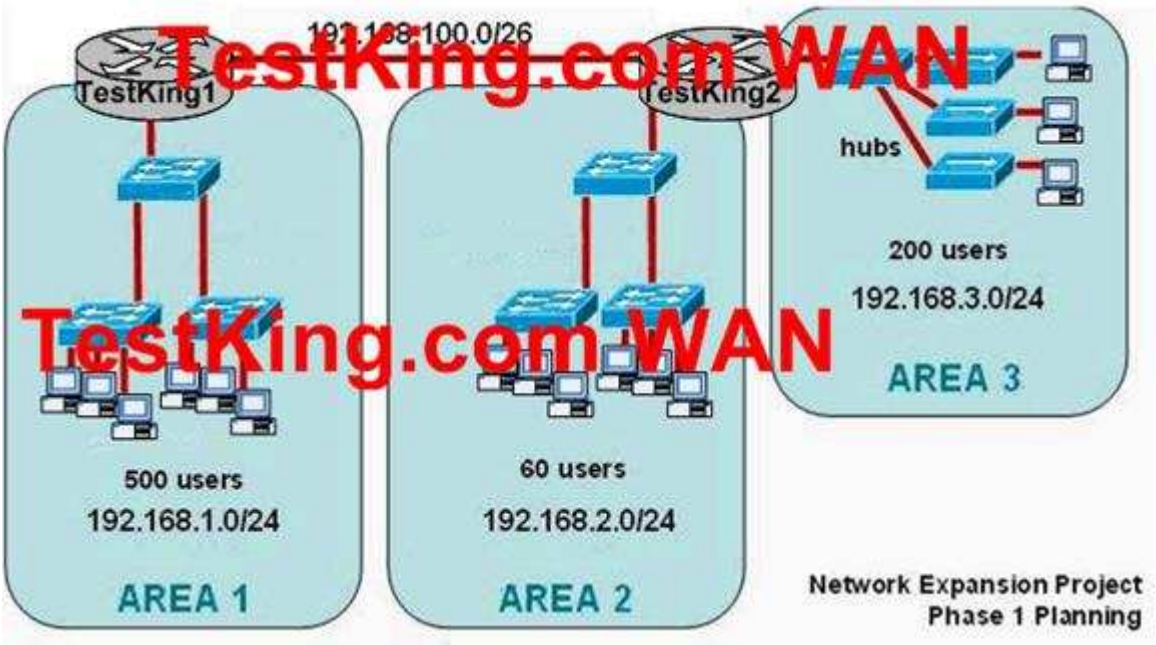
TestKing.com
TestKing.com

You work as a network technician at a TestKing office. After configuring two interfaces on the TestKing3 router as shown, you notice an error message. What should be done to fix this error?

A. The subnet mask of the serial interface on TestKing3 should be changed to 255.255.255.0.
B. The subnet mask of the FastEthernet interface on TestKing3 should be changed to 255.255.255.240.
C. The serial interface must be configured first.
D. The serial interface must use the address 192.168.1.2.
E. The address of the FastEthernet interface should be changed to 192.168.1.66.

Answer: B
Explanation:
Cisco routers will not allow you to configure two interfaces that belong to the same IP subnet. In this case, by giving the serial 0/0 interface an IP address of 192.168.1.65, it would belong to this /28 subnet but it would also belong to the 192.168.1.17/24 subnet. You need to ensure that two interfaces are given IP addresses and subnet masks so that they belong to different subnets, and given the options only the option of changing the mask of the FE interface to an /28 will accomplish this.

QUESTION NO: 11
Exhibit:



The junior network support staff at TestKing provided the diagram as a recommended configuration for the first phase of a four-phase network expansion project. The entire network expansion will have over 1000 users on 14 network segments and has been allocated this IP address space:

192.168.1.1 through 192.168.5.255
192.168.100.1 through 198.168.100.255

There are three problems with this IP addressing design. What are they? (Choose three)

A. The broadcast domain in AREA 1 is too large for IP to function.
B. The AREA 3 IP address space is inadequate for the number of users.
C. AREA 2 could use a mask of /25 to conserve IP address space.
D. The router-to-router connection is wasting address space.
E. The network address space that is provided requires a single network-wide mask.
F. The AREA 1 IP address space is inadequate for the number of users.

Answer: C, D, F
Explanation:
C: Since there are only 60 users on this LAN, a /25 could be used as that will provide for up to 128 IP addresses (126 usable). In fact, since there are only 60 users, a /26 could be used as that will provide for up to 62 usable IP addresses. However, this would not accommodate any kind of growth and could cause problems in the future.
D: On point to point serial router links, a /30 is generally used as this will allow for only 2 usable IP addresses, which is all that is needed. In this case, a /26 has been assigned.
F: In this area, there are 500 users, but a /24 will only provide for 254 usable IP addresses. A /23 or larger will be needed to accommodate this many users.

Topic 4, CONFIGURE, VERIFY, AND TROUBLESHOOT BASIC ROUTER OPERATION AND ROUTING ON CISCO DEVICES (220 questions)

Section 1: Describe basic routing concepts (including: packet forwarding, router lookup process) (4 questions)

QUESTION NO: 1
The following output was shown on router TestKing3:

```
TestKing3 # show running-config
   <some output text omitted>
  router rip
   network 10.0.0.0
  !
  ip classless
TestKing3# show ip route
   <some output text omitted>
  Gateway of last resort is 10.1.5.5 to network 0.0.0.0
      10.0.0.0/24 is subnetted, 2 subnets
R     10.1.3.0 [120/1] via 10.1.2.2, 00:00:00, Serial0/0
C     10.1.2.0 is directly connected, Serial0/0
C     10.1.5.0 is directly connected, Serial0/1
C     10.1.6.0 is directly connected, FastEthernet0/0
R*    0.0.0.0/0 [120/1] via 10.1.5.5, 00:00:00, Serial0/1
```

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Refer to the output of the two show commands in the exhibit above. If the TestKing network administrator tries to ping host 10.1.8.55 from host 10.1.6.100, how will these ICMP packets be processed by Router TestKing3?

A. The packets will be routed out the Fa0/0 interface
B. The packets will be discarded
C. The packets will be routed out the S0/0 interface
D. The packets will be routed out the S0/1 interface
E. None of the above

Answer: D

QUESTION NO: 2
Router TK1 receives information about network 192.168.111.0/24 from multiple sources. What will TK1 consider the most reliable information about the path to that network?

A. An OSPF update for network 192.168.111.0/16
B. A static route to network 192168.1111.0/24
C. A Directly connected interface with an address of 192.168.1111.254/24
D. A RIP update for network 192.168.1111.0/24
E. A Default route with a next hop address of 192.168.1111.1
F. A static route to network 192.168.1111.0/24 with a local serial interface configured as the next hop
G. None of the above

Answer: C

QUESTION NO: 3
Router TK1 has just received a packet and needs to route it. What two actions must this router take in order to route incoming packets? (Choose two)

A. Inspect the routing table to select the best path to the destination network addresses.
B. Validate sources of routing information.
C. Inspect the ARP table to verify a legitimate source MAC address for each packet.
D. Identify the destination network address of each packet.
E. Verify the receipt of routed packets by the next hop router.
F. Identify the source network address of each packet.

Answer: A, D
Explanation:
The router decides how to forward an incoming packet by finding the routes that "match" the destination address of the packet, and then forwarding it according to the most narrowly applicable one. A packet matches a route in the following way: a packet has (among other things) a destination address in its header, a route contains either a network or a host address, a network mask (netmask), and instructions on how to forward a packet using the route. The packet matches the route if its destination address is part of the address subspace defined by the network address or exactly matches the host address of the route. A route is more narrowly applicable than another if the address subspace defined by its network address contains fewer actual addresses than the other, which is indicated by the netmask. An entry with a host address, rather than a network address, is the narrowest kind.

QUESTION NO: 4
Part of the TestKing network is shown below:

TestKing.com WAN
TestKing.com WAN

In this network, host TestKingA has established communications with host TestKingB for the first time. What enabled router TestKing2 to forward this traffic in the appropriate direction to reach the network to which host TestKingB is attached?

A. A default gateway
B. TCP/IP
C. A routing protocol
D. DHCP
E. A Layer 4 protocol
F. DNS
G. None of the above

Answer: C
Explanation:
Routing is the process of selecting paths in a network along which to send data or physical traffic. In order for routers to know how to forward traffic to the correct destinations located on other IP networks, a routing protocol must be enabled, either via the use of a dynamic routing protocol such as RIP or EIGRP, or through the use of static routes.

Section 2: Describe the operation of Cisco routers (including: router bootup process, POST, router components) (23 questions)

QUESTION NO: 1

Exhibit:

You work as a network technician at TestKing.com. Study the exhibit carefully. For what reasons have this TestKing router loaded its IOS image from the location that is shown? (Choose two)

A. TestKing3 defaulted to ROMMON mode and laded the IOS image from a TFTP server
B. Cisco Routers will first attempt to load an image from TFTP for management purpose
C. Ruouter1 has specific boot system commands that instruct it to load IOS from a TFTP server
D. TestKing3 is acting as a TFTP server fro other routers
E. TestKing3 can't locate valid IOS image in flash memory

Answer: C, E

QUESTION NO: 2

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You work as a network technician at TestKing.com. Study the exhibit carefully. What will router TestKingA do when it starts up next time?

A. start the limited IOS in ROM
B. start in ROM monitor mode
C. retrieve configuration information from the running-config file
D. look for startup instructions in NVRAM
E. load IOS from flash

Answer: B
Explanation:
RAM-Sometimes called DRAM for dynamic random-access memory, RAM is used by the router just as it is used by any other computer: for working storage. The running or active configuration file is stored here.
ROM-This type of memory (read-only memory) stores a bootable IOS image, which typically is not used for normal operation. ROM contains the code that is used to boot the router until the router knows where to get the full IOS image or as a backup bootable image, in case there are problems.
Flash memory-Either an EEPROM or a PCMCIA card, Flash memory stores fully functional IOS images and is the default location where the router gets its IOS at boot time. Flash memory also can be used to store any other files, including configuration files.
NVRAM-Nonvolatile RAM stores the initial or startup configuration file.

IOS on a router uses a configuration file for the initial configuration at router startup and the active, running configuration file. The startup configuration file is in NVRAM; the other file, which is in RAM, is the one that the router uses during operation. When the router first comes up, the router copies the stored configuration file from NVRAM into RAM, so the running and startup configuration files are identical at that point. Also, exterior to the router, configuration files can be stored as ASCII text files anywhere using TFTP or FTP.
The boot process follows this basic litany:
1. The router performs a power-on self-test (POST) to discover and verify the hardware.
2. The router loads and runs bootstrap code from ROM.
3. The router finds the IOS or other software and loads it.
4. The router finds the configuration file and loads it into running config.
Two configuration tools tell the router what OS to load:
1. The configuration register
2. The boot system configuration command
First, the configuration register tells the router whether to use a full-featured IOS,ROMMON, or the limited-feature IOS, which also is called RXBOOT mode. The configuration register is a 16-bit software register in the router, and its value is set using the config-register global configuration command. (Some older routers had a hardware configuration register with jumpers on the processor card, to set bits to a value of 0 or 1.) On most Cisco routers, the default Configuration Register setting is hexadecimal 2102.

Boot System Commands	Result
No **boot** command	Tries loading the following (in order): first file in flash; broadcasts looking for TFTP server and a default filename; IOS in ROM; or uses ROM Monitor.
boot system ROM	IOS from ROM is loaded.
boot system flash	The first file from Flash memory is loaded.
boot system flash *filename*	IOS with the name *filename* is loaded from Flash memory.
boot system tftp *filename* **10.1.1.1**	IOS with the name *filename* is loaded from the TFTP server.
Multiple boot system commands, any variety	An attempt occurs to load IOS based on the first **boot** command the in configuration. If that fails, the second **boot** command is used, and so on, until one is successful.

0x2102 : Default, which loads the IOS from Flash Memory
0x2100 : Boot the router in ROM Monitor Mode
0x2142: Boot the router bypassing the startup configuration

QUESTION NO: 3
There are no boot system commands in the router configuration in NVRAM for router TK1. What is the fallback sequence that the router TK1 will use to find an IOS during reload?

A. ROM, NVRAM, TFTP server
B. Flash, TFTP server, ROM
C. TFTP server, Flash, NVRAM
D. Flash, NVRAM, ROM
E. NVRAM, TFTP server, ROM
F. None of the above

Answer: B

QUESTION NO: 4
During startup, router TK1 displays the following error message:

boot: cannot open "flash:"

What will TK1 do next?

A. It will attempt to locate the configuration file from a TFTP server. If this fails, it will initiate the setup dialog.
B. It will attempt to locate the IOS from a TFTP server. If this fails, it will load a limited IOS from ROM.
C. It will attempt to locate the configuration file from a TFTP server. If this fails, it will load a limited configuration from ROM.
D. Because of damaged flash memory, the router will fail the POST.
E. It will attempt to locate the IOS from a TFTP server. If this fails, it will initiate the setup dialog.
F. None of the above

Answer: B
Explanation:
The boot sequence of a Cisco router is shown below:
Booting up the router and locating the Cisco IOS

1. POST (power on self test)
2. Bootstrap code executed
3. Check Configuration Register value (NVRAM) which can be modified using the config-register command

0 = ROM Monitor mode
1 = ROM IOS
2 - 15 = startup-config in NVRAM

4. Startup-config file: Check for boot system commands (NVRAM)
If boot system commands in startup-config
a. Run boot system commands in order they appear in startup-config to locate the IOS
b. [If boot system commands fail, use default fallback sequence to locate the IOS (Flash, TFTP, ROM)?]
If no boot system commands in startup-config use the default fallback sequence in locating the IOS:
a. Flash (sequential)

b. TFTP server (netboot)
c. ROM (partial IOS) or keep retrying TFTP depending upon router model

5. If IOS is loaded, but there is no startup-config file, the router will use the default fallback sequence for locating the IOS and then it will enter setup mode or the setup dialogue.
6. If no IOS can be loaded, the router will get the partial IOS version from ROM

Reference: http://www.svrops.com/svrops/documents/ciscoboot.htm

QUESTION NO: 5
After logging into a router and typing in a few show commands, you press the up arrow key. What will this do?

A. It will recall the previous command line
B. It will move the cursor one line up
C. It will redisplay the current command line
D. It will capitalize the command line
E. None of the above

Answer: A
Explanation:
The up arrow key is used to recall the previous command line entry. The commands that were entered previously can be displayed by repeatedly pressing the up arrow key, or by entering the "show history" command.

QUESTION NO: 6
After working on a router, some problems arise and you wish to view the commands that you recently entered. Which IOS command opens the history buffer and displays the most recently entered commands?

A. Show history
B. Show buffers
C. Show typed commands
D. Show terminal buffer
E. Show command
F. None of the above

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Answer: A
Explanation:
The router will buffer previously entered commands. By default, the "show history" command will display the previous ten commands that were entered. To see the contents of the buffer you enter the show history command.
Incorrect Answers:
B. This command will show the memory buffer information
C, D. These are invalid commands.

QUESTION NO: 7
You have just purchased a brand new router and wish to have the router prompt you through the initial configuration commands. Which router mode does this describe?

A. ROM Monitor mode
B. SETUP mode
C. Autoflash mode
D. RXBOOT mode
E. None of the above

Answer: B
Explanation:
Setup mode is a convenient mode that walks you through the setup procedure by prompting you with specific questions and options one by one.

QUESTION NO: 8
After working all night and successfully configuring a Cisco router for the TestKing network you save your changes on the startup config, reboot the router, and go out for a cigarette. When you return, none of your changes are active and the router boots to the initial configuration mode! Which of the choices below indicates the source of your problem?

A. Hardware failure in NVRAM prevents the router from loading the config
B. Startup-config in flash is corrupt and cannot be analyzed
C. Router configuration-register set to bypass startup configuration

D. Startup-config in NVRAM is corrupt and cannot be analyzed
E. None of the above

Answer: C
Explanation:
The default configuration-register setting of 0x2102 loads the IOS from flash and the configuration from NVRAM.
However, for password recovery, you can set the register to 0x2142 and the startup-config file in NVRAM will be bypassed. The problem described here is that the config register was not changed back to 0x2102 before the router was rebooted, so the active configuration is bypassed. Simply setting the config register back to 0x2102 will fix this problem.
Incorrect Answers:
A, B, D. All of these describe hardware or software errors. In the event that this is the problem, errors will be generated and the router will fail to boot properly. In these cases, the router will not return to the initial startup configuration.

QUESTION NO: 9
While working in setup mode, a configuration line is typed incorrectly. What should you do to exit setup mode, without executing or saving any of the mistakes you made? (Select two answer choices)

A. Type exit at the setup dialog.
B. Type close at the setup dialog.
C. Press the Ctrl-C key combination.
D. Press the Ctrl-X key combination.
E. Issue the copy startup-config command.
F. Issue the 'write e" command.
G. Issue the "write mem" command

Answer: C
Explanation:
Here is the partial output from new router while it boots up:
At any point you may enter a question mark '?' for help.
Refer to the 'Getting Started' Guide for additional help.
Use ctrl-c to abort configuration dialog at any prompt.
Incorrect Answers:
A. The Exit command can not be used during setup mode.

B. This is an invalid command
E. This command is used to save the configuration stored on NVRAM to a location.
F. This will have the effect of erasing the running configuration, and setting the router configuration back to the factory default settings.
G. This is an old command that is still supported on the latest Cisco IOS. It is short for "write memory" and has the same effect as the "copy running-config startup-config" command.

QUESTION NO: 10
You are a senior network administrator at TestKing, and while performing the password recovery procedure on your 2500 series Cisco router, you type in the following command:

```
o/r 0x2142
```

What is the purpose of this command?

A. It is used to restart the router.
B. It is used to bypass the configuration in NVRAM.
C. It is used to enter ROM Monitor mode.
D. It is used to view the lost password.
E. It is used to save the changes to the configuration.

Answer: B
Explanation:
Theo/r 0x2142 command changes the value of config-register to 2142 in a Cisco 2500 series router, so that the Router ignores the NVRAM contents and reverts to the initial setup configuration mode when it boots.

QUESTION NO: 11
Refer to the exhibit below. A TestKing technician wants to upload a new IOS in the router while keeping the existing IOS. What is the maximum size of an IOS file that could be loaded if the original IOS is also kept in flash?

Exhibit:

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A. 4 MB
B. 5 MB
C. 8 MB
D. 3 MB
E. 7 MB
F. None of the above

Answer: A
Explanation:
Based on the output provided, the total amount of flash memory available is 8388608 bytes (8 MB), but the existing IOS is using up 3803056 bytes (3 MB), so in order to fit both IOS files into the flash the new image must be no greater than the amount of available memory, which is 4585552 bytes (4 MB).

QUESTION NO: 12
Refer to the diagram. What is the largest configuration file that can be stored on this router?

Exhibit:

A. 31369K bytes
B. 16384K bytes
C. 191K bytes
D. 114688K bytes
E. None of the above

Answer: C
Explanation:

Non-Volatile Random Access Memory (NVRAM) is used as the storage location for the router's startup configuration file. After the router loads its IOS image, the settings found in the startup configuration are applied. When changes are made to a router's running configuration, they should always be saved to the startup configuration (stored in NVRAM) or they will be lost when the router shuts down. Remember that the running configuration is stored in RAM, which is erased when the router is powered down. On a Cisco 2500 series router, NVRAM is a relatively tiny 32KB in size. In this example, the file size is only 191K, so the config file must not exceed this.

QUESTION NO: 13
Why might the TestKing network administrator set the configuration register to 0x2142 on a 2600 series Cisco router?

A. To boot the IOS from ROM
B. To reset the console password
C. To upload a new version of the configuration file
D. To upload a new version of the IOS
E. To allow a new memory upgrade to be recognized by the router

Answer: B
Explanation:
About 99 percent of the time someone uses a config-register, it's more than likely because of a lost router password. The two config-registers for recovering passwords are 0x2102 and 0x2142.
The first config-register, 0x2102, is the normal config-register if you boot the router from internal Flash. You can see this config-register by using the show version command.
In this output, you'll notice the last line says, "Configuration register is 0x2102." This is normal.
But let's say you forgot the router's password. To recover this password (as long as it's unencrypted), boot the router and bypass the startup-config using config-register 0x2142; you should then be able to see the password in the startup-config. You can use the same method for encrypted passwords, but you'll need to overwrite the original password with a new one. To change the configuration register, enter the following:
Router(config)# config-register 0x2142
This will instruct the router to bypass the configuration and boot up as if it were a brand new router using factory default settings.

QUESTION NO: 14
After making some network changes you power off and then power on your Cisco router named TK1. What sequence of events occurs when TK1 is powered up?

A. Perform POST, locate configuration statements, apply configuration statements, locate Cisco IOS software, and load Cisco IOS software.
B. Locate Cisco IOS software, load Cisco IOS software, locate configuration statements, apply configuration statements, and perform POST.
C. Test software routines, POST, load configuration files, load Cisco IOS software, test Cisco IOS software.
D. Perform POST, locate Cisco IOS software, load the Cisco IOS software, locate configuration statements, and apply configuration statements.
E. Load and test IOS, load configuration files, test software routines, POST.
F. None of the above

Answer: D
Explanation:
Upon initial start up, Cisco routers perform the following steps in order:
1. The router performs a power-on self-test (POST) to discover and verify the hardware.
2. The router loads and runs bootstrap code from ROM.
3. The router finds the IOS or other software and loads it.
4. The router finds the configuration file and loads it into running config.

QUESTION NO: 15
You are the network administrator at TestKing. You need to perform password recovery on Router TK1. What must you modify in the password recovery process? (Choose two.)

A. Configuration register
B. NVRAM
C. Boot flash
D. CMOS
E. Flash

Answer: A, B
Explanation:
Recovering a Lost Password
This section describes how to recover a lost enable

password and how to enter a new enable secret password.
Password recovery consists of the following major processes:
Determining the Configuration Register Value
1. With this process, you determine the configuration of the router, so that you may restore the configuration after the password is recovered.

Resetting the Router
1. With this process, you reconfigure the router to its initial startup configuration. You then display the enable password, if one is used.

Resetting the Password
1. If you are using an enable secret password, you enter a new password with this process. You then restore the router to its prior configuration.

Resetting the Configuration Register Value
1. If you are using an enable password, you use this process to restore the router to its prior configuration.

QUESTION NO: 16
How can a TestKing administrator determine if a router has been configured when it is first powered up?

A. A configured router prompts for a password
B. A configured router goes to the privileged mode prompt
C. An un configured router goes into the setup dialog
D. An un configured router goes to the enable mode prompt

Answer: C
Explanation:
If a non-configured router is started, then it goes into setup mode and ask for the minimum configuration parameters (hostname, IP address to interfaces, enable password, etc). If the router is already configured it boots by implementing the saved startup-config.

QUESTION NO: 17
What will cause a TestKing router to enter setup mode? (Choose two)

A. The configuration file is missing in NVRAM.
B. The configuration register is set to 0x2100.
C. Boot system commands are misconfigured in the running-configuration.
D. The setup command was issued from the privileged mode prompt.

E. The IOS is missing.
F. The IOS is corrupt.

Answer: A, D
Explanation:
When router boots up, it checks the valid configuration into NVRAM and tries to load the configuration. If there is not configuration router automatically goes into setup dialog. From setup dialog, you able to configuration the basic configuration. As well you can run the setup command manually from privileged mode using the setup command.

QUESTION NO: 18
Refer to the graphic. A network associate is planning to copy a new IOS image into the TestKing1 router. This new image requires 8 MB of flash memory and 32 MB of RAM. How will the IOS proceed with the copy process?

A. The new IOS will be copied into flash memory and the current image will remain.
B. IOS will issue an error message because flash memory is not large enough to hold the new image.
C. During the copy process, the current IOS image will be erased.
D. The current IOS image must be manually erased before IOS will allow the new image to be copied.

Answer: A
Explanation:
According to the output shown above, the existing IOS is 8760520 bytes (8M) and the total size of the flash on this device is 24567K (24M). The new IOS only requires an additional 8 MB, so it will be copied on to the flash directly and both images will reside on the flash. The existing IOS is only overwritten it there is insufficient space to hold both.

QUESTION NO: 19
What is the default configuration register setting on most Cisco routers?

A. 0x2104
B. 0x2012
C. 0x2210
D. 0x2102
E. 0x2142
F. None of the above

Answer: D
Explanation:
About 99 percent of the time someone uses a config-register, it's more than likely because of a lost router password. Normally, the two config-registers for recovering passwords are 0x2102 and 0x2142.
The first config-register, 0x2102, is the normal config-register if you boot the router from internal Flash. You can see this config-register by using the show version command.
In this output, you'll notice the last line says, "Configuration register is 0x2102." This is normal.

QUESTION NO: 20
During the boot sequence, a TestKing 2800 series router needs to locate and load an operating system. What is the default order the router uses to find an operating system?

A. ROM, TFTP server, Flash
B. Flash, TFTP server, ROM
C. Flash, NVRAM, TFTP server
D. Flash, ROM, TFTP server
E. Flash, TFTP server, RAM

Answer: B
Explanation:
Booting up the Router:
Cisco routers can boot Cisco IOS software from these locations:

1. Flash memory
2. TFTP server
3. ROM (not full Cisco IOS)

Multiple source options provide flexibility and fallback alternatives.
Reference: http://www.svrops.com/svrops/documents/ciscoboot.htm

QUESTION NO: 21
What will a new TestKing router do during startup if a configuration file is not located in NVRAM?

A. It will search for the configuration file in the locations specified by boot system commands.
B. It will search for the configuration file in flash and if no configuration file is found there, it will enter the setup dialog.
C. It will search for the configuration file on a TFTP server and if no configuration file is found there, it will enter the setup dialog.
D. It will search for the configuration file in flash and if no configuration file is found there, it will load a limited configuration file from ROM.
E. It will search for the configuration file on a TFTP server and if no configuration file is found there, it will load a limited configuration file from ROM.

Answer: C
Explanation:
When a router boots and is able to locate the IOS it begins to load the configuration file. The configuration file, saved in NVRAM, is loaded into main memory and executed one line at a time. These configuration commands start routing processes, supply addresses for interfaces, and set media characteristics.
If no configuration file exists in NVRAM, the router attempts a network boot and sends a broadcast request for the file on a TFTP server. If this is also not found, the operating system executes a question-driven initial configuration routine called the system configuration dialog.

QUESTION NO: 22
A TestKing router boots to the prompt shown in the exhibit below. What does this signify, and how should the network administrator respond?

Exhibit:

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A. This prompt signifies that the configuration file was not found in flash memory. The network administrator should use TFTP to transfer a configuration file to the router.
B. This prompt signifies that the IOS image in flash memory is invalid or corrupt. The network administrator should use TFTP to transfer an IOS image to the router.
C. This prompt signifies that the configuration file was not found in NVRAM. The network administrator should follow the prompts to enter a basic configuration.
D. This prompt signifies that the router could not authenticate the user. The network administrator should modify the IOS image and reboot the router.

Answer: B
Explanation:
The default boot sequence for Cisco IOS software:

1. NVRAM
2. Flash (sequential)
3. TFTP server (network boot)
4. ROM (partial IOS)

If a router boots up in ROM mode as shown in this example, it means that the router was unsuccessfully able to find a valid IOS to boot from, and a valid IOS image will need to be loaded onto it.

QUESTION NO: 23
A TestKing router boots up in ROMMON mode. What is ROM Monitor (ROMMON)?

A. A memory component for storing the saved configuration file
B. A memory management tool
C. An operating system used for hardware troubleshooting and for password recovery

D. Temporary storage space for the router operating files
E. The source of the primary Cisco IOS software image
F. None of the above

Answer: C
Explanation:
The ROM Monitor is a very limited code set that enables you to perform elementary functions to manually get the router or switch back to a functioning state. You can perform low-level diagnostics and even copy a new IOS file to the Cisco device over the console port. It is also used after the break sequence is issued during bootup for password recovery use.

Section 3: Select the appropriate media, cables, ports, and connectors to connect routers to other network devices and hosts (6 questions)

QUESTION NO: 1
Which type of cable should be used to make a connection between the Fa0/0 port on a router and the Fa0/0 port switch?

A. Rollover cable
B. Console cable
C. Crossover cable
D. Straight-through cable
E. Serial cable

Answer: D
Explanation:
Straight-through cables are used to connect host to switch (or hub) and router to switch (or hub).

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	Hub	Switch	Router	Workstation
Hub	Crossover	Crossover	Straight	Straight
Switch	Crossover	Crossover	Straight	Straight
Router	Straight	Straight	Crossover	Crossover
Workstation	Straight	Straight	Crossover	Crossover

QUESTION NO: 2
You are trying to connect directly into the LAN port of a TestKing router. You want to telnet to the local Cisco router using TCP/IP but cannot create a session.

What should you do to resolve the problem?

A. Use a straight-through cable to connect your computer's COM port to the router's console port.
B. Use a crossover cable to connect your computer's COM port to the router's console port.
C. Use a straight-through cable to connect your computer's COM port to the router's Ethernet port.
D. Use a crossover cable to connect your computer's Ethernet port to the router's Ethernet port.
E. Use a rollover cable to connect your computer's Ethernet port to the router's Ethernet port.
F. Use a straight-through cable to connect your computer's Ethernet port to the router's Ethernet port.
G. None of the above

Answer: D
Explanation:
In order to connect directly to a router via telnet, you must connect to the router via one of the LAN ports. When connecting directly to the Ethernet port with a PC without the use of a switch or hub, a crossover cable must be used.
Incorrect Answers:

A, B, C. In order to telnet directly into the router via a TCP/IP connection, the COM port of the PC can not be used. The COM port is used for direct terminal emulation programs such as HyperTerminal.
E. Rollover cables are used for console connections into the router, not for TCP/IP connections.
F. Straight through cables are used for connections into a switch or hub from the PC. It will not work for direct Ethernet connections into the router.

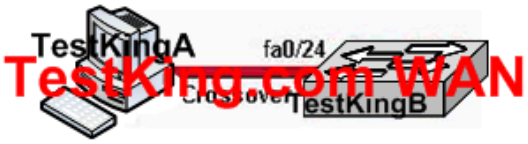
QUESTION NO: 3
Refer to the following five diagrams:

A.

B.

C.

D.



E.

TestKing.com WAN

Based on the information provided above, which two network topologies are using the correct type of twisted-pair cables? (Choose two)

A. Diagram A
B. Diagram B
C. Diagram C
D. Diagram D
E. Diagram E

Answer: A, C

QUESTION NO: 4
Refer to the exhibit shown below.

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Based on the output shown above, What could be possible causes for the "Serial0/0 is down" interface status? (Choose two)

A. The bandwidth is set too low.
B. A protocol mismatch exists.
C. A Layer 1 problem exists.
D. An incorrect cable is being used.
E. There is an incorrect IP address on the Serial 0/0 interface.

Answer: C, D

Explanation:

Status Line Condition	Possible Problem	Solution
Serial *x* is up, line protocol is up	—	This is the proper status line condition. No action is required.
Serial *x* is down, line protocol is down (DTE mode)	The router is not sensing a CD signal (that is, the CD is not active). A telephone company problem has occurred—line is down or is not connected to CSU/DSU. Cabling is faulty or incorrect. Hardware failure has occurred (CSU/DSU).	1. Check the LEDs on the CSU/DSU to see whether the CD is active, or insert a breakout box on the line to check for the CD signal. 2. Verify that you are using the proper cable and interface (see your hardware installation documentation). 3. Insert a breakout box and check all control leads. 4. Contact your leased-line or other carrier service to see whether there is a problem. 5. Swap faulty parts. 6. If you suspect faulty router hardware, change the serial line to another port. If the connection comes up, the previously connected interface has a problem.

Reference: http://www.cisco.com/univercd/cc/td/doc/cisintwk/itg_v1/tr1915.htm

QUESTION NO: 5
The following port types are installed on a TestKing device:

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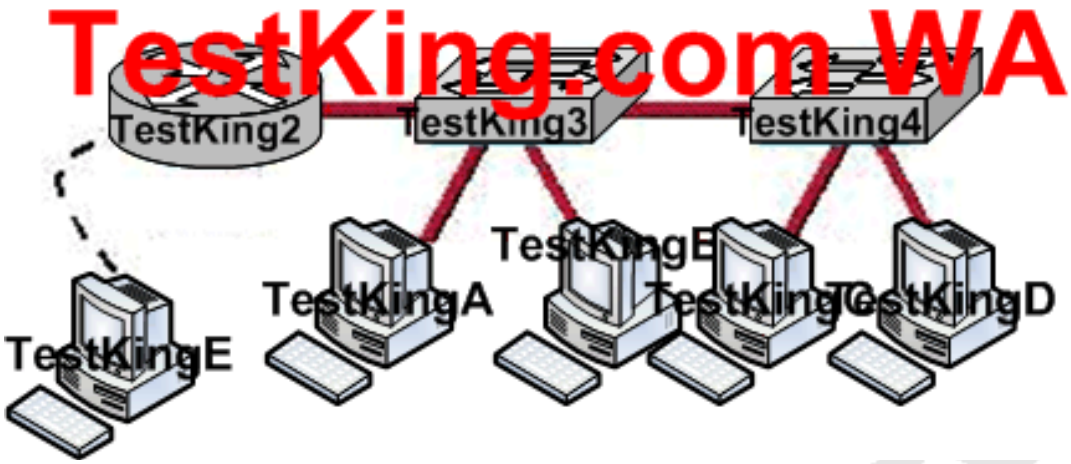
From the choices shown above, which port can be used for a WAN T1 connection?

A. Console
B. Serial 0
C. AUI
D. BRI
E. None of the above

Answer: B
Explanation:
From the choices above, only the serial connection can be used for a data T1. In this case, the serial interface would connect to an external CSU/DSU.
Incorrect Answers:
A: The router includes an asynchronous serial console port and an auxiliary port. The console and auxiliary ports provide access to the router either locally using a console terminal connected to the console port, or remotely using a modem connected to the auxiliary port.
C: For flexibility, some Cisco routers provide a generic AUI connector for Ethernet ports. These AUI ports are designed to connect to an external transceiver for conversion to a specific media type (such as twisted pair, coax, or fiber).
D: BRI ports are used to connect to ISDN links, not T1.
Reference:
http://www.ieng.net/univercd/cc/td/doc/product/access/acs_mod/2800/hw/03_hw.htm#wp1033227

QUESTION NO: 6
Exhibit:



You need to provide the cables needed for a new TestKing office. Based on the graphic, which types of cables are required to interconnect the devices shown? (Choose three)

A. Rollover cable
B. RJ-11 cable
C. USB cable
D. Crossover cable
E. Straight-through cable
F. V.35 cable

Answer: A, D, E
Explanation:
Crossover Cables are used to Connect:
Host to Host (Peer to Peer) Networking
Switch to Switch
Hub to Hub
Computer to Router's Ethernet Port
Straight through Cable are used for:
Host to Switch
Host to Hub
Switch to Router
Serial Cables are for:
Router's Serial Port to Serial Port
Rollover Cable:
To connect Router/Switch Console port.

In this example, one switch is connected with another switch using a crossover cable. The switch connected with the router uses a straight through cable and the PC Connects to the router's console port using the console rollover cable.

Section 4: Configure, verify, and troubleshoot RIPv2 (7 questions)

QUESTION NO: 1
Part of the TestKing WAN is shown below:

The TestKing network shown in the exhibit above is running the RIP version 2. This network has converged, and the routers in this network are functioning properly. Then, the FastEthernet0/0 interface on router TestKing1 goes down. In which two ways will the routers in this network respond to this change? (Choose two)

A. All routers will reference their topology database to determine if any backup routes to the 192.168.1.0 network are known.
B. Routers router TestKing2 and router TestKing3 mark the route as inaccessible and will not accept any further routing updates from router TestKing1 until their hold-down timers expire.
C. When router TestKing2 learns from router TestKing1 that the link to the 192.168.1.0 network has been lost, router TestKing2 will respond by sending a route back to router TestKing1 with an infinite metric to the 192.168.1.0 network.
D. Because of the split-horizon rule, router TestKing2 will be prevented from sending erroneous information to router TestKing1 about connectivity to the 192.168.1.0 network.
E. router TestKing1 will send LSAs to router TestKing2 and router TestKing3 informing them of this change, and then all routers will send periodic updates at an increased rate until the network again converges.

Answer: C, D
Explanation:
RIP version 2 will send triggered updates when the topology changes like when a link goes down.
The following are the key characteristics of RIPv2 pertaining to this question:
1. Split horizon - RIP doesn't advertise routes back out the interface in which they came. Or put another way, a router won't tell a neighbor about routes that the neighbor presumably already knows about. That would be silly, and could cause a loop in certain circumstances.
2. Triggered update - RIP will send an update out just a soon as the routing table changes. He won't wait for the Update timer to expire.
3. Route poisoning- RIP will tell other routers that a failed route is junk by advertising it with an infinite metric (which is 16 for RIP), effectively poisoning it.
Reference: http://www.ethanbanks.net/?m=200702

QUESTION NO: 2
The TestKing WAN is migrating from RIPv1 to RIPv2. Which three statements are correct about RIP version 2? (Choose three)

A. It uses broadcast for its routing updates
B. It supports authentication
C. It is a classless routing protocol
D. It has a lower default administrative distance than RIP version 1
E. It has the same maximum hop count as version 1
F. It does not send the subnet mask un updates

Answer: B, C, E

QUESTION NO: 3
RIP version 2 is being used as the routing protocol within the TestKing network. What does RIP version 2 use to prevent routing loops? (Choose two)

A. CIDR
B. Split horizon
C. Authentication

D. Classless masking
E. Hold-down timers
F. Multicast routing updates
G. Path Vectoring

Answer: B, E
Explanation:
Distance Vector routing protocols employ the split horizon mechanism to reduce the possibility of routing loops. Split horizon blocks information about routes from being advertised by a router out of any interface from which that information originated.
RIP versions 1 and 2 also use the concept of hold timers. When a destination has become unreachable (or the metric has increased enough to cause poisoning), the destination goes into "holddown". During this state, no new path will be accepted for the same destination for this amount of time. The hold time indicates how long this state should last.
Incorrect Answers:
A, C, D, F. Although these are all features and functions of RIP version 2, they are not mechanisms used to prevent routing loops.
G. Path Vectoring is a concept used by BGP routers. RIP version 1 and 2 are considered to be distance vector routing protocols.

QUESTION NO: 4
Refer to the following TestKing network:

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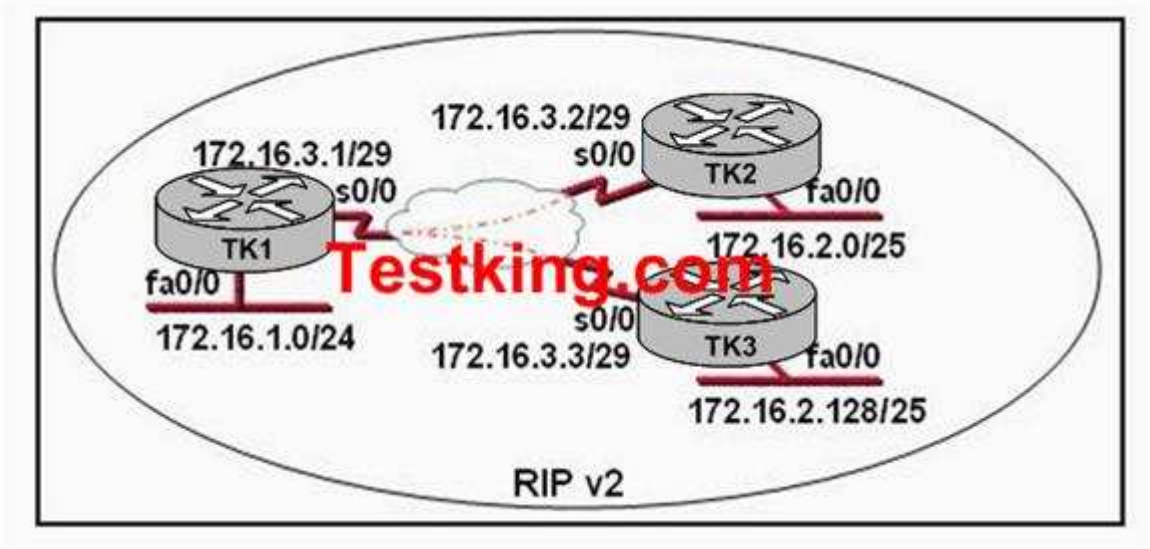


S0/0 on TK1 is configured as a multipoint interface to communicate with TK2 and TK3 in the hub-and-spoke Frame Relay topology shown in the exhibit. Originally, static routes were configured between these routers to successfully route traffic between the attached networks. What will need to be done in order to use RIP v2 in place of the static routes?

A. Configure the no ip subnet-zero command on TK1, TK2, and TK3.
B. Dynamic routing protocols such as RIP v2 cannot be used across Frame Relay networks.
C. Configure the s0/0 interface on TK1 as two subinterfaces and configure point-to-point links to TK2 and TK3.
D. Change the 172.16.2.0/25 and 172.16.2.128/25 subnetworks so that at least two bits are borrowed from the last octet.
E. Change the network address configurations to eliminate the discontiguous 172.16.2.0/25 and 172.16.2.128/25 subnetworks.

Answer: C
Explanation:

For Dynamic Routing in Hub-and spoke topology, configure the subinterface for each link then define the link as point to point. One reason for the use of subinterfaces is to circumvent the rule of split horizon. Split horizon dictates that a route cannot be advertised out the same interface upon which it was learned in the first place. This can be a problem in hub and spoke frame relay networks, but by using pt-pt subinterfaces this problem will be eliminated.

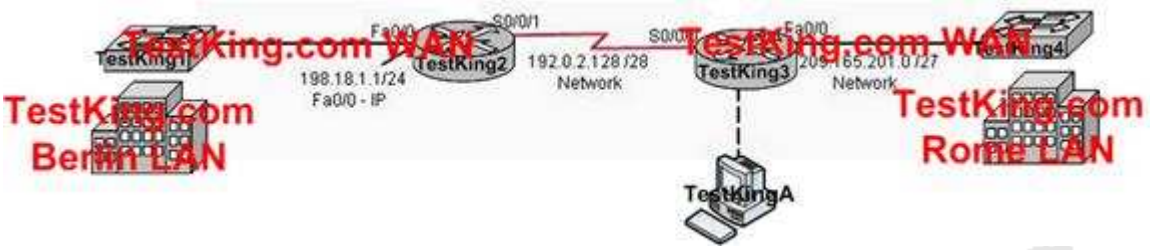
QUESTION NO: 5
The following output was shown on router TK1:

Based on the information shown above, what can be determined from the line of show ip route output shown in the exhibit? (Choose two)

A. The 10.10.10.8 network is two hops away from this router.
B. The next routing update can be expected in 35 seconds.
C. The IP address 10.10.10.6 is configured on S0/1.
D. The IP address 10.10.10.8 is configured on S0/1.
E. This route is using the default administrative distance.

Answer: A, E
Explanation:
When issuing the "show ip route" command, the first number in the brackets is the administrative distance of the information source; the second number is the metric for the route. In this case, the value of 120 is the default AD for RIP routes, and the 2 represents the metric, which is the number of router hops in RIP.

QUESTION NO: 6 SIMULATION
Network topology exhibit:



You work as a network technician at TesttKing.com. Study the network topology exhibit carefully. You are stationed at the Rome office of TestKing.com. You have upgraded the Rome LAN by adding the TestKing3 router to the network. You are now required to finish the installation. The following steps remains:
*** make the initial router configurations:**
The following configurations are required:
Router name: TestKing3
Enable Secret password: testkingenable
Access user EXEC mode password: testkingexec
Telnet access password: testkingtelenet
Configure the IP addresses (IPv4 not IPv6) as follows:
Serial network: 209.1675.201.0/27. Assign the second assignable host address to TestKing3.
Ethernet network: 192.0.2.128/28: Assign the last assignable host address to TestKing3.

*** configure RIP V2 as the routing protocol**

Use PC TestKing2 to configure TestKing3 using the command line interface.

Answer:
Explanation: Pending. Send your suggestion to feedback@testking.com

QUESTION NO: 7
Network topology exhibit:

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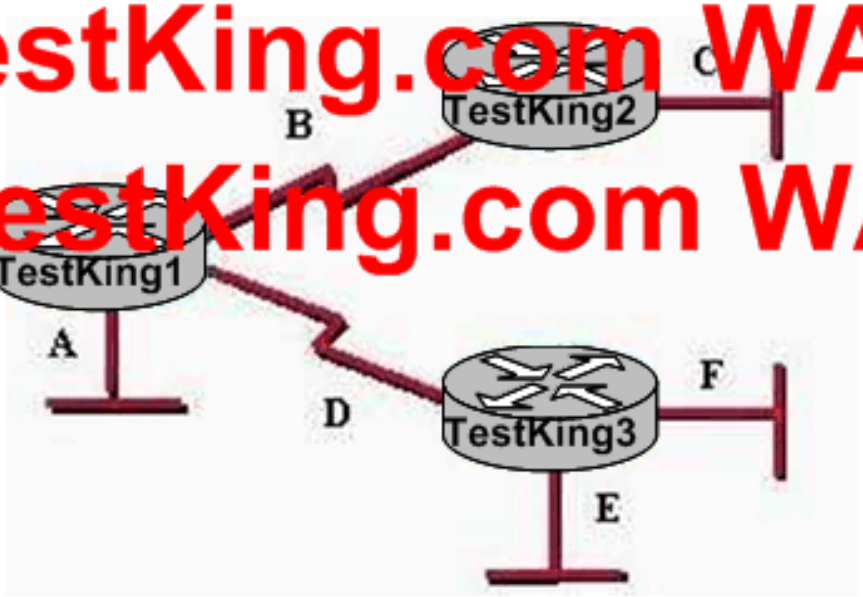

TestKing.com WAN

TestKing uses RIP as the routing protocol. This RIP network has been fully operational for two days. Each routing table is complete. Which networks will be included in the next routing update from the TestKing1 router to the TestKing3 router?

A: A, B, C, D, E, F
B: A, C
C: A, B, C, D
D: B, D
E: D, E, F
F: A, B, C

Answer: F

Section 5: Access and utilize the router to set basic parameters. (including: CLI/SDM) (8 questions)

QUESTION NO: 1

Which one of the following commands would you enter to terminate a VTY line session?

A. close
B. disable
C. disconnect
D. suspend
E. exit
F. None of the above

Answer: E
Explanation:
A VTY line is a telnet session. To end a telnet session from a remote device, enter the exit or logout command.
Incorrect Answers:
A, B, C, D. These are all invalid commands.

QUESTION NO: 2
You work as a network engineer at TestKing.com. You are required to allow establishment of a Telnet session with a router TestKingC.
Which set command must be configured?

A. TestKingC(config)# line console 0
TestKingC(config-line)# enable password testking

B. TestKingC(config)# line console 0
TestKingC(config-line)# enable secret testking
TestKingC(config-line)# login

C. TestKingC(config)# line console 0
TestKingC(config-line)# password testking
TestKingC(config-line)# login

D. TestKingC(config)# line vty 0
TestKingC(config-line)# enable password testking

E. TestKingC(config)# line vty 0
TestKingC(config-line)# enable secret testking
TestKingC(config-line)# login

F. TestKingC(config)# line vty 0
TestKingC(config-line)# password testking
TestKingC(config-line)# login

Answer: F
Explanation:
CLI Password Configuration:

Access From	Password Type	Configuration
Console	Console password	Line console 0 Login Password testking
Auxiliary	Auxiliary password	Line aux 0 Login Password tkrules
Telnet	Vty password	Line vty 0 4 Login Password testkingrules

QUESTION NO: 3
Which sequence of actions will allow telnet traffic from a TestKing user's PC to a router using TCP/IP?
A. Connect the PC's COM port to the router's console port using a straight-through cable.
B. Connect the PC's COM port to the router's console port using a crossover cable.
C. Connect the PC's COM port to the router's Ethernet port using a straight-through cable.
D. Connect the PC's Ethernet port to the router's Ethernet port using a crossover cable.
E. Connect the PC's Ethernet port to the router's Ethernet port using a rollover cable.
F. Connect the PC's Ethernet port to the router's Ethernet port using a straight-through cable.

G. None of the above

Answer: D
Explanation:
A crossover cable is used to directly connect a switch to a switch, a hub to a hub, a host to a host, or a host's Ethernet port to a router's Ethernet interface. If your Router's interface is configured with IP addressing and telnet service is enabled you can log through the telnet program into your router.
Incorrect Answers:
A, B, C: The COM port is used for direct terminal connections to a router, via the use of terminal emulation programs such as HyperTerminal.
E: A rollover cable is used to connect via a console connection.
F: A straight through cable would be used if there was a LAN switch or a hub in place, but when connecting to the router directly from a PC a cross over cable should be used.

QUESTION NO: 4
You are given a PC, a router, and a cable. Select the correct combination that will allow you to log into router TK1 locally using a terminal emulation program such as HyperTerminal.

A. Connect the PC's COM port to the router's console port using a straight-through cable.
B. Connect the PC's COM port to the router's console port using a rollover cable.
C. Connect the PC's COM port to the router's Ethernet port using a straight-through cable.
D. Connect the PC's Ethernet port to the router's Ethernet port using a rollover cable.
E. Connect the PC's Ethernet port to the router's Ethernet port using a straight- through cable.
F. None of the above

Answer: B
Explanation:
To connect the Router in Console port to configure using HyperTerminal, you required the Rollover Cable, which connects the PC's COM port to the router's Console port.
Incorrect Answers:
A, C, E: Straight Cables are used for: Host to switch, Switch to Router.
D: Rollover cables are used for Console/COM connections, not for IP traffic over the Ethernet ports.

QUESTION NO: 5
Which router console commands shown below are used to manage telnet sessions to other routers? (Select three)

A. TestKingD# disconnect 3
B. TestKingD# exit session 2
C. TestKingD# kill connection 1
D. TestKingD# show sessions
E. TestKingD# show connection all
F. TestKingD# resume 4

Answer: A, D, F
Explanation:

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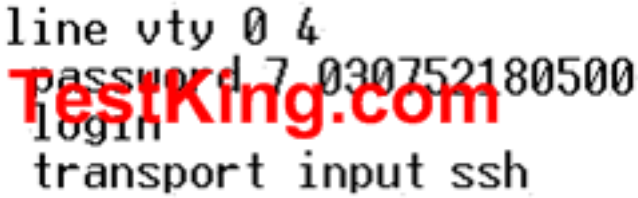
Function	Command Options
Telnet to another device	Use telnet exec command. Just type the host or IP address from exec mode.
Suspend a Telnet session	Press the key sequence Ctrl-Shift-6, then x
Discover currently suspended Telnet session	Use the where exec command Use the show sessions exec command
Resume a suspended Telnet session	Use the resume command, with no parameter, to reconnect to the most recently suspended Telnet. Use the resume x command, where x is the number of the suspended Telnet session based on the output of show sessions. Just press Enter in exec mode to resume to the most recently suspended Telnet session.
Terminate a suspended telnet	Resume connection, and log out using the quit command. Use the disconnect command on the router you Telnnetted from.

Reference: Cisco Press CCNA Study Guide, p.392

QUESTION NO: 6
Part of the configuration of router TK1 is shown below:



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What is the effect of the configuration shown above on router TK1?

A. It configures SSH globally for all logins.
B. It tells the router or switch to try to establish an SSH connection first and if that fails to use Telnet.
C. It configures the virtual terminal lines with the password 030752180500.
D. It configures a Cisco network device to use the SSH protocol on incoming communications via the virtual terminal ports.
E. It allows seven failed login attempts before the VTY lines are temporarily shutdown.
F. None of the above.

Answer: D
Explanation:
Secure Shell (SSH) is a protocol which provides a secure remote access connection to network devices. Communication between the client and server is encrypted in both SSH version 1 and SSH version 2. If you want to prevent non-SSH connections, add the "transport input ssh" command under the lines to limit the router to SSH connections only. Straight (non-SSH) Telnets are refused.
Reference: www.cisco.com/warp/public/707/ssh.shtml

QUESTION NO: 7
You need to make changes to a new TestKing router. By which prompt is the global configuration mode on this router identified?

A. Router(config-line)#
B. Router(config-router)#
C. Router#
D. Router(config)#
E. Router>
F. Router(config-if)#

G. None of the above

Answer: D
Explanation:
There are many different configuration modes. Each of these makes changes to the device configuration. To ensure that those configuration changes are not lost if the router reboots, you must copy the running configuration to the startup configuration. The type and number of configuration submodes depends on the type of router, the Cisco IOS version, and the components installed on the router:
- Global configuration mode- The command for accessing the global configuration mode is configure terminal. In the global configuration mode, the router continues to display its host name followed by (config) and the # symbol:
RouterA#configure terminal
RouterA(config)#
The global configuration mode is where you can make "global" changes to the configuration of the router. A common example of a global configuration is the creation of an access list. From the global configuration mode, you can move to a position that enables you to configure specific components of the router, such as the router interfaces; virtual private network (VPN) components (isakmp, crypto, and so on); CLI connections (line); authentication, authorization, and accounting (AAA) server groups; and many more. To exit to the privileged global configuration mode, use the key combination Ctrl-Z or type the command "end."

QUESTION NO: 8
You need to configure a new Cisco router for remote access on the TestKing network. How many simultaneous telnet sessions does this Cisco router support by default?

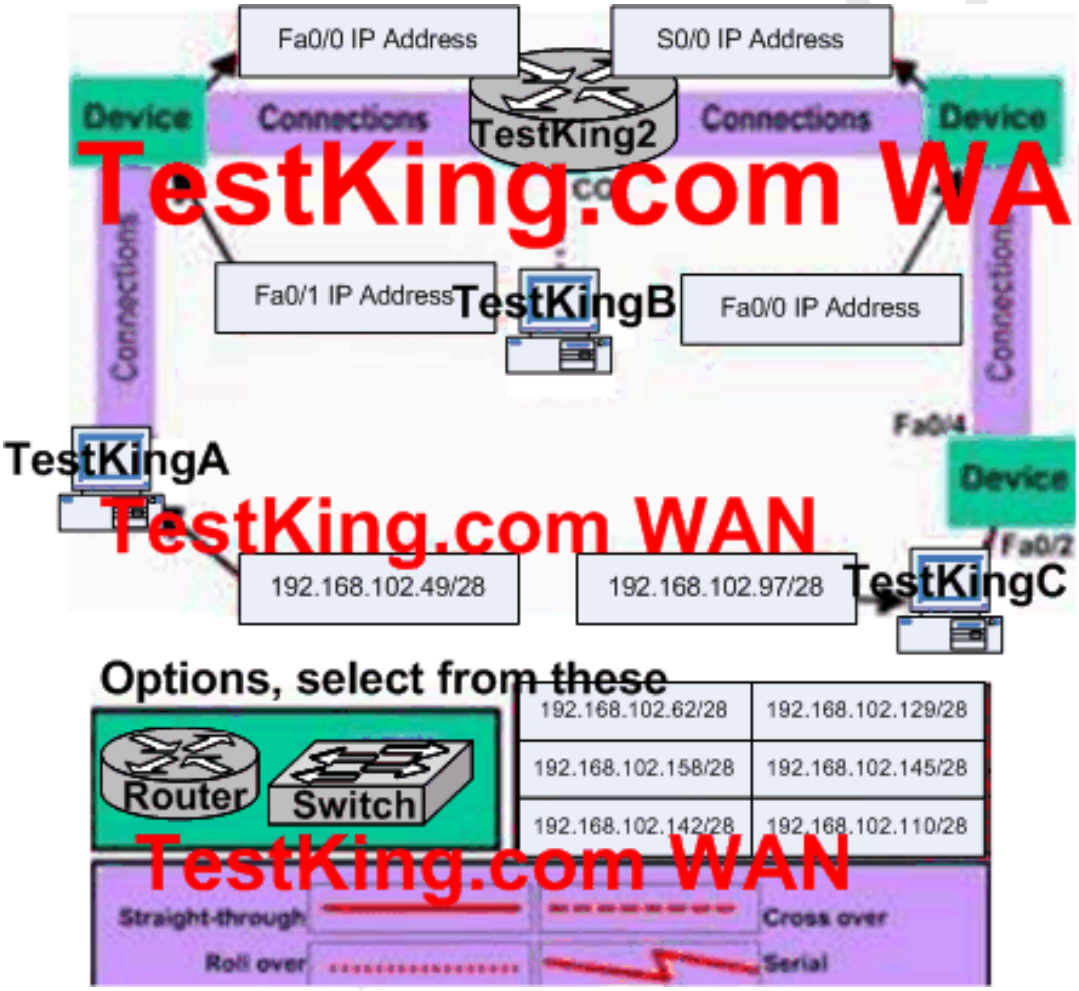
A. 4
B. 2
C. 5
D. 1
E. 6
F. 0

Answer: C
Explanation:

Telnet sessions use virtual terminal sessions, which are configured under the "line vty" portion of the configuration. There are 5 total vty sessions that can be configured, numbered 0-4.

Section 6: Connect, configure, and verify operation status of a device interface (9 questions)

QUESTION NO: 1 SIMULATION



You work as a network engineer at TestKing.com.
You are required to set up the TestKing network.
There are two separate tasks.
Task 1:
First you need to make the following placements:
*** place a router or switch at each device spot**
*** place a connection type at each connections spot**
*** place an IP address at each IP spot**

Task 2:
Configure each, if any, additional router as follows:
*** each additional interface should have the correct IP address and be enabled**
*** set the password to allow console access to password1**
*** set the password to allow telnet access to password2**
*** set the password to allow privilege mode access to password3**

Note. For Task2 you need to gather information from the TestKing2 router. You should not reconfigure the TestKing2 router. This information is not available here, however.

Answer:
Explanation:
Answer of Task 1:

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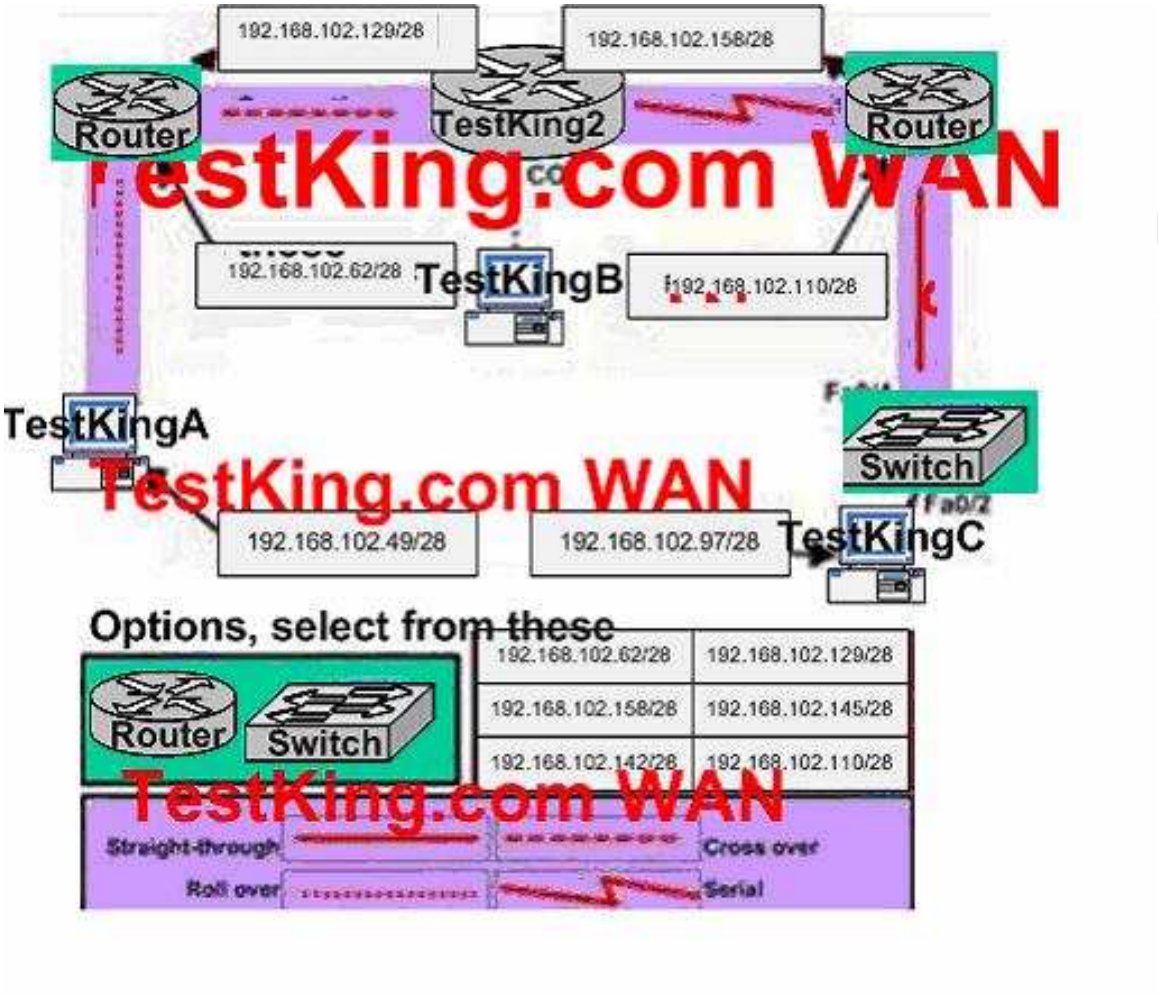


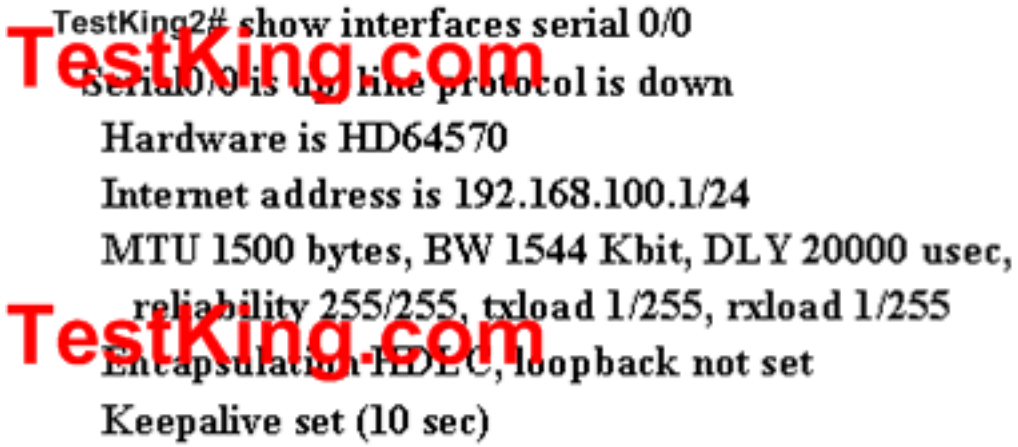
Answer: of Task 2:

1. Click on the PC connected to Router with Rollover cable.
2. #config t
3. Router(Config)#interface fa0/1
4. Router(Config-if)#ip address 192.168.102.62 255.255.255.240
5. Router(Config-if)#no shutdown
6. Router(Config)#interface fa0/0
7. Router(Config-if)#ip address 192.168.102.129 255.255.255.240
8. Router(Config-if)#no shutdown
9. Router(Config-if)#exit

10. Router(config-if)#line console 0
11. Router(Config-line)#password password1
12. Router(Config-line)#login
13. Router(Config)#line vty 0 4
14. Router(Config-line)#password password2
15. Router(Config-line)#login
16. Router(Config-line)#exit
17. Router(Config)#enable password password3
18. copy running-config startup-config

Note: Depending on the simulation, the last step (step 18) may not be necessary.

QUESTION NO: 2
Refer to the following "show" output:



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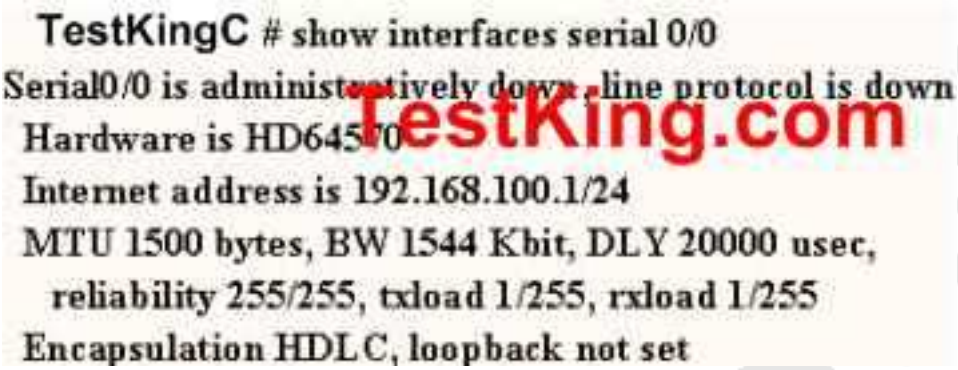
The "show interfaces serial 0/0" command was issued on router TestKing2 as shown above. What are possible causes for this interface status of this router? (Choose three)

A. No cable is attached to the interface.
B. The interface is shut down.
C. The clockrate is not set.
D. No loopback address is set.
E. No keepalive messages are received.
F. There is a mismatch in the encapsulation type.
G. The interface is functioning properly

Answer: C, E, F

QUESTION NO: 3
The interface status of a TestKing router is shown below:



The result of the show interfaces serial 0/0 command is displayed in the exhibit. What command should be executed to make this interface operational?

A. TestKingC(config-if)# enable
B. TestKingC(config-if)# no keepalive
C. TestKingC(config-if)# encapsulation ppp
D. TestKingC(config-if)# no shutdown
E. TestKingC(config-if)# clockrate 56000
F. TestKingC(config-if)# line protocol up

Answer: D
Explanation:

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no shutdown	Enable the interface and the configuration changes you have just made on the interface.

Serial0 is administratively down, line protocol is up.	The possible causes for this state are • The serial interface has been disabled with the **shutdown interface** configuration command. • Different interfaces on the router are using the same IP address.	The following are some steps you can take to isolate the problem: • Use the **show configuration** privileged EXEC command to display the serial port configuration. If "shutdown" is displayed after "interface Serial0," use the **no shutdown** interface configuration command to enable the interface. • Use the **show interface** privileged EXEC command to display the IP addresses for all router interfaces. Use the **ip address** interface configuration command to assign unique IP addresses to the router interfaces.

QUESTION NO: 4
Which of the following commands displays the configurable parameters and statistics of all interfaces on a router?

A. show interfaces
B. show processes
C. show running-config
D. show versions
E. show startup-config

Answer: A
Explanation:
Use the **show interfaces** EXEC command to display statistics for all interfaces configured on the router or access server. The resulting output varies, depending on the network for which an interface has been configured.

The following is an example from theshow interfaces command. Because your display will depend on the type and number of interface cards in your router or access server, only a portion of the display is shown.
TK1#showinterfaces

Ethernet0isup,lineprotocolisup
HardwareisMCIEthernet,addressis0000.0c00.750c(bia0000.0c00.750c)
Internetaddressis131.108.28.8,subnetmaskis255.255.255.0
MTU1500bytes,BW10000Kbit,DLY100000usec,rely255/255,load1/255
EncapsulationARPA,loopbacknotset,keepaliveset(10sec)
ARPtype:ARPA,ARPTimeout4:00:00
Lastinput0:00:00,output0:00:00,outputhangnever
Lastclearingof"showinterface"counters0:00:00
Outputqueue0/40,0drops;inputqueue0/75,0drops
Fiveminuteinputrate0bits/sec,0packets/sec
Fiveminuteoutputrate2000bits/sec,4packets/sec
1127576packetsinput,447251251bytes,0nobuffer
Received354125broadcasts,0runts,0giants,57186*throttles
0inputerrors,0CRC,0frame,0overrun,0ignored,0abort
5332142packetsoutput,496316039bytes,0underruns
0outputerrors,432collisions,0interfaceresets,0restarts

Reference:
http://www.cisco.com/univercd/cc/td/doc/product/software/ios120/12cgcr/inter_r/irshowin.htm

QUESTION NO: 5
The following was seen on a TestKing router in Huntsville:

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Refer to the router output shown in the graphic. What can be assumed about the network attached to this router interface?

A. The network hosts are attached to a hub.
B. The interface is being used at near maximum capacity.
C. There should never be any collisions in this network.
D. The network has an excessive number of errors.
E. The network is using an unusual Ethernet encapsulation.

Answer: C
Explanation:
Based on the output shown, this interface is configured to operate in full duplex mode. Full-duplex is a data communications term that refers to the ability to send and receive data at the same time.

Legacy Ethernet is half-duplex, meaning information can move in only one direction at a time. In a totally switched network, nodes only communicate with the switch and never directly with each other. Switched networks also employ either twisted pair or fiber optic cabling, both of which use separate conductors for sending and receiving data. In this type of environment, Ethernet stations can forgo the collision detection process and transmit at will, since they are the only potential devices that can access the medium. This allows end stations to transmit to the switch at the same time that the switch transmits to them, achieving a collision-free environment.
Reference: http://computer.howstuffworks.com/ethernet15.htm

QUESTION NO: 6
Refer to the output of the three TestKing router commands shown in the exhibit. A new technician has been told to add a new LAN to the company router. Why has the technician received the error message that is shown following the last command?

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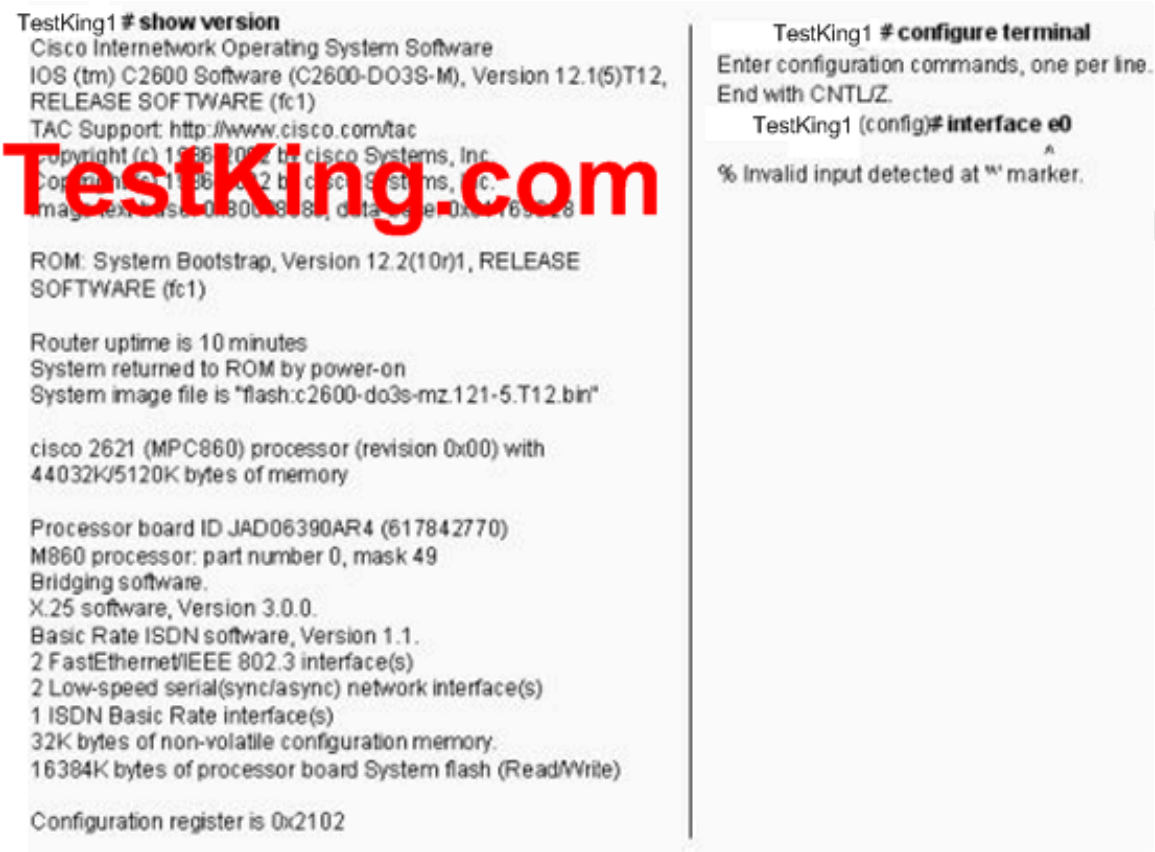

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A. The command was entered from the wrong prompt.
B. The router does not support LAN interfaces that use Ethernet.
C. The interface was already configured.
D. The IOS software loaded on the router is outdated.
E. The interface type does not exist on this router platform.
F. None of the above

Answer: E
Explanation:

The show version command displays the information regarding version of IOS, name of IOS image, configuration register as well all interface name of router. According to the output of show version, there is no ethernet interface so trying to configure the invalid interface. What the technician needs to enter is "interface fastethernet 0" not "ethernet 0".

QUESTION NO: 7
In the TestKing router below, serial0/0 does not respond to a ping request from a host on the FastEthernet0/0 LAN. How can this problem be corrected?

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```
BHM# show ip interface brief
Interface              IP-Address      OK? Method Status                Protocol
FastEthernet0/0        192.168.16.1    YES NVRAM  up                    up
Serial0/0              192.168.15.2    YES NVRAM  administratively down down
FastEthernet0/1        192.168.17.1    YES NVRAM  up                    up
Serial0/1              unassigned      YES NVRAM  administratively down down
```

A. Correct the IP address for Serial 0/0.
B. Change the encapsulation type on Serial 0/0.
C. Correct the IP address for FastEthernet 0/0.
D. Enable autoconfiguration on the Serial 0/0 interface.
E. Enable the Serial 0/0 interface.

Answer: E
Explanation:
The status of the interface shows "administratively down" which means that the interface was manually shut down, or it was never enabled in the first place. This interface needs to be enabled using the "no shutdown" command under interface serial 0/0 in the configuration.

QUESTION NO: 8
An administrator issues the show ip interface s0/0 command and the output displays that interface Serial0/0 is up, line protocol is up

What does "line protocol is up" specifically indicate about the interface?

A. The cable is attached properly.
B. CDP has discovered the connected device.
C. Keepalives are being received on the interface.
D. A carrier detect signal has been received from the connected device.
E. IP is correctly configured on the interface.

Answer: C
Explanation:
Serial 0/0 is up, line protocol is up is the proper status line condition.
Line serial0/0 is up: This statement represents that the physical connection is good.
Line protocol is up: This represents that the data link layer is OK, meaning that layer 2 keepalives are being received on the interface.
When the line protocol goes down, a possible problem is keep-alives not being sent by remote router.

QUESTION NO: 9
You need to configure the interfaces on a new TestKing router, but first you need to enter the global configuration mode. Which command is used on router TestKing3 to reach this mode?

A. TestKing3# router
B. TestKing3# setup
C. TestKing3# interface
D. TestKing3> enable
E. TestKing3# configure terminal

Answer: E
Explanation:
Global configuration mode is the mode that allows you to configure the router and it takes effect immediately. You can enter into the global configuration mode using "configure terminal" command.
Interface configuration mode allows you to configure the interface on a particular interface such as setting the IP address, setting bandwidth, clock rate, encapsulation type, duplex, speed, etc. Use the "interface interface-name" command to enter into the interface configuration mode.

Section 7: Verify device configuration and network connectivity using ping, traceroute, telnet, SSH or other utilities (9 questions)

QUESTION NO: 1
Network Topology Exhibit:

Configuration and output exhibit:

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You work as a network technician at TestKing.com. Study the exhibit carefully. A technician is troubleshooting a host connectivity problem. The host is unable to ping a server connected to Switch TestKingA. Based on the result of the testing, what could be the problem?

A. TCP/IP has not been correctly installed on the host
B. A local physical layer problem exists
C. The host NIC is not functioning
D. A remote physical layer problem exists
E. None of the above

Answer: B

QUESTION NO: 2
The following output was seen on a TestKing device:

Study the exhibit above carefully. This graphic shows the result of an attempt to open a Telnet connection to router TestKing1 From router TestKing2. Which of the following command sequences will correct this problem?

A. TestKing2(Config)#line console 0
TestKing2(Config-line)#login
TestKing2(Config-line)#password cisco
B. TestKing1 (Config)#line console 0
TestKing1(Config-line)#password cisco
C. TestKing2(Config)#line vty 0 4
TestKing2(Config-line)#login
TestKing2(Config-line)#password cisco
D. TestKing1(Config)#line vty 0 4
TestKing1(Config-line)#login
TestKing1(Config-line)#password cisco
E. None of the above

Answer: D

QUESTION NO: 3

You are unable to telnet to a router at address 203.125.12.1 from a workstation with the IP address 203.125.12.23. You suspect that there is a problem with the IP protocol stack in your PC. Which of the following actions is most likely to confirm your diagnosis?

A. ping 127.0.0.0
B. ping 203.125.12.1
C. telnet 127.0.0.1
D. ping 127.0.0.1
E. tracert 203.125.12.1
F. None of the above

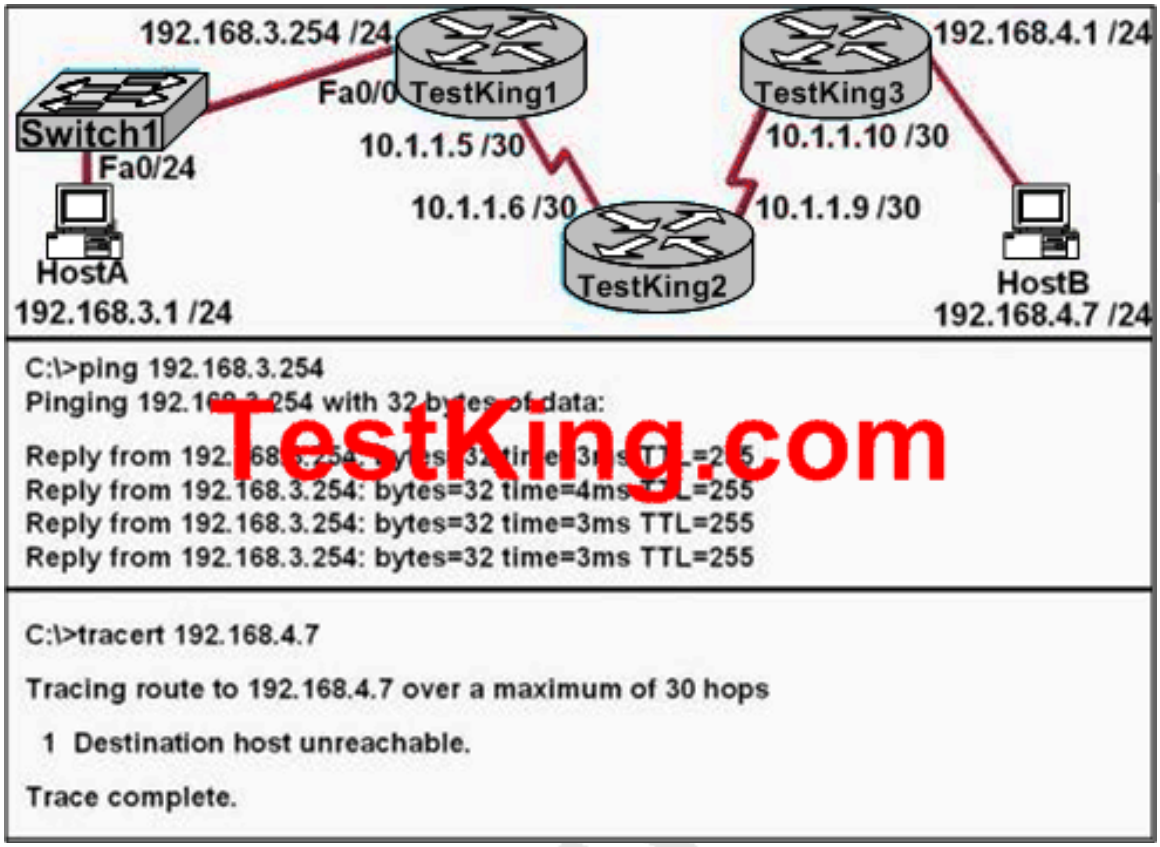
Answer: D
Explanation:
Every Windows based PC uses the 127.0.0.1 as the local loopback IP address. Every PC will respond to this local IP address if the TCP/IP stack is correctly installed and running on the machine. If you cannot ping the loopback address of 127.0.0.1, then something is wrong with the TCP/IP protocol stack

QUESTION NO: 4
An administrator issues the command "ping 127.0.0.1" from the command line prompt on a PC host named TK1. If an ICMP reply is received, what does this confirm?

A. PC host TK1 has connectivity up to Layer 5 of the OSI model.
B. PC host TK1 has a default gateway correctly configured.
C. PC host TK1 has connectivity with a local host.
D. PC host TK1 has the TCP/IP protocol stack correctly installed.
E. PC host TK1 has connectivity with a Layer 3 device.
F. None of the above

Answer: D

QUESTION NO: 5
In the network shown below, The TestKing technician is testing connection problems. What is the problem indicated by the output from HostA?



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A. The gateway address of HostA is incorrect or not configured.
B. An access list is applied to an interface of TestKing3.
C. The routing on TestKing2 is not functioning properly.
D. The Fa0/24 interface of Switch1 is down.
E. None of the above

Answer: A
Explanation:
Since pings sent to router TestKing1 are successful, we know that basic connectivity exists at least to the first hop toward the destination. However, when we perform a traceroute to the destination, the first hop does not show up at all. This is due to the fact that the host does not have a default gateway specified, and therefore does not know where to send traffic with a destination address in a different subnet.
Incorrect Answers:

B: Although this may indeed be true, if this were the problem, then the traceroutes would at least reach router TestKing3.
C: If this were the problem, then the traceroute would have at least reached the first hop.
D: If this were true, then pings sent to 192.168.3.254 would be unsuccessful.

QUESTION NO: 6
Regarding the extended ping command; which of the statements below are true? (Select all valid answer choices)

A. The extended ping command is supported from user EXEC mode.
B. The extended ping command is available from privileged EXEC mode.
C. With the extended ping command you can specify the TCP and UDP port to be pinged.
D. With the extended ping command you can specify the timeout value.
E. With the extended ping command you can specify the datagram size.

Answer: B, D, E
Explanation:
The extended ping command works only at the privileged EXEC command line.
Some of the extended ping command values include the datagram size and timeout value as shown:
Datagram size [100]: Size of the ping packet (in bytes). Default: 100 bytes.
Timeout in seconds [2]: Timeout interval. Default: 2 (seconds). The ping is declared successful only if the ECHO REPLY packet is received before this time interval.
Incorrect Answers:
A. Regular pings are available in both user and privileged mode, but not extended pings.
C. Ports can not be specified.

QUESTION NO: 7
When you use the ping command to send ICMP messages across a network, what's the most common request/reply pair you'll see? (Select one answer choice)

A. Echo request and Echo reply
B. ICMP hold and ICMP send
C. ICMP request and ICMP reply
D. Echo off and Echo on
E. None of the above

Answer: A
Explanation:
The ICMP protocol uses Echo request and Echo reply with the Ping command. The PING utility is the most commonly used message to verify connectivity to a remote device within the network.

QUESTION NO: 8
Part of the TestKing network is shown below:

Ping exhibit:

Tracert exhibit:

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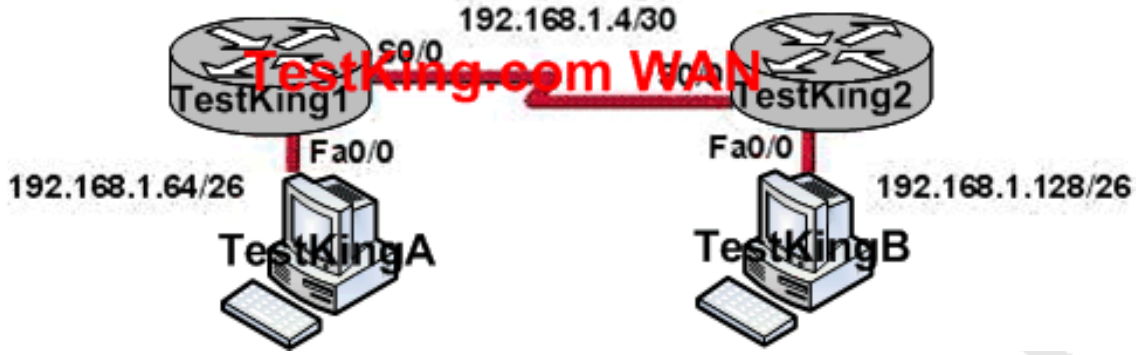
You work as a network technician at TestKing.com. You are testing connection problems in the network and your PC (host TestKingA) has provided the output shown above. What is the problem indicated by this output?

A. The routing on Router TestKing2 is not functioning properly.
B. The Fa0/24 interface of Switch TestKing4 is down.
C. An access list is applied to an interface of Router TestKing3.
D. The gateway address of Host TestKingA is incorrect or not configured.
E. None of the above

Answer: D
Explanation:
Destination Host Unreachable - This error message means that no local or remote route exists for a destination host at the sending host or at a router. Troubleshoot the local host or the router's routing table. In this case, the local host does not have a route to the destination, which means that the default gateway has not been configured.
Incorrect Answers:
A: If this were the case, the "Destination host unreachable" message would have come from the router (default gateway), not the local host.
B: If this were true, the IP address of the default gateway would not be reachable.
C. Based on the output shown above, the traffic is not even being sent to the router at all so an access list problem can be ruled out until traffic gets sent from the host to the default gateway.

QUESTION NO: 9
Network Topology Exhibit:



TestKing1 configuration exhibit:

TestKing1 configuration:

```
interface fa0/0
 ip address 192.168.1.65 255.255.255.192
 no shutdown
interface serial 0/0
 ip address 192.168.1.5 255.255.255.252
 no shutdown
```

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TestKing2 configuration exhibit:

TestKing2 configuration:

```
interface fa0/0
 ip address 192.168.1.129 255.255.255.192
 no shutdown
interface serial 0/0
 ip address 192.168.1.6 255.255.255.252
 no shutdown
ip route 192.168.1.64 255.255.255.192 s0/0
```

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You need to ensure connectivity between two new TestKing offices. You apply the configurations in the exhibit into the two new routers TestKing1 and TestKing2. Otherwise, the routers are configured with their default configurations. A ping from Host TestKingA to Host TestKingB fails, but you are able to ping the S0/0 interface of TestKing2 from Host TestKingA. The configurations of the hosts have been verified as correct. What could be the cause of the problem?

A. The interfaces on TestKing2 are not configured properly.
B. The serial cable on TestKing1 needs to be replaced.
C. The IP addressing scheme has overlapping subnetworks.
D. Router TestKing1 has no route to the 192.168.1.128 network.
E. The ip subnet-zero command must be configured on both routers.

Answer: D
Explanation:
Since TestKing1 does not have any static routes or dynamic routing configured on it, it will only be able to ping directly connected interfaces. This explains why pings work across the serial interface, but not to any networks beyond the directly connected network.
Incorrect Answers:
A: The interface configuration appear to be correct, and the fact the pings on directly connected interfaces work validates this.
B: If there was a problem with the serial cable then pings across the connection would fail.
C, E: The ip addressing is valid, and there is no need to the "ip subnet-zero" command to be used since this command is useful for network addressing, but not for IP routing.

Section 8: Perform and verify routing configuration tasks for a static or default route given specific routing requirements (12 questions)

QUESTION NO: 1
The TestKing network administrator has issued the "ip route 172.16.33.0 255.255.255.0 192.168.22.44" command on a TestKing router. Which two statements are true about this command? (Choose two)

A. It configures the router to send any traffic for an unknown destination to the 172.16.33.0 network
B. It establishes a static route to the 172.16.33.0 network
C. It uses the default administrative distance
D. It establishes a static route to the 192.168.22.0 network

Answer: B, C

QUESTION NO: 2
Part of the TestKing network is shown below:

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Study the exhibit shown above carefully. In this TestKing network segment, you add the following command to the TestKing1 router configuration:

ip route 192.168.12.0 255.255.255.0 172.16.12.1.

What are the results of adding this command? (Choose two)

A. Traffic for network 172.16.12.0 is forwarded to the 192.168.12.0 network
B. The command establishes a static route
C. Traffic for al l networks is forwarded to 172.16.12.1
D. The command invokes a dynamic routing protocol for 192.168.12.0
E. Traffic for network 192.168.12.0 is forwarded to 172.16.12.1
F. This route is automatically propagated throughout the entire network

Answer: B, E

Explanation:
To create static routes on a Cisco router, you use the ip route command followed by the destination network, network mask, and either the next-hop IP address or the local exit interface. It's vital to keep that last part in mind - you're either configuring the IP address of the downstream router, or the interface on the local router that will serve as the exit interface.

Let's say your local router has a serial0 interface with an IP address of 200.1.1.1/30, and the downstream router that will be the next hop will receive packets on its serial1 interface with an IP address of 200.1.1.2/30. The static route will be for packets destined for the 172.10.1.0 network. Either of the following ip route statements would be correct.

R1(config)#ip route 172.10.1.0 255.255.255.0 200.1.1.2 (next-hop IP address)

OR

R1(config)#ip route 172.10.1.0 255.255.255.0 serial0 (local exit interface)

QUESTION NO: 3
You need to configure a default route on a TestKing router. Which command will configure a default route on a router?

A. TK1(config)# ip route 0.0.0.0 10.1.1.0 10.1.1.1
B. TK1(config)# ip default-route 10.1.1.0
C. TK1(config)# ip default-gateway 10.1.1.0
D. TK1(config)# ip route 0.0.0.0 0.0.0.0 10.1.1.1

Answer: D
Explanation:
The command "IP route 0.0.0.0 0.0.0.0 <ip-address of the interface>" command is used to configure a default route on a router. In this case, a default route with a next hop IP address of 10.1.1.1 was configured.
Incorrect Answers:
A. This will be an invalid route, since the "10.1.1.0" value will specify the network mask, which in this case is invalid.
B, C. These commands are invalid. The command "ip default-network" could be used, but not "ip default-route" or "ip default-gateway". IP default-gateway is used on switches, not routers.

QUESTION NO: 4
Static routing needs to be configured on router TK1. In which situation would the use of a static route be appropriate?

A. To configure a route to the first Layer 3 device on the network segment.
B. To configure a route from an ISP router into a corporate network.
C. To configure a route when the administrative distance of the current routing protocol is too low.
D. To reach a network is more than 15 hops away.
E. To provide access to the Internet for enterprise hosts.
F. None of the above

Answer: B
Explanation:
Static routes are special routes that the network administrator manually enters into the router configuration. Stub networks are the ideal candidate for static routes.
There is no need to run a routing protocol over the WAN links between an ISP Router and a corporate network when only a single Internet link exists.

QUESTION NO: 5
The TestKing network is shown below:

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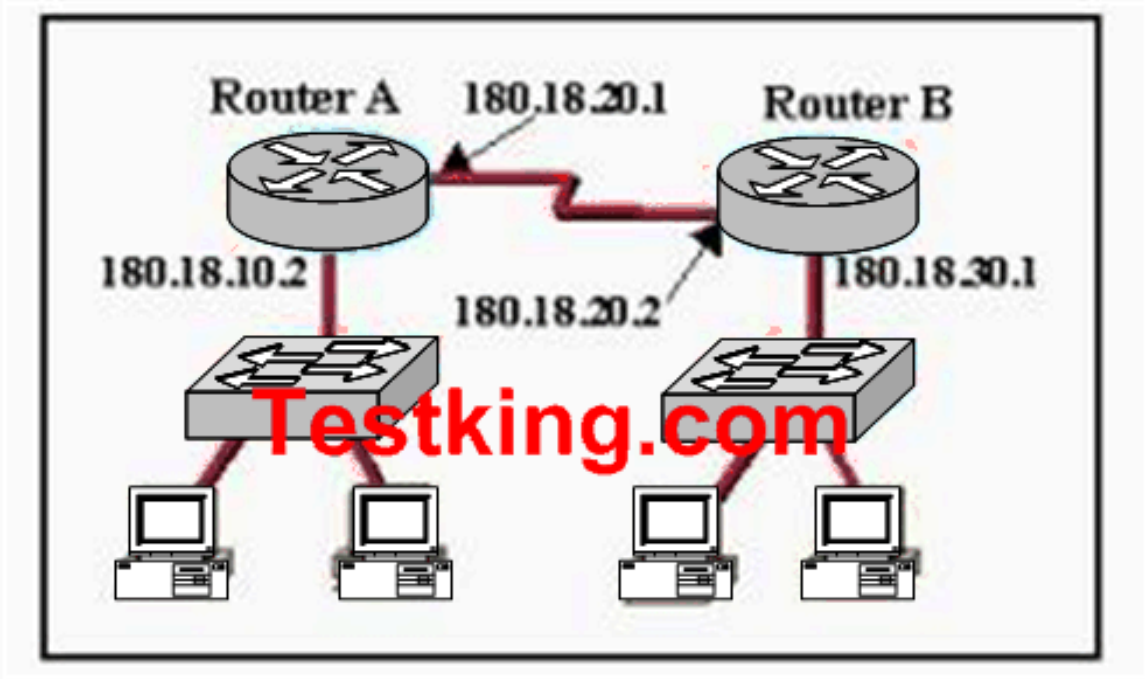

Based on this information, which of the following will configure a static route on Router A to network 180.18.30.0/24 with an administrative distance of 90?

A. Router(config)# ip route 90 180.18.20.1 255.255.255.0 182.18.20.2
B. Router(config)# ip route 180.18.20.1 255.255.255.0 182.18.30.0 90
C. Router(config)# ip route 180.18.30.1 255.255.255.0 182.18.20.1 90
D. Router(config)# ip route 90 180.18.30.0 255.255.255.0 182.18.20.2
E. Router(config)# ip route 180.18.30.0 255.255.255.0 182.18.20.2 90

Answer: E
Explanation:
Static route entries consist of the destination IP network address, the IP address of the next hop router, and the metric (hop count) for the route. A static route that points to the next hop IP address has an Administrative distance of 1. If the static route points to an outgoing interface, the static route has the Administrative distance of 0.
One common reason to change the administrative distance of a route is when you use Static Routes to backup and existing IGP route. This is normally used to bring up a backup link when the primary fails. In this example, choice E specifies that to reach the 180.18.30.0/24 network, forward this traffic to the router with the next hop IP address of 182.18.20.2 (Router B) using an administrative distance of 90.

QUESTION NO: 6
The network administrator of the Oregon router adds the following command to the router configuration: ip route 192.168.12.0 255.255.255.0 172.16.12.1. What are the results of adding this command? (Choose two.)

Exhibit:

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A. Traffic for network 192.168.12.0 is forwarded to 172.16.12.1.
B. This route is automatically propagated throughout the entire network.
C. Traffic for all networks is forwarded to 172.16.12.1.
D. Traffic for network 172.16.12.0 is forwarded to the 192.168.12.0 network.
E. The command invokes a dynamic routing protocol for 192.168.12.0.
F. The command establishes a static route.

Answer: A, F
Explanation:
In order to configure a static route the router has to be in global configuration mode.
ip route network prefix mask {address | interface} [distance]

network - the destination network
mask - is the subnet mask for that network
address - IP address of the next hop router
interface - or the interface the traffic is to leave by
distance - (optional) the administrative distance of the route

There are other parameters but these have been removed as they are not relevant to the CCNA exam.

Example:

ip route 10.0.0.0 255.0.0.0 131.108.3.4 110

10.0.0.0 is the destination network. 255.0.0.0 is the subnet mask for that network and 131.108.3.4 is the next hop for the router to use. The 110 is the administrative distance which we will look at later on.

QUESTION NO: 7
Which of the commands below can you use to configure a default route on router TK1? (Select two answer choices)

A. TK1(config)# ip route 0.0.0.0 0.0.0.0 E0
B. TK1(config)# ip route 0.0.0.0 255.255.255.255 S0
C. TK1(config-interface)# ip route 255.255.255.255 0.0.0.0 192.168.1.21
D. TK1(config)# ip route 0.0.0.0 0.0.0.0 192.168.1.21
E. TK1(config)# ip route 0.0.0.0 192.168.1.21 255.255.255.255
F. TK1# ip default-network 0.0.0.0 192.168.1.21 255.255.255.255

Answer: A, D
Explanation:
There are two ways to specify a default static route. One is to specify the interface to use for forwarding packets, like the example in A. The other way is to specify the IP address of the next hop router, such as the example in D. The ip route 0.0.0.0 0.0.0.0 command uses the fact that network 0.0.0.0 is used by Cisco IOS software to represent the default network.
Reference: CCNA ICND Exam Certification Guide By Wendell Odem Pg.524
Incorrect Answers:
B. All zero's must used for the subnet mask of a default route, not all 1's.
C. The default route is made in global configuration mode.
D, E. A subnet mask is not needed after the next hop router is specified.

QUESTION NO: 8
Which of the following commands would you use to configure a default route to any destination NOT found in the routing table of router TK1?

A. TK1(config)# ip default-route 0.0.0.0 255.255.255.255 s0
B. TK1(config)# ip route 0.0.0.0 255.255.255.255 s0
C. TK1(config)# ip default-route 0.0.0.0 0.0.0.0 s0
D. TK1(config)# ip route 0.0.0.0 0.0.0.0 s0
E. TK1(config)# ip route any any e0
F. None of the above

Answer: D
Explanation:
Choice D is the correct syntax for configuring a gateway of last resort. Note that an alternative way is to specify the IP address of the next hop router, for example, "ip route 0.0.0.0 0.0.0.0 10.1.1.1."

QUESTION NO: 9
The topology of the TestKing network is displayed below, along with the routing table of the TestKing1 router:

```
TestKing1# show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 172.19.22.2 to network 0.0.0.0

C    172.17.22.0 is directly connected, FastEthernet0/0
C    172.18.22.0 is directly connected, Serial0/0
S*   0.0.0.0/0 [1/0] via 172.19.22.2
```

172.17.22.0 172.31.5.0

Changes to the TestKing network were made, and now users on the TestKing3 LAN are not able to connect to the TestKing4 LAN. Based on the information above, what could be the reason for this?

A. The Fast Ethernet interface is disabled.
B. The neighbor relationship table is not updated.

C. A static route is configured incorrectly.
D. The routing table on TestKing1 is not updated.
E. IP routing is not enabled.

Answer: C
Explanation:
On the bottom line of the command output for 'show ip route' you can see that there is an asterisk by the letter S. The S stands for static route, and the static route is incorrectly configured.
Incorrect Answers:
A. If this were true, then the users on the LAN would be unable to connect to anything outside of their own network.
B. It appears that only a single static route is being used on the TestKing1 router. Neighbors do not need to be established for static routes.
D. The routing table consists of a single static route, which is configured incorrectly. The routing tables do not become updated dynamically when static routes are used.
E. This is not true, as a static route has been configured.

QUESTION NO: 10
Some of the TestKing routers have been configured with default routes. What are some of the advantages of using default routes? (Choose two)

A. They establish routes that will never go down.
B. The keep routing tables small.
C. They require a great deal of CPU power.
D. The allow connectivity to remote networks that are not in the routing table.
E. They direct traffic from the Internet into corporate networks.

Answer: B, D
Explanation:
Routers use default routing as a last resort when all other methods (directly connected, static, or dynamic) have been exhausted. For stub networks, a single default static route could be used to provide connectivity to the entire network. This is desirable for stub networks where only a single link connects the remote location to the rest of the networks. Because all of the traffic only has one link to use, a single default route will make the routing table as small as possible, while providing for connectivity to networks not in the routing table, since as traffic destined for the Internet.
Incorrect Answers:

A. Although default routes are normally statically assigned, these routes can still go down. If the interface used as the default route should go down, or the next hop IP address of the default route become unreachable, the static default route will go down.
C. Using static routes, including default routes, is the least CPU-intensive method of routing.
E. To influence the way incoming traffic from the Internet gets to a corporation, BGP routing would be used, not default routing.

QUESTION NO: 11
You have just configured a static default route on router TK1. What is the purpose of a default route?

A. It is a route to be used when the routing protocol fails.
B. It is a route configured by an ISP that sends traffic into a corporate network.
C. It is a route used when a packet is destined for a remote network that is not listed in the routing table.
D. It is a route manually configured for a specific remote network for which a routing protocol is not configured.
E. It is used to send traffic to a stub network.
F. None of the above

Answer: C
Explanation:
Every IP host needs to have a default route either manually configured or dynamically learned. Default routes provide end hosts a way out of their local subnet and routers with a router of last resort if no other route (specifically relating to the destination) exists in the routers route table.
Routers use default routing as a last resort when all other methods (directly connected, static, or dynamic) have been exhausted. Routers inspect received datagrams to identify the logical Network layer address of the ultimate destination. If a directly connected static or dynamic route exists within the router's route table, it forwards the datagram.
If the destination remains unknown, that is, no method of routing has resulted in a learned route; it forces the router to use a default route. Typically, administrators implement default routes on point-to-point (a link with only two routers) or dial-up connections, linking TestKing.com's network to the outside work.
Reference: http://www.informit.com/articles/article.asp?p=26129&seqNum=4&rl=1

QUESTION NO: 12
On router TK1 the following configuration command was entered:

ip route 0.0.0.0 0.0.0.0 192.168.1.2

What is the result of adding this command to this router when it is already configured for dynamic routing?

A. It configures the router to block routing updates from being sent to IP address 192.168.1.2.
B. It configures the router to send all packets to IP address 192.168.1.2 if the packets match no other entry in the routing table.
C. It configures the router to drop all packets for which the destination network is unknown.
D. It configures the router to send all packets to IP address 192.168.1.2.
E. It configures the router as a firewall, blocking all packets from IP address 192.168.1.2.
F. None of the above

Answer: B
Explanation:
There is a special kind of static route called a default route, which is what this example is showing. Sometimes a default route is called a "zero / zero" route. This is because the network and subnet you are specifying, as the destination for the traffic it would match, are all zeros. A default route says "for any traffic that does not match a specific route in the routing table, send that traffic to this destination". In other words, a default route is a "catch-all".

Section 9: Manage IOS configuration files. (including: save, edit, upgrade, restore) (12 questions)

QUESTION NO: 1
If NVRAM in a TestKing router lacks boot system commands, where does this router look for the Cisco IOS by default?

A. ROM

B. RAM
C. Flash
D. Bootstrap
E. Startup-.config
F. None of the above

Answer: C
Explanation:
Flash memory - Either an EEPROM or a PCMCIA card, Flash memory stores fully functional IOS images and is the default location where the router gets its IOS at boot time. Flash memory also can be used to store any other files, including configuration files.
Reference:
CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) page 187

QUESTION NO: 2
When you power up a TestKing router; in what memory is the start-up configuration normally stored in?

A. RAM
B. ROM
C. FLASH
D. NVRAM
E. None of the above

Answer: D
Explanation:
The startup configuration is stored in the Non-Volatile RAM.
Incorrect Answers:
A, B: No configuration information is stored in RAM or ROM.
C. The IOS is normally stored in the flash memory, not the saved configuration.

QUESTION NO: 3

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You are the administrator of the Testking network and you have forgotten the password to one of your routers. After completing the password recovery procedure the router returned to its normal operation. The config-register was set back to the initial default value. What is this value?

A. 0x2112
B. 0x2104
C. 0x2102
D. 0x2142
E. 0x2100

Answer: C
Explanation:
The config-register's default factory setting is 0x2102. The following display the possible configuration register values and their meanings:

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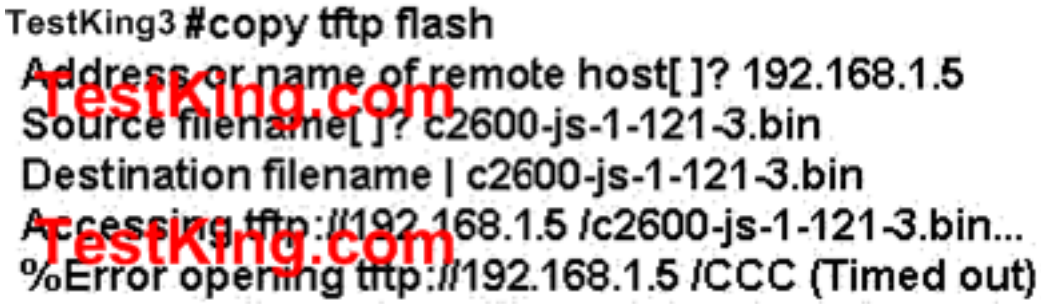
Configuration Register Setting	Router Behavior
0x102	Ignores break 9600 console baud
0x1202	1200 baud rate
0x2101	Boots into bootstrap Ignores break Boots into ROM if initial boot fails 9600 console baud rate
0x2102	Ignores break Boots into ROM if initial boot fails 9600 console baud rate default value for most platforms
0x2120	Boots into ROMmon 19200 console speed
0x2122	Ignores break Boots into ROM if initial boot fails 19200 console baud rate
0x2124	NetBoot Ignores break Boots into ROM if initial boot fails 19200 console speed
0x2142	Ignores break Boots into ROM if initial boot fails 9600 console baud rate Ignores the contents of Non-Volatile RAM (NVRAM) (ignores configuration)
0x2902	Ignores break Boots into ROM if initial boot fails 4800 console baud rate

0x2922	Ignores break Boots into ROM if initial boot fails 38400 console baud rate
0x3122	Ignores break Boots into ROM if initial boot fails 57600 console baud rate
0x3902	Ignores break Boots into ROM if initial boot fails 2400 console baud rate
0x3922	Ignores break Boots into ROM if initial boot fails 115200 console baud rate

Incorrect Answers:
D. This is the setting that would be used during the password recovery procedure.
Reference:
http://www.cisco.com/en/US/products/hw/routers/ps133/products_tech_note09186a008022493f.shtml

QUESTION NO: 4
You issued the following command on router TestKing3:



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When upgrading the IOS image, you receive the exhibited error message shown above. Based on the information given, what could be the cause of this error?

A. The TFTP server is unreachable from the router.
B. The new IOS image is too large for the router flash memory.
C. The IOS image on the TFTP server is corrupt.
D. The new IOS image is not correct for this router platform.
E. There is not enough disk space on the TFTP server for the IOS image.
F. None of the above

Answer: A
Explanation:
The problem shown here is that the destination file is not reachable. When copying files via TFTP the first step is to ensure that there is connectivity to the TFTP server. You should perform the following steps:
1. Verify that the TFTP server has IP connectivity to the router.
2. Check the IP addresses of the TFTP server and the router or access server targeted for the TFTP software upgrade.
3. Ping the router or access server to verify that a network connection exists between them.

QUESTION NO: 5
The relevant system information regarding a Testking router is shown in the following display:

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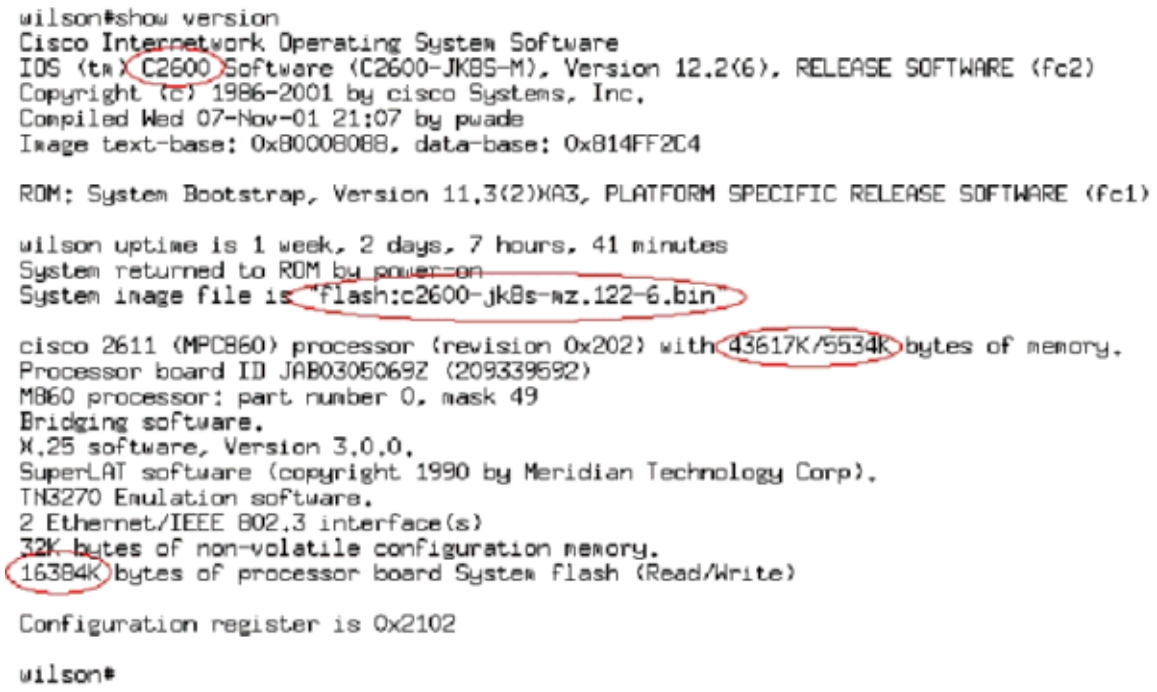
Refer to the partial Command output shown. Which two statements are correct regarding the router hardware? (Choose Two)

A. Total RAM Size is 32 KB.
B. Total RAM Size is 16384 KB (16 MB)
C. Total RAM Size is 65536 KB (64 MB)
D. FLASH Size is 32 KB.
E. FLASH Size is 16384 KB (16 MB)
F. FLASH Size is 65536 KB (64 MB)

Answer: C, E
Explanation:
The RAM is found by adding up the memory, so in this case it is 53248K+12288K = 65536K. The Flash is found at the very bottom of the output, which is shown as 16384K

How Do I Know What Platform I Have?
Type the show version command at the enable command prompt of the router to see the platform, RAM, flash memory, and current version of code you are running.
This example shows a Cisco 2600 router with 48 MB of RAM (43617 K + 5534 K), 16 MB of flash memory (16384 K), and a code image called flash:c2600-jk8s-mz.122-6.bin.



Reference:
http://www.cisco.com/en/US/products/sw/secursw/ps1018/products_tech_note09186a00800949e4.shtml

QUESTION NO: 6
Which is the correct fallback sequence for loading the Cisco IOS?

A. ROM, Flash, NVRAM
B. ROM, TFTP server, Flash
C. Flash, TFTP server, ROM
D. Flash, NVRAM, RAM

Answer: C

Explanation:
By default, a Cisco IOS router will normally boot up from flash where the IOS is stored. If the IOS in not found or has become corrupted, the router will then send an all hosts broadcast (255.255.255.255) to find a TFTP server to download the IOS from. Should that fail, the router will boot up in ROM Monitor mode as a last resort.

QUESTION NO: 7
See the following exhibit below:

```
system image file is "flash;c2600-ik8033-mz.122-8.Ts.bin

cisco 2620 (MPC860 processor (revision 0x200) with 16384/2048k
bytes of
memory.
processor board ID JAD05076EF6
M860 processor:part number 0, mask 49.
Bridging software
x.25 software version 3.0.0
1 Fast Ethernet ( IEEE 802.3 interface (s)
2 Low speed serial (synch/asynch) network interface (s)
32k bytes of non-volatile configuration memory.
16384k bytes of processor board System Flash (Read/Write)
configuration register is 0x2142
```

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A router consistently loses its configuration each time it reboots. Given the output shown in the graphic, what is the cause of this problem?

A. The processor is overheating.
B. Configuration register is misconfigured.
C. There is no problem.
D. Cisco products are inferior compared to Nortel products. Migrate to Nortel instead.
E. None of the above

Answer: B
Explanation:

The value of the register 0x2142 means that the router should omit the startup configuration when it loads. To solve this problem change the value of the register to 0x2102

QUESTION NO: 8
A Cisco router has been configured, and the copy running-config startup-config command has been issued. When the router is power cycled, the router prompts with:

"Would you like to enter the initial configuration dialog? [yes/no]"

Why has this occurred?

A. There is an error in the router DRAM.
B. Te IOS image is corrupt.
C. The configuration register is set to 0x2142.
D. The TFTP server that contains the router configuration file is unreachable.
E. A boot system configuration command has placed the router into setup mode.

Answer: C
Explanation:
When the configuration setting is set to 0x2142, the router will ignore the contents of the NVRAM information. More specifically, this setting will:
1. Ignores break
2. Boots into ROM if initial boot fails
3. 9600 console baud rate
4. Ignores the contents of Non-Volatile RAM (NVRAM) (ignores configuration)

QUESTION NO: 9
What is the purpose of using the copy flash tftp command on a router?

A. To copy an IOS image to the router
B. To create a backup copy of the IOS
C. To move the IOS image from a server to the router
D. To backup the router configuration to a server

Answer: B
Explanation:
When upgrading the IOS on a router, if there is enough space to copy the system image file, then the original one can be retained and the new file can be copied in the additional memory space. If there is not enough space available, as in this case, then the existing file from the Flash is erased while downloading a new one. It is a good practice to backup the existing system image to the TFTP server using the "copy flash tftp" command.
Reference: http://www.cisco.com/warp/public/63/copyimage.html

QUESTION NO: 10
Refer to the following exhibit:

The TestKing network administrator configures a new router and enters the copy startup-config running-config command on the router. He powers down the router and sets it up at a remote location. When the router starts, it enters the system configuration dialog as shown. What is the cause of the problem?

A. The network administrator failed to save the configuration.
B. The configuration register is set to 0x2100.
C. The boot system flash command is missing from the configuration.
D. The configuration register is set to 0x2102.
E. The router is configured with the boot system startup command.
F. None of the above

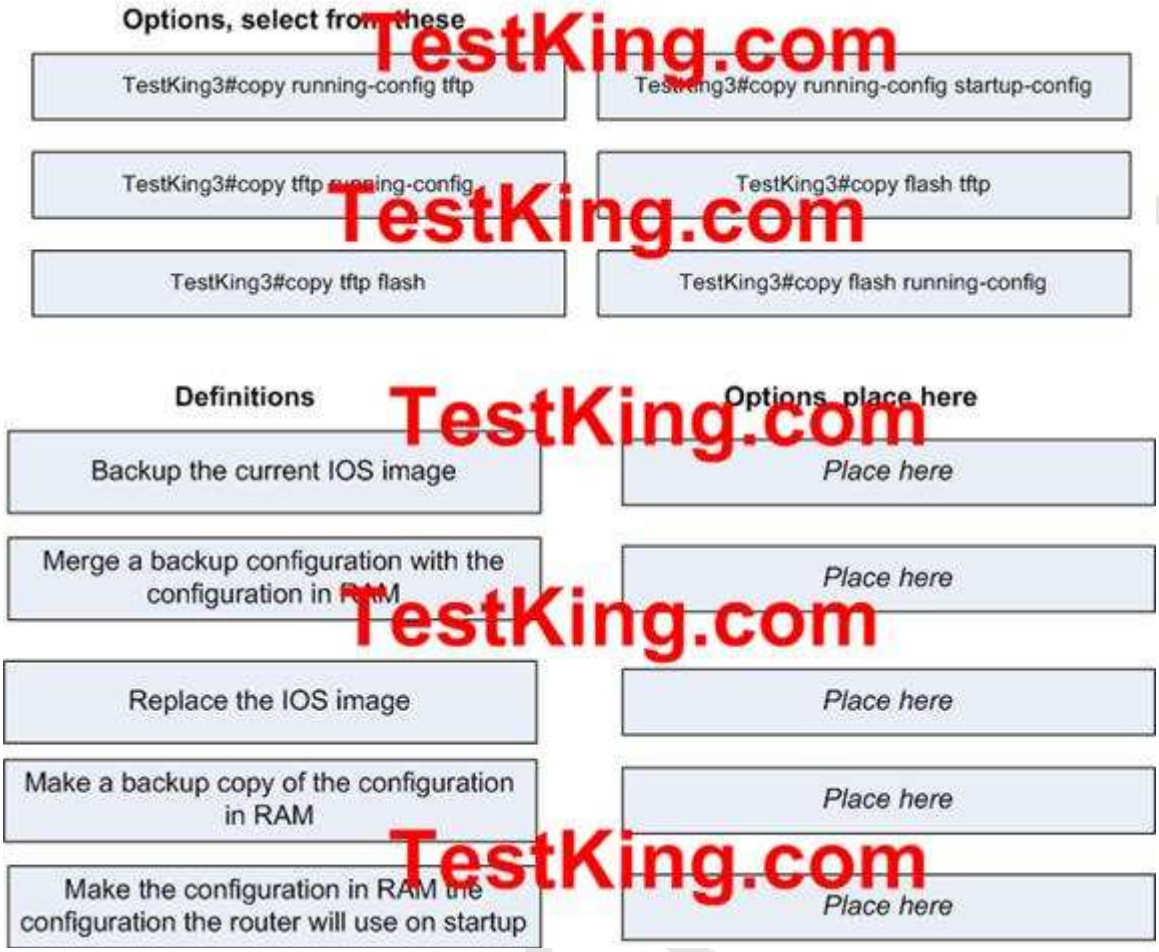
Answer: A
Explanation:
This output is what you get when the router doesn't have a valid startup configuration in NVRAM. When the administrator issued the "copy start run" command, the existing config was then overwritten by the startup config, which in a new router is the factory default (unconfigured) settings. What the administrator meant to issue was the "copy run start" command to save the configuration, not the "copy start run" as shown here.

QUESTION NO: 11
Before installing a new, upgraded version of the IOS, what should be checked on the router, and which command should be used to gather this information? (Choose two)

A. show running-config
B. show version
C. the version of the bootstrap software present on the router
D. the amount of available ROM
E. the amount of available flash and RAM memory
F. show processes

Answer: B, E
Explanation:
To upgrade the IOS, the first two steps are:
1. Download the Cisco IOS software image to your workstation or PC.
2. Install the new Cisco IOS software image in the outbound directory of the TFTP server. The TFTP server looks for the router's Cisco IOS software image in this directory. Make sure that the image you want to copy to your Flash is in this directory.
Check the memory requirements needed for the Software image being upgraded, which is mentioned in the Downloads download page. Using the show version command, verify that you have enough memory.

QUESTION NO: 12 DRAG DROP
You work as a network administrator at TestKing.com.
Your boss, Mrs. Tess King, tells you to match the commands with the appropriate descriptions. One of the commands listed below will not be used.



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Answer:

Explanation:

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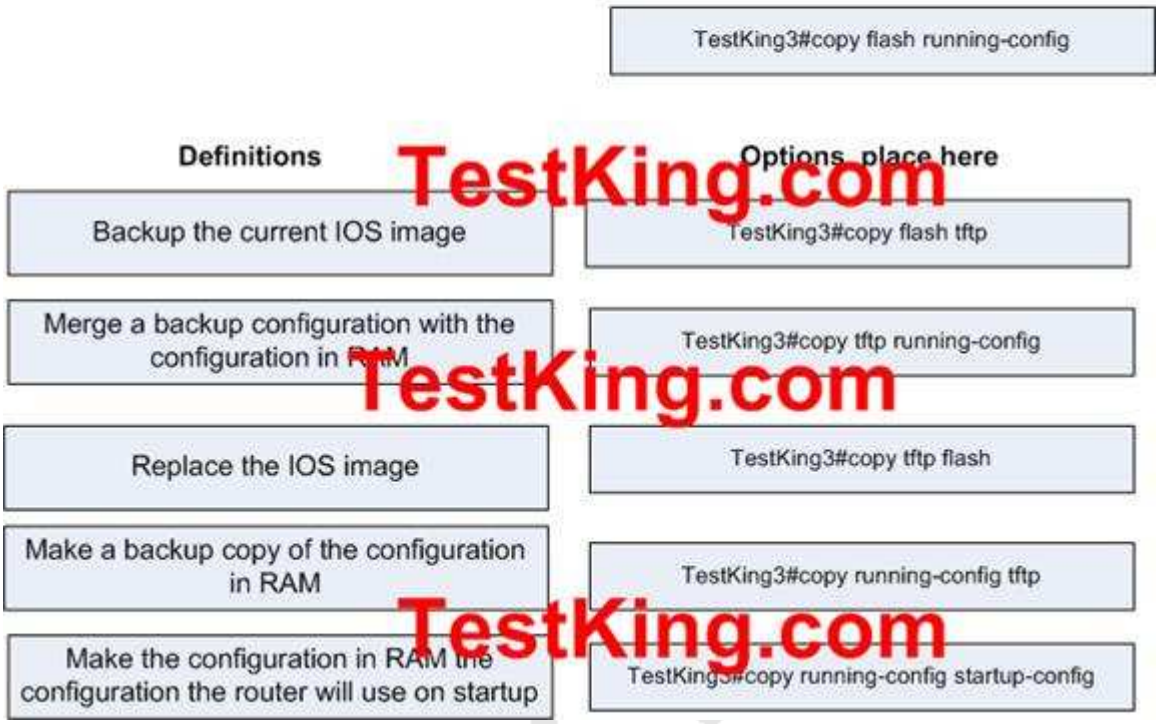
Options, select from these



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Section 10: Manage Cisco IOS. (13 questions)

QUESTION NO: 1
Which of the commands below would you enter if you wanted to see the configuration register of your router?

A. show boot
B. show flash
C. show register
D. show version
E. show config

Answer: D
Explanation:
To display the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images, use the show version command in EXEC mode.

Example:
The following is sample output from the show version command:

```
Router1> show version
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-J-M), Experimental Version 11.3(19970915:164752) [
hampton-nitro-baseline 249]
Copyright (c) 1986-1997 by cisco Systems, Inc.
Compiled Wed 08-Oct-97 06:39 by hampton
Image text-base: 0x60008900, data-base: 0x60B98000
ROM: System Bootstrap, Version 11.1(11855) [beta 2], INTERIM SOFTWARE
BOOTFLASH: 7200 Software (C7200-BOOT-M), Version 11.1(472), RELEASE
Router1 uptime is 23 hours, 33 minutes
cisco 7206 (NPE150) processor with 57344K/8192K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0 (512KB Level 2 Cache)
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
8 Ethernet/IEEE 802.3 interface(s)
2 FastEthernet/IEEE 802.3 interface(s)
4 Token Ring/IEEE 802.5 interface(s)
```

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```
4 Serial network interface(s)
1 FDDI network interface(s)
125K bytes of non-volatile configuration memory.
1024K bytes of packet SRAM memory.
20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
20480K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2102
```

QUESTION NO: 2
After logging into a router, you type in "enable" and then enter the correct password when prompted. What is the current router prompt symbol at this point?

A. >
B. #
C. ?
D. *
E. All of the above
F. None of the above

Answer: B
Explanation:
When you enter the privileged mode by typing enable the router prompt will change to a # character.
Incorrect Answers:
A. This is the prompt given after initially logging on.
C, D. These are not valid router prompts.

QUESTION NO: 3
In the Cisco IOS, what is the definition of a global command?

A. A command that can be entered in any configuration mode.
B. A command that supports all protocols.
C. A command that is implemented in all IOS versions.
D. A command that is set once and affects the entire router.
E. A command that is available in every release of IOS.

Answer: D
Explanation:
When you enter global configuration mode and enter a command, it is applied to the running configuration file that is currently running in ram. The configuration of a global command affects the entire router. An example of a global command is one used for the hostname of the router.
Incorrect Answers:
A. Global configuration commands must be performed while in global configuration mode. For example, when you are in the interface configuration mode, you most likely will need to exit out into global mode to type in the commands.
B. Global commands do not necessarily support every protocol.
C. This is not necessarily true, since there are certain global commands that are supported on one feature set that are not on a different feature set of IOS.
E. Global commands can become outdated, and can be replaced by newer commands in the newer releases of IOS.

QUESTION NO: 4
Which of the following commands will display the name of the IOS image file being used in a TestKing router?

A. Router# show IOS
B. Router# show version
C. Router# show image
D. Router# show protocols
E. Router# show flash

Answer: B, E
Explanation:
Different Cisco IOS versions and feature sets will ultimately dictate the size of the IOS file and the amount of Flash and DRAM memory required to run the IOS. If you are planning to upgrade to a new IOS, you must make sure that you have enough memory (the more, the better) in your device. To see the amount of Flash you have and the current IOS file stored in Flash memory, utilize the show flash command as follows:

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Router>show flashSystem flash directory:File Length Name/status 1 5510192 c2600-is-mz.120-3.T3.bin[5510256 bytes used, 2878352 available, 8388608 total]8192K bytes of processor board System flash (Read/Write)Typically, the filename of the IOS file in Flash correctly reflects the actual IOS version running currently on the device. However, an administrator can easily change the filename to his or her own purposes, or there could be multiple IOS files stored on the Flash and you are not sure which one is running currently. To ensure the correct version of IOS, use the widely practical show version command.

Incorrect Answers:

A, C. These are invalid commands.

D. The command "show protocols" will show the routed protocols in use by the router and by interface conditions and their IP address, if configured.

QUESTION NO: 5

After making changes to the router, you issue the "copy running-config startup-config" command to save changes. After reloading the router, the router comes up in setup mode. You again make changes, save them, and reboot. Again, the router comes up in setup mode.

What is the most likely cause of this?

A. The NVRAM is corrupted.
B. The boot system commands were omitted in the configuration.
C. The configuration register setting is incorrect.
D. The upgraded configuration incompatible with the hardware platform.
E. The upgraded IOS incompatible with the hardware.
F. None of the above

Answer: C

Explanation:

When you enter the command, "copy running-config startup-config" you save your current settings to NVRAM. The problem described in this question is that it appears the router is set to bypass the NVRAM, making it come up in the initial configuration dialog. The most likely cause of a router with the configuration register settings set incorrectly is that the router recently went through the password recovery procedure.

QUESTION NO: 6

You need to upgrade the IOS of an existing router on your network. The new IOS image is located on a TFTP server that you have set up within the network. What command should you issue in order to download the new IOS version?

A. Router# copy tftp flash
B. Router# copy flash run
C. Router(config)# restore flash
D. Router(config)# repair flash
E. Router# copy flash tftp
F. Router# copy start flash
G. None of the above

Answer: A
Explanation:
The command "copy tftp flash" will copy the new IOS version upgrade from your networks TFTP server (assuming of course you have a TFTP server with the new version of IOS standing by).
Incorrect Answers:
C, D. The copy tftp flash command should be issued from the enable command prompt. It is not necessary to go into configuration mode.
E. This will have the reverse effect, and will copy the IOS image on your router onto a folder in your TFTP server.

QUESTION NO: 7
Study the exhibit below:

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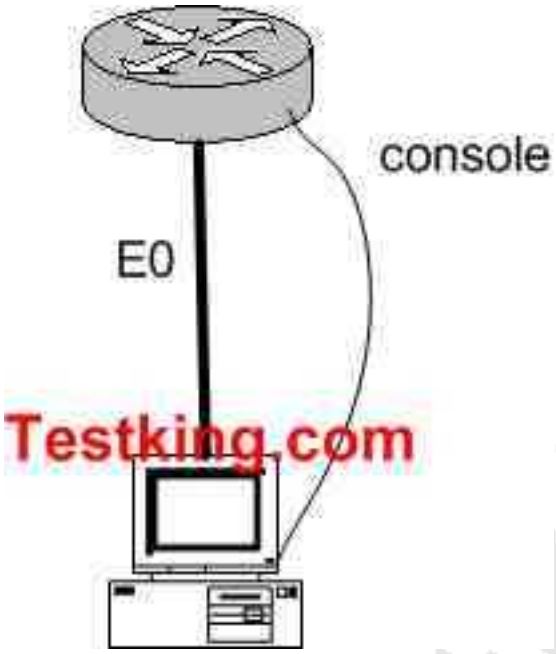
The TestKing systems administrator in Lisbon has configured a new router to connect with his company's head office in Gibraltar. He attempted to create and save an image file of the new router on the TFTP server in Gibraltar but failed. Based on the information given by above exhibit, what is the underlying problem?

A. The IP address if the TFTP server not correct.
B. There is an incorrect subnet mask of the TFTP server.
C. The default gateway of the TFTP server not properly set.
D. The subnet mask on the Lisbon router not correct
E. There is an incorrect IP address configured on E0 of the Gibraltar router
F. None of the above

Answer: B
Explanation:

An incorrect subnet mask on the TFTP server is the cause of this problem. If you look at the subnet masks of all the other devices you'll notice that they are /28. If you rewrite the subnet mask of the TFTP server, of 255.255.255.192 you'll notice that it translates to a subnet mask of /26. A subnet mask of 255.255.255.240, which is a /28, applied to the TFTP server will fix this problem.

QUESTION NO: 8
Study the exhibit below:



You just connected your computer directly to the E0 port of a router and you're running a console session. Which of the following steps below are required to successfully implement the "copy flash tftp" command and upload the flash image onto the TFTP server? (Select three answer choices)

A. TFTP server software must be activated.
B. TFTP server software must be running on the administrator's workstation.
C. There must be space in the flash memory of the router to accommodate the file to be copied.
D. The copy flash tftp command must provide the IP address of the administrator's workstation.
E. The administrator's workstation must be on the same subnet as the router E0 interface.

F. The Ethernet connection between the router and the administrator's workstation must be via straight-through cable.

Answer: B, D, E
Explanation:
The sole purpose of the 'copy flash tftp' command is to copy the routers configuration file to the TFTP server to save it. The first logical variable for this operation is that the TFTP software is actually running. So B is correct. D is correct because the IOS won't be able to send off if it doesn't even know where the TFTP server is. Finally, TFTP server must be on the same subnet as the connectivity must be direct and the TFTP and router will need to know how to reach each other.
In

Answer:
A. The TFTP can't just be activated, it has to be running in the right place.
C. This is not valid because you aren't downloading into the flash, you're uploading out of the flash, so space isn't a concern.
F. A cross over cable must be used when connecting from a PC directly into the router's Ethernet interface.

QUESTION NO: 9
What kind of information can you deduce from an IOS image file name? (Select three answer choices)

A. Distribution channel failures
B. Feature capabilities
C. Memory capacity needs
D. Hardware product platform
E. Programming language requirements
F. Run location and compression status

Answer: B, D, F
Explanation:
Image Naming Conventions:
You can identify the platform, features, and image location by the name of the image. The naming convention is platform-features-type for images that are stored on a UNIX system.

The platform variable indicates which platforms can use this image. Examples of platform variables include rsp (Cisco 7000 series with RSP7000 and Cisco 7500 series), c1600 (Cisco 1600 series), and c1005 (Cisco 1005).

The features variable identifies the feature sets supported by the image.

The type field can contain the following characters:

f-The image runs from Flash memory.
m-The image runs from RAM.
r-The image runs from ROM.
l-The image is relocatable.
z-The image is zip compressed.
x-The image is mzip compressed.

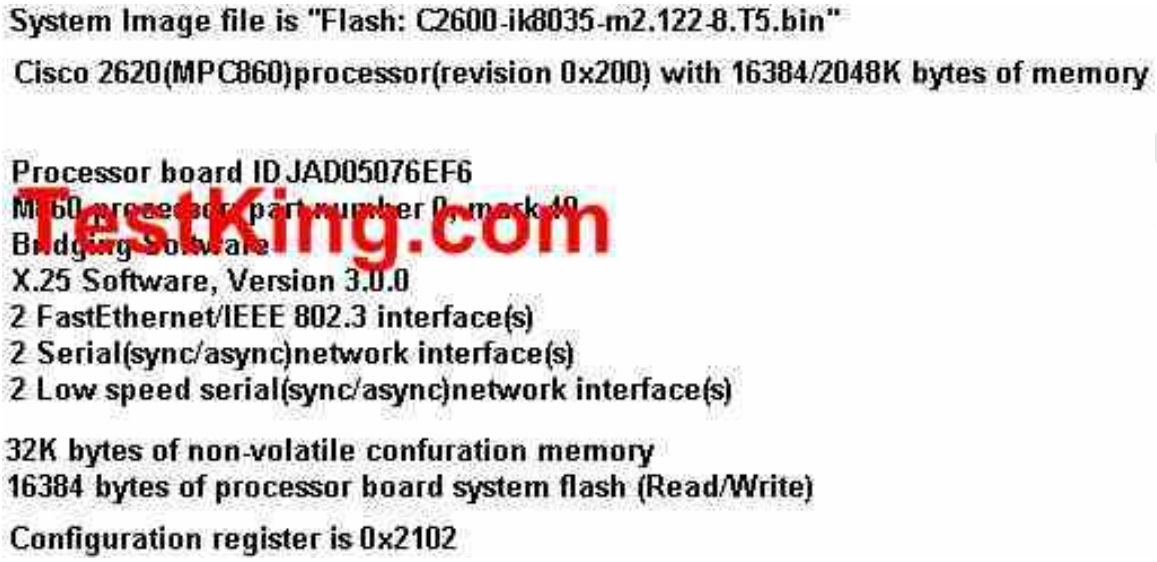
QUESTION NO: 10
You wish to upgrade the IOS of a router without removing the image currently installed.
What command will display the amount of memory that is being used by the current IOS image and whether there is enough room available to hold both the current and new images?

A. Router# show version
B. Router# show flash
C. Router# show memory
D. Router# show buffers
E. Router# show running-config
F. All of the above

Answer: B
Explanation:
The "show flash" command is used to display the layout and contents of the flash memory file system. It will show name of the file system, as well as the number of bytes used and the number available within the flash memory.

QUESTION NO: 11

The "show version" command was issued on a Testking router as shown below:



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The Network administrator at TestKing.com wants to upgrade the IOS of this router. The new Image requires 64 MB of RAM & 16 MB for Storage of the File. Given the Output Shown in the Graphic, which of the following is true?

A. This router meets the requirements for the new image.
B. This router will require a DRAM upgrade to meet the requirements for the Image.
C. This router will require a FLASH upgrade to meet the requirements for the Image.
D. This router will require a NVRAM upgrade to meet the requirements for the Image.

Answer: B
Explanation:
Based on the output above, the router above will not require a Flash memory upgrade, as only 16 MB is required and the Testking router does indeed have 16 MB of flash (16384 bytes). However, a DRAM upgrade is required, as 64 MB of RAM is needed but this router has only slightly more than 16 MB as shown by the 16384/2048 value.

QUESTION NO: 12

You are a trainee technician at TestKing, Inc. Your instructor tells you to backup an IOS image of a Cisco device to a Windows 2003 server on the network.

What should you do first? (Choose three)

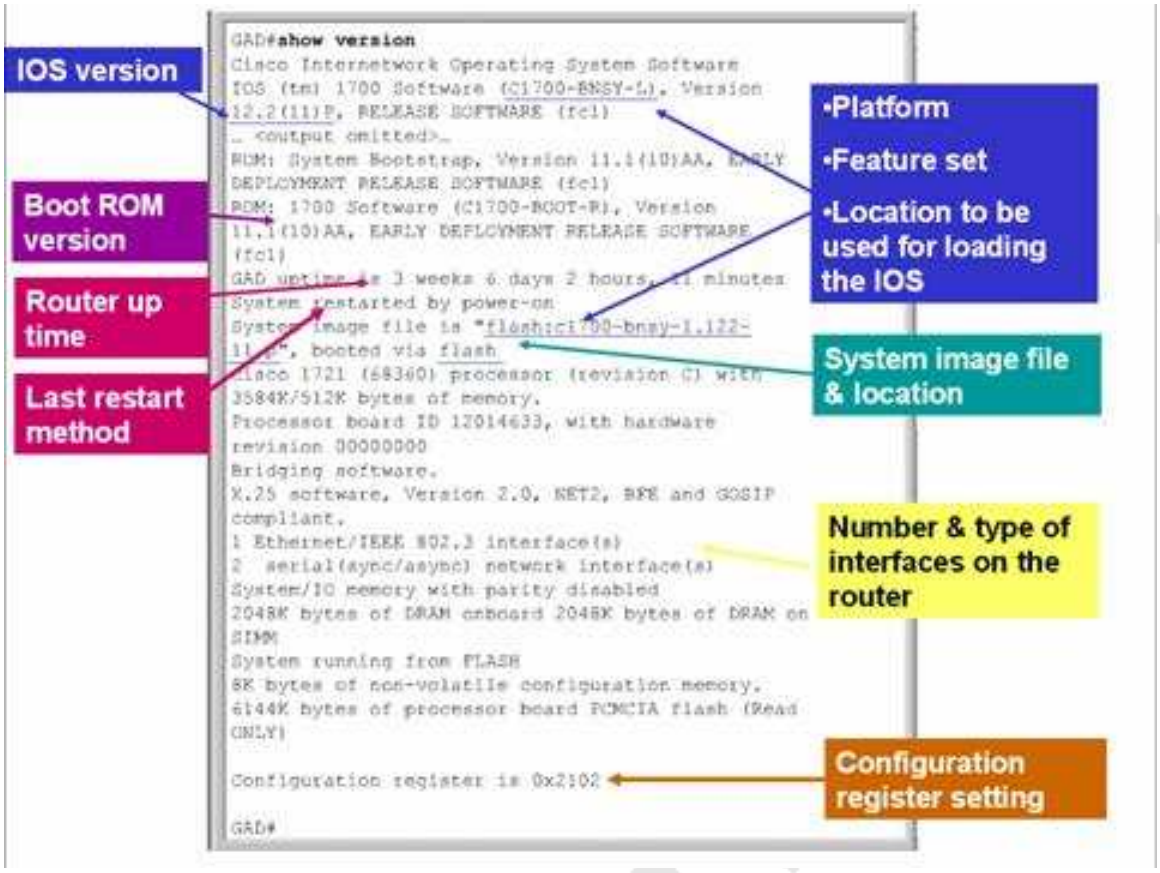
A. Make sure that the network server can be accessed.
B. Check that the authentication for access is set.
C. Assure that the network server has adequate space for the code image.
D. Verify any file naming and path requirements.
E. Make sure that the server can load and run the bootstrap code.

Answer: A, C, D
Explanation:
In order to properly back up the Cisco IOS image onto a Windows server, you should ensure that the server is reachable and that you have the proper permissions to save files to the server. In addition to this, the server will need enough space to hold the backup file.
Incorrect Answers:
E. In order to simply back up the IOS file, the server needs to only be able to save it to a hard disk. It does not need to load, read, or boot the image.

QUESTION NO: 13
Router TK1 is not operating as expected and you want to verify that the router booted using the correct IOS image. Which command should be used to determine which IOS is running on the router?

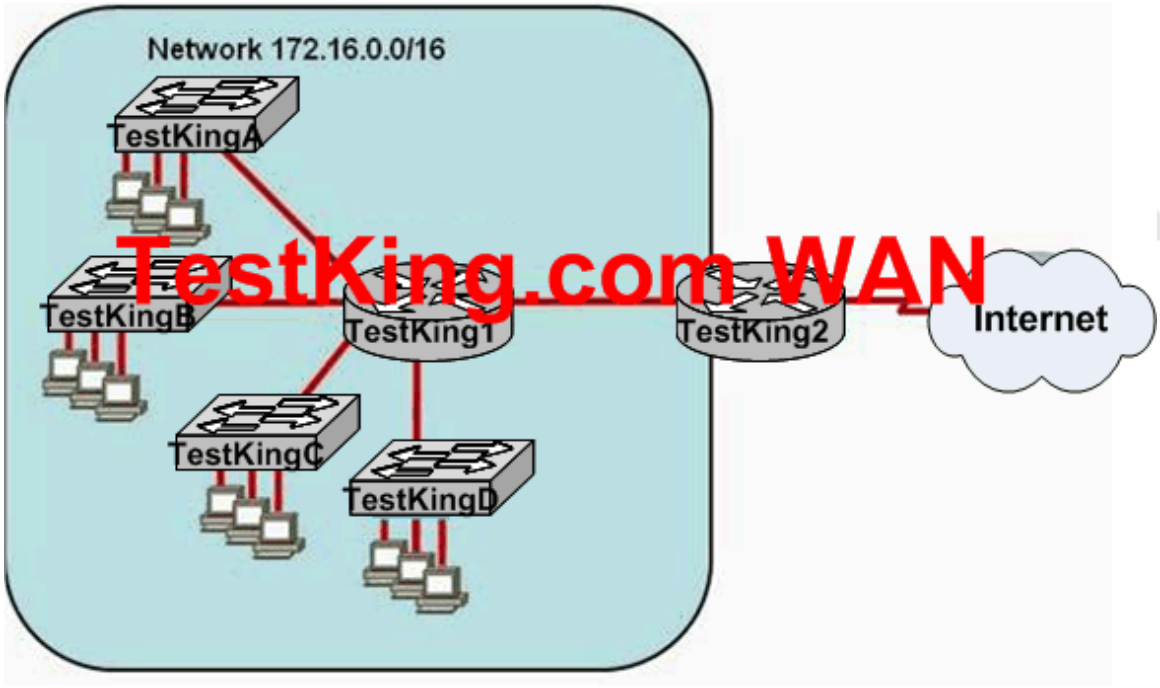
A. show memory
B. show flash
C. show version
D. show startup-config
E. show config-register
F. None of the above

Answer: C
Explanation:
The "show version" command displays info about the router and IOS running in RAM as shown below:



Section 11: Compare and contrast methods of routing and routing protocols (32 questions)

QUESTION NO: 1
A portion of the TestKing network is shown in the following exhibit:

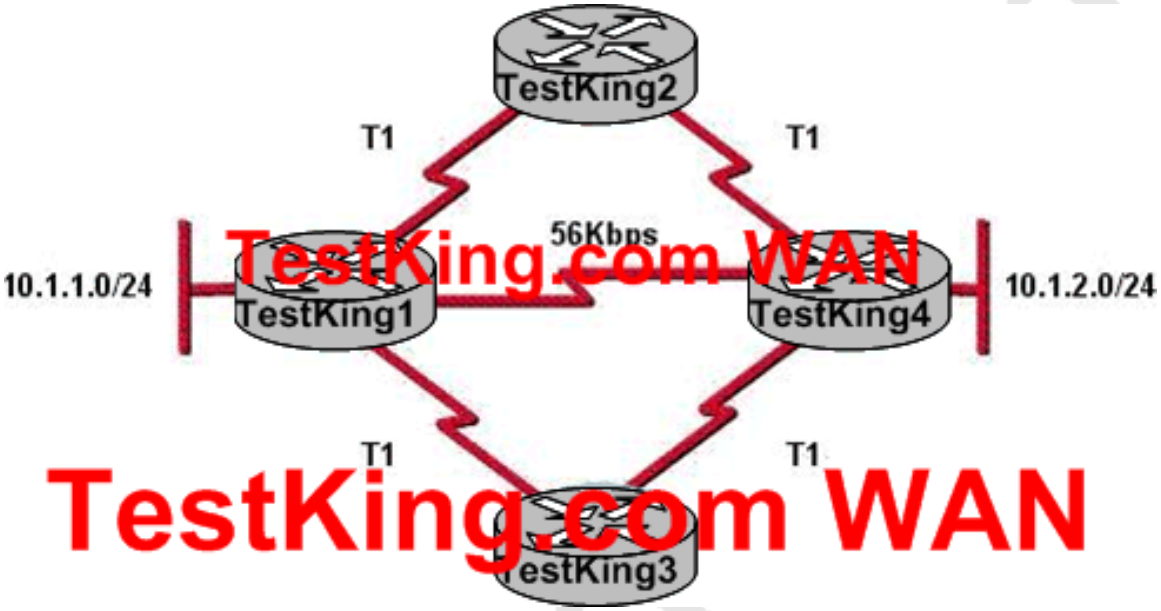


You work as a network technician at TestKing.com. Study the exhibit carefully. The TestKing network administrator requires easy configuration options and minimal routing protocol traffic. What two options provide adequate routing table information for traffic that passes between the two routers and satisfy the requests of the network administrator? (Choose two)

A. A dynamic routing protocol on TestKing1 to advertise summarized routes to TestKing2
B. A dynamic routing protocol TestKing2 to advertise summarized routes a TestKing1
C. A static route on TestKing2 to direct traffic that is destined for 172.16.0.0/16 to TestKing1
D. A dynamic routing protocol on TestKing2 to advertise all routes a TestKing1
E. A dynamic routing protocol on TestKing1 to advertise all routes to TestKing2
F. A static, default route on TestKing1 that directs traffic to TestKing2

Answer: C, F

QUESTION NO: 2
Four different TestKing routers are connected together as shown below:



Based on the information shown above, how will router TestKing1 choose a path to the 10.1.2.0/24 network when different routing protocols are configured? (Choose three)

A. If RIPv2 is the routing protocol, the equal coast paths TestKing1-TestKing2-TestKing4 and TestKing1-TestKing3-TestKing4 will be installed in the routing table by default
B. If EIGRP is the routing protocol, only the path TestKing1-TestKing4 will be installed in the routing table by default
C. If RIPv2 is the routing protocol, only the path TestKing1-TestKing4 will be installed in the routing table by default
D. If EIGRP and OSPF are both running on the network, the EIGRP paths will be installed in the routing table
E. If EIGRP and OSPF are both running on the network, the OSPF paths will be installed in the routing table

F. If EIGRP is the routing protocol, the equal cost paths TestKing1-TestKing2-TestKing4 and TestKing1-TestKing3-TestKing4will be installed in the routing table by default

Answer: C, D, F
Explanation:
Path selection criteria for RIP and RIPv2 is hop count so path TK1-TK4 will be used because of 1 hop count. Choice C is correct.
EIGRP has lower administrative distance of 90 than OSPF 110 so EIGRP will be preferred. Choice D is correct.
EIGRP uses bandwidth for the path selection criteria and load balances by default for equal cost paths, making choice F correct.

QUESTION NO: 3
When designing OSPF networks; what is the purpose of using a hierarchical design? (Select all choices that apply)

A. To reduce the complexity of router configuration
B. To speed up convergence
C. To confine network instability to single areas of the network
D. To reduce routing overhead
E. To lower costs by replacing routers
F. To decrease latency

Answer: B, C, D
Explanation:
An OSPF network designed in a hierarchical fashion with different areas is used because a small change in the topology of a single area won't force every router to run the SPF algorithm. Changes in one area are limited to that area only, not to every router within the entire network. Confining the topology changes to one area reduces the overhead and speeds the convergence of the network.
Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 194
Incorrect Answers:
A. This choice is incorrect because a hierarchical design actually adds complexity to the router configuration.

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E. This is incorrect because a hierarchical design will not eliminate the need for routers. In fact, segmenting the network into multiple areas may actually require the use of additional routers.
F. The use of a hierarchical design will in no way reduce the latency involved. If additional routers are implemented in order to segment the network into additional areas, then the latency involved may actually increase.

QUESTION NO: 4
You are a network administrator and you need to implement a routing protocol on your network that provides:

* Scalability
* VLSM support
* Minimal overhead
* Support for connecting networks using routers of multiple vendors

Which of the following routing protocol would best serve your needs?

A. VTP
B. RIP version 1
C. EIGRP
D. OSPF
E. IGRP
F. CDP

Answer: D
Explanation:
Since one of the requirements is that the routing protocol must support other vendors, our only choices are RIP and OSPF. Since RIP version 1 does not support VLSM, OSPF is the only choice.
Incorrect Answers:
A. VTP is the VLAN Trunking Protocol. This is not a routing protocol.
B. RIP version one does not support VLSM. Note that RIPv2 does support VLSM, and would be a valid choice.
C, E: EIGRP and IGRP are Cisco proprietary routing protocols, and are not supported by other vendors.
F. CDP is the Cisco Discovery Protocol, which is used to exchange information between Cisco devices. It can only be used between Cisco routers and switches, and it is not a routing protocol.

QUESTION NO: 5
You need to configure a single router into load balancing traffic across 4 unequal cost paths. Which routing protocols can satisfy this requirement? (Select two)

A. RIP v1
B. RIP v2
C. IGRP
D. EIGRP
E. OSPF
F. IS-IS

Answer: C, D
Explanation:
In general, load balancing is the capability of a router to distribute traffic over all its network ports that are the same distance from the destination address. Load balancing increases the utilization of network segments, thus increasing effective network bandwidth. There are two types of load balancing: equal cost path and unequal cost path. Every routing protocol supports equal cost path load balancing. In addition to that, IGRP and EIGRP also support unequal cost path load balancing, which is known as variance. The variance command instructs the router to include routes with a metric less than n times the minimum metric route for that destination, where n is the number specified by the variance command. The variable n can take a value between 1 and 128, with the default being 1, which means equal cost load balancing (variance<n> for example. Traffic is also distributed proportionally among unequal cost links, with respect to the metric.

QUESTION NO: 6
You need to choose a routing protocol for a new TestKing network. This network will be running IP, IPX, and AppleTalk, and you wish to utilize only one routing protocol. Which one would be the best choice?

A. OSPF
B. EIGRP
C. RIP v2
D. IGRP
E. RIP v1

Answer: B
Explanation:
Only EIGRP provides routing protocol support for IP, IPX, and AppleTalk networks.

QUESTION NO: 7
Which of the routing protocols shown below support both VLSM and route summarization? (Select three)

A. IGRP
B. EIGRP
C. RIP v1
D. RIP v2
E. OSPF
F. VTP
G. CDP

Answer: B, D, E
Explanation:
EIGRP and OSPF support Variable Length Subnet Masks (VLSM) and provide for both automatic and manual route summarization configurations. RIPv2 is an enhanced version of RIP, and overcame some of the limitations of RIP by introducing support for VLSM.
Incorrect Answers:
A, C: IGRP and RIP are relatively old and simplistic routing protocols that were developed before the concepts of VLSM and route summarization.
F. VTP is the VLAN Trunking Protocol, used in switched LAN environments to carry VLAN information. It is not a routing protocol.
G. CDP is the Cisco Discovery Protocol, used between neighboring Cisco devices to automatically discover information. It is not a routing protocol.

QUESTION NO: 8
Which of the following routing protocols support the use of VLSM (Variable Length Subnet Masking)? (Select three)

A. RIPv1
B. EIGRP
C. OSPF
D. IGRP

E. RIPv2

Answer: B, C, E
Explanation:
Static routing, OSPF, IS-IS, EIGRP, BGP, and RIP version 2 all support VLSM.
Incorrect Answers:
A, D: RIPv1 and IGRP do not support VLSM.
Reference: Sybex CCNA Study Guide edition 4, Page 123

QUESTION NO: 9
Which of the following routing protocols do NOT support VLSM (variable length subnet masking)? (Choose all that apply).

A. RIPv1
B. IGRP
C. EIGRP
D. OSPF
E. IS-IS
F. RIPv2

Answer: A, B
Explanation:
RIP version 1 and IGRP are classful IP routing protocols. They do not support variable length subnet masks.
Incorrect Answers:
C, D, E, F. Static routing, OSPF, IS-IS, EIGRP, BGP, and RIP version 2 all support VLSM.

QUESTION NO: 10
You need to implement the use of a routing protocol that meets the following requirements:

1. **Converges quickly**
2. **Supports VLSM, CIDR, IP, and IPX.**
3. **Uses minimal bandwidth for routing updates.**

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Which one of the following routing protocols would be the best choice?

A. RIPv1
B. RIPv2
C. IGRP
D. OSPF
E. EIGRP

Answer: E
Explanation:
EIGRP would be the best choice as it provides support for VLSM and CIDR, has faster convergence times than other protocols, is scalable, and supports IP, IPX, and AppleTalk. EIGRP is a Cisco proprietary routing protocol, so it will not work with other vendors. However, the requirements of the question made no mention of the use of non-Cisco routers, so it will not be an issue in this case.
Incorrect Answers:
A, C: Both of these routing protocols do not support VLSM.
B. While RIPv2 supports VLSM, it provides no support for IPX. The IPX RIP protocol is similar in function to RIP version 1. Both versions of RIP also consume more bandwidth than EIGRP.
D. OSPF does not support IPX.

QUESTION NO: 11
See the TestKing WAN diagram below:

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TestKing has four offices, each with its own network, as shown in the graphic. Three of the networks have approximately 50 hosts each, and one network has 10 hosts. The multi-vendor routers are connected by serial links that use separate subnetwork numbers. The TestKing network has leased one Class C address to be used for all networks and serial links, and they do not wish to replace any of their existing routers.
Which routing protocol would be most appropriate for this scenario?

A. TCP/IP
B. RIP version 1
C. RIP version 2
D. IGRP
E. EIGRP
F. All of the above are acceptable

Answer: C
Explanation:

The question describes 2 important requirements. The first is the fact that a routing protocol that supports VLSM is needed, as specified by the fact that one class C address range is to be used for all networks. The second important requirement is that routers from multiple vendors are being used, so the routing protocol chosen must be non-proprietary. RIP version 2 is a standards based routing protocol that supports variable length subnet masking (VLSM). Note that OSPF would also be a viable choice, but it was not one of the answer choices.

Incorrect Answers:

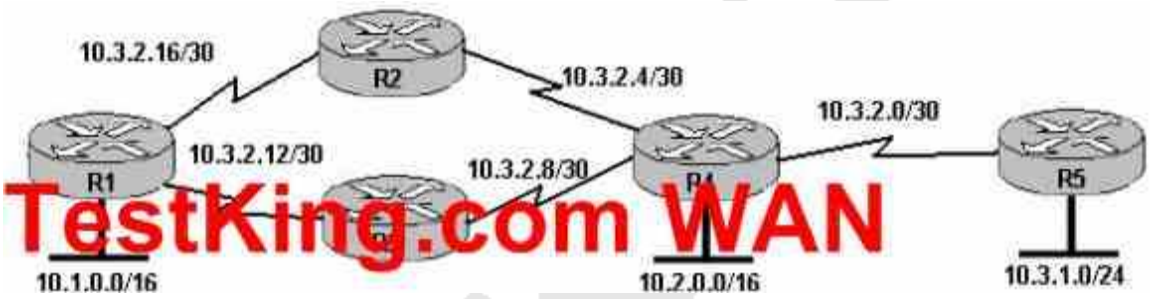
A. This is not a routing protocol.

B. RIP version 1 does not support VLSM

D, E: Although these both support VLSM, IGRP and EIGRP are Cisco proprietary routing protocols which are not supported by other router vendors.

QUESTION NO: 12

The TestKing WAN is displayed in the diagram below:



Based on the information shown above, which routing protocols can be used within the TestKing network show in the diagram? (Choose three).

A. RIP v1
B. RIP v2
C. IGRP
D. OSPF
E. BGP
F. EIGRP

Answer: B, D, F

Explanation: the exhibit showed routers withVariable Length Subnet Mask (VLSM), and asked which 3 protocols can be used. 3 protocols that support VLSM are RIP v2, OSPF and EIGRP.
Incorrect Answers:
A, C: Both of these routing protocols do not support VLSM information.
E. BGP is used for external routing between different autonomous systems, and is not generally used within a single AS.

QUESTION NO: 13
The TestKing Network consists of the following 5 IP networks:

```
NETWORK 1: 192.168.10.0/26
NETWORK 2: 192.168.10.64/27
NETWORK 3: 192.168.10.96/27
NETWORK 4: 192.168.10.128/30
NETWORK 5: 192.168.10.132/30
```

Which of the following routing protocols will support this IP addressing scheme? (Choose all that apply).

A. RIP version 1
B. RIP version 2
C. IGRP
D. EIGRP
E. OSPF
F. BGP

Answer: B, D, E
Explanation:
Because this network is using IP subnets with variable length subnet masks, only routing protocols that support VLSM will fit this particular case. The routing protocols that support VLSM are RIP v2, EIGRP and OSPF.
Incorrect Answers:
A, C: RIP version 1 and IGRP do not support VLSM information within the routing updates.
F. BGP is used for inter-AS routing, such as the Internet. It is not normally used as an Interior routing protocol.

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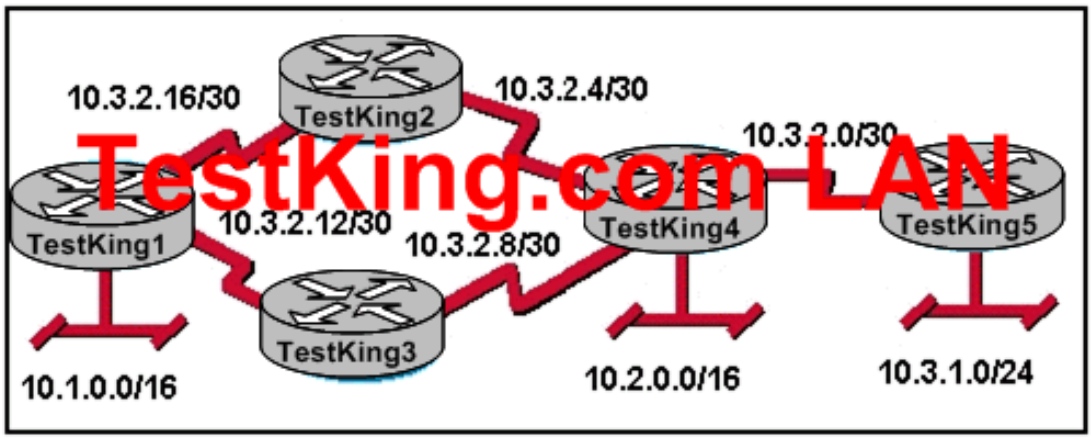
QUESTION NO: 14
The TestKing network is shown in the following exhibit:



Which routing protocols can be used within the TestKing network shown in the diagram? (Choose three.)

A. RIP v1
B. RIP v2
C. IGRP
D. OSPF
E. BGP
F. EIGRP

Answer: B, D, F
Explanation:
In this network there are IP subnets which use variable length subnet masks. RIP V2, OSPF and EIGRP are the interior routing protocols that support VLSM.

QUESTION NO: 15
TestKing.com is merging with several local businesses that use routers from multiple vendors. Which routing protocol would work best to connect TestKing.com with the enterprise networks it has acquired by providing scalability and VLSM support while minimizing network overhead?

A. IGRP
B. EIGRP
C. OSPF
D. RIP v2
E. RIP v1

Answer: D
Explanation:
RIP (both version 1 and version 2) is standards based, providing inter-operability support between vendors. RIPv2 is an enhancement to the first version and contains the following enhancements:
1. Support for variable length subnet masks (VLSM) (Because of this, RIP doesn't assume that all networks are classful.)
2. Multicast routing updates
3. Authentication with an encrypted password for routing updates

Incorrect Answers:
A, B: IGRP and EIGRP are Cisco proprietary routing protocols that are not supported by other vendors.
C: OSPF is a CPU-intensive protocol, and very large OSPF networks can experience routing and update traffic problems that seriously impact network performance. In addition, routers in large OSPF networks require large amounts of memory.
E: RIPv1 does not support VLSM.

QUESTION NO: 16
The Testking WAN is displayed in the diagram below:

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Which dynamic routing protocol should be recommended for the Testking network shown in the graphic above? (Choose three)

A. OSPF
B. RIP version 1
C. RIP version 2
D. IGRP
E. EIGRP

Answer: A, C, E
Explanation:
In this network, the 192.168.23.0/24 network is subnetted into two other networks. Because this class C network is being subnetted, a routing protocol that supports variable length subnet mask information is required. OSPF, EIGRP, and RIP version 2 all support VLSM information to be shared across the network.
Incorrect Answers:
B, D. RIP version 1 and IGRP do not support VLSM, which will be required in order for this network to have the two LANs both be reachable.

QUESTION NO: 17
Router TK1 learns about a remote network from EIGRP, OSPF, and a static route. Assuming all routing protocols are using their default administrative distance, which route will TK1 use to forward data to the remote network?

A. The router will use the static route.
B. The router will use the OSPF route.
C. The route will use the EIGRP route.
D. The router will load balance and use all three routes.
E. None of the above

Answer: A
Explanation:
When a router learns about the same network via multiple sources, the router will choose the source with the lowest administrative distance (AD). By default, the AD for these routing protocols are:

Connected Interface has 0 AD
Static Route : 1
EIGRP : 90
OSPF : 110

So, the static route will be chosen since it has the lowest AD.

QUESTION NO: 18
A TestKing router learns two routes to a remote network, one route via OSPF and one route via RIPv2. The network administrator wants the router to install the route learned via RIPv2 into its routing table. What should the network administrator configure to ensure that the router will use the route learned via RIPv2?

A. Nothing. The router will automatically use routes learned via RIP over routes learned via OSPF.
B. The network administrator should configure the routers along the OSPF path with lower priority numbers.
C. The network administrator should configure the router interface on the OSPF path to be a passive interface.
D. The network administrator should configure an administrative distance for RIP that is lower than the administrative distance of OSPF.
E. If two paths exist to a remote network, the only way to force the router to prefer one path over the other is to configure the preferred path as a static route.

Answer: D

Explanation:
When multiple routing protocols are configured for the same networks, the router will use the path with the lowest Administrative Distance (AD). By default, OSPF has and AD of 110 and RIP has an AD of 120. In order to ensure that the router prefers the route learned via RIP over OSPF, the AD of the RIP route must be reduced to a value less than 120.

QUESTION NO: 19
Routers TestKing1 and TestKing 2 are connected as shown below:

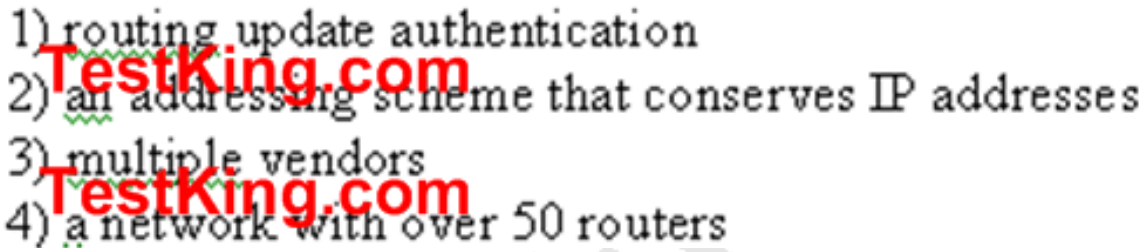
The TestKing network associate has configured the internetwork that is shown above, but has failed to configure routing properly. Which configuration combinations will allow the hosts on the TestKing2 LAN to access resources on the TestKing1 LAN with the least impact on router processing and WAN bandwidth?

A. TestKing1(config)# router ospf 1
TestKing1(config-router)# network 192.168.2.4 0.0.0.3 area 0
TestKing1(config-router)# network 172.16.25.0 0.0.0.255 area 0
TestKing2(config)# router ospf 1
TestKing2 (config-router)# network 192.168.1.0 0.0.0.255 area 0
TestKing2 (config-router)# network 192.168.2.4 0.0.0.3 area 0
B. TestKing1(config)# router rip
TestKing1(config-router)# network 192.168.2.0
TestKing1(config-router)# network 172.16.0.0
TestKing2(config)# router rip
TestKing2 (config-router)# network 192.168.1.0
TestKing2 (config-router)# network 192.168.2.0
C. TestKing1(config)# ip route 192.168.1.0 255.255.255.0 192.168.2.5
TestKing2(config)# ip route 172.16.25.0 255.255.255.0 192.168.2.6

D. TestKing1(config)# router eigrp 56
TestKing1(config-router)# network 192.168.2.4
TestKing1(config-router)# network 172.16.25.0
TestKing2(config)# router eigrp 56
TestKing2 (config-router)# network 192.168.1.0
TestKing2 (config-router)# network 192.168.2.4

Answer: C

QUESTION NO: 20
You need to choose a routing protocol for use in the TestKing network that meets the following requirements:



Which routing protocol fulfills these requirements?

A. OSPF
B. RIPv2
C. RIPv1
D. EIGRP
E. None of the above

Answer: A

QUESTION NO: 21

You have been tasked with choosing a routing protocol that would best fit the needs of the TestKing network. Which routing protocol uses bandwidth and delay as metrics, by default?

A. EIGRP
B. OSPF
C. BGP
D. RIPv1
E. RIPv2
F. None of the above

Answer: A

QUESTION NO: 22
Non-contiguous networks can pose a problem for network reachability in certain circumstances. Which of the following routing protocols have means of minimizing the risk? (Select three choices)

A. RIP v1
B. RIP v2
C. EIGRP
D. IGRP
E. OSPF
F. VLSM

Answer: B, C, E
Explanation:
OSPF, RIP version 2, and EIGRP all provide support for discontiguous networks. This is provided by the fact that subnet mask information is advertised along with the routes, and these protocols all support Variable Length Subnet Masks (VLSM).
Incorrect Answers:
A. Whenever RIP version 1 advertises a network across a different major net boundary, RIP summarizes the advertised network at the major net boundary. RIP version 2 is an updated version of RIP, and one of the main features that it was able to provide over RIPv1 is support for VLSM information.
D. IGRP does not support VLSM. Like RIP version 2, EIGRP is the updated version of IGRP, which provides support for VLSM.

F. VLSM is the feature that is required to support non-contiguous networks, but VLSM is not itself a routing protocol.

QUESTION NO: 23
Which of the following technologies can be used in distance vector routing protocols to prevent routing loops? (Select two)

A. Spanning Tree Protocol
B. Shortest path first tree
C. Link-state advertisements (LSA)
D. Hold-down timers
E. Split horizon
F. VRP

Answer: D, E
Explanation:
In order to prevent information from looping throughout a network, distance vector protocols, such as RIP version 2, use the following mechanisms:
* **Splithorizon -** the routing protocol advertises routes out an interface only if they were not learned from updates entering that interface.
* Hold-down timer - After finding out that a router to a subnet has failed, a router waits a certain period of time before believing any other routing information about that subnet.
In addition to these, a finite number of hops are also used. This ensures that packets do not loop through a network indefinitely.
Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 154.

QUESTION NO: 24
Which of the following routing protocols are less likely prone to problems in non contiguous networks? (Select all valid responses)

A. IGRP
B. ICMP
C. OSPF
D. RIP v1
E. RIP v2
F. EIGRP

Answer: C, E, F
Explanation:
OSPF, RIP v2, and EIGRP all support VLSM information, which will eliminate the problems that can arise from non contiguous networks.
Incorrect Answers:
A, D. IGRP and RIP version 1 are distance vector routing protocols that do not support VLSM information, so they are prone to problems that can arise from discontiguous network schemes.
B. ICMP (Internet Control Message Protocol) is not a routing protocol. It is used primarily for the management and monitoring of networks.

QUESTION NO: 25
Which of the following statements describe the characteristic of link state routing protocols? (Choose all that apply.)

A. The exchange of an advertisement is triggered by a change in the network.
B. All routers exchange routing tables with each other in a multipoint network.
C. Packets are routed based upon the shortest path to the destination.
D. Paths are chosen depending on the cost efficiency factor.
E. Every router in an OSPF area is capable of representing the entire network topology.
F. Only the designated router in an OSPF area can represent the entire network topology.

Answer: A, C, E
Explanation:
The predominant link state routing protocols are OSPF and IS-IS. The following describes the features and functionality of OSPF:
Open Shortest Path First
* Each router discovers its neighbors on each interface. The list of neighbors is kept in a neighbor table.
* Each router uses a reliable protocol to exchange topology information with its neighbors.
* Each router places the learned topology information into its topology database.
* Each router runs the SPF algorithm against its own topology database.
* Each router runs the SPF algorithm against its own topology database to calculate the best routes to each subnet in the database.
* Each router places the best roué to each subnet into the IP routing table.

The following list points out some of the key features of OSPF:
* Converges very quickly - from the point of recognizing a failure, it often can converge in less than 10 seconds.
* Supports VLSM.
* Uses short Hello messages on a short regular interval, with the absence of hello messages indicating that a neighbor is no longer reachable.
* Sends partial updates when link status changes and floods full updates every 30 minutes. The flooding, however, does not happened all at once, so the overhead s minimal.
* Uses cost for the metric.

Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 417

QUESTION NO: 26
What are the different characteristics of distance vector and link state routing protocols?

A. Distance vector protocols send the entire routing table to directly connected neighbors.
B. Distance vector protocols are responsible for sending updates to all networks listed in the routing table.
C. Link state protocols are responsible for sending the entire routing table to the whole network.
D. Link state protocols send updates regarding their own links status to all other routers on the network.
E. None of the above

Answer: A, D
Explanation:
Distance Vector Protocols:
Distance Vector Protocols advertise routing information by sending messages, called routing updates, out the interfaces on a router. These updates contain a series of entries, with each entry representing a subnet and a metric.
Link-State Protocols:
Sends partial updates when link status changes and floods full updates every 30 minutes. The flooding, however, does not happen all at once, so the overhead is minimal.
Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 413 + 419

QUESTION NO: 27
Which one of the following statements best explains the split horizon rule used in distance vector routing protocols?

A. Only routers can split boundaries (horizons) between concentric networks.
B. Each AS must keep routing tables converged to prevent dead routes from being advertised across boundaries.
C. Networks can only remain fully converged if all information is sent out all active interfaces.
D. Information about a route should not be sent back in the direction from which the original update came.
E. Distance vector protocols need fall back routers that are responsible for momentary loops.

Answer: D
Explanation:
Simply said, the rule of split horizons says that routing information should not be sent out the same interface that it was learned on. This is used to prevent routing loops in the network, but it can also cause problems on NBMA networks, such as a hub and spoke frame relay network. Split horizons include two related concepts that affect what routes are included in a routing update:
An update does not include the subnet of the interface out which the update is sent
All routes with outgoing interface of interface x are not included in updates sent out that same interface x.
Incorrect Answers
A. There is no such requirement
C. This is not a feature of split horizon
B. This is not a related feature for split horizon
E. Distance vector protocols updates routing table at regular intervals instead of Topology changes
Reference: Wendell Odom. CISCO CCNA Certification Guide (2000 Cisco Press) Page 369.

QUESTION NO: 28
Which of the following statements are correct in regard to classless routing protocols? (Select two)

A. Discontiguous subnets are not allowed.
B. Variable length subnet masks are allowed.
C. RIP v1 is a classless routing protocol.
D. IGRP supports classless routing within the same autonomous system.
E. RIP v2 supports classless routing.

Answer: B, E
Explanation:
Classless and Classful Routing Protocols
Some routing protocols must consider the Class A, B, or C network number that a subnet resides in when performing some of its tasks. Other routing protocols can ignore Class A, B, and C rules altogether. Routing protocols that must consider class rules are called classful routing protocols; those that do not need to consider class rules are called classless routing protocols.

You can easily remember which routing protocols fall into each category because of one fact:

Classful routing protocols do not transmit the mask information along with the subnet number, whereas classless routing protocols do transmit mask information.

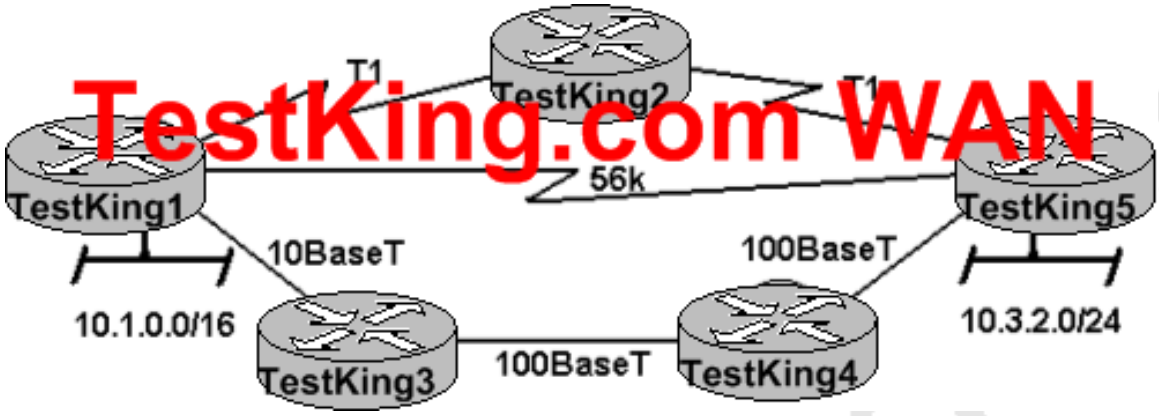
You might recall that routing protocols that support VLSM do so because they send mask information along with the routing information. Table 7-3 lists the routing protocols and whether they transmit mast information, support VLSM, and are classless or classful.

Table 7-3 Interior IP Routing Protocol: Classless or Classful?

Routing Protocol	Classless	Sends Mask/Prefix in Routing Updates	VLSM Support	Route Summarization Support
RIP-1	No	Yes	No	No
IGRP	No	No	No	No
RIP-2	Yes	Yes	Yes	Yes
EIRGP	Yes	Yes	Yes	Yes
OSPF	Yes	Yes	Yes	Yes

Reference: CCNA ICND Exam Certification Guide by Wendell Odem, Pg.233

QUESTION NO: 29
The TestKing WAN is displayed below:



Assume that the routing Protocol referenced in each choice below is configuration with its default settings and the given routing protocol is running on all the routers. Which two conditional statements accurately state the path that will be chosen between network 10.1.0.0 and 10.3.2.0 for the routing protocol mentioned? (Choose Two)

A. If RIPv2 is the routing protocol; the path will be from TESTKING1 toTESTKING3 to TESTKING4 to TESTKING5.
B. If RIPv2 is the routing protocol; the path will be from TESTKING1 to TESTKING5.
C. If EIGRP is the routing protocol; the path will be from TESTKING1 toTESTKING3 to TESTKING4 to TESTKING5.
D. If EIGRP is the routing protocol, the path will be from TESTKING1 toTESTKING2 to TESTKING5.
E. If OSPF is the routing protocol; the path will be from TESTKING1 to TESTKING5.

Answer: B, C
Explanation:
RIP, IGRP both are called the distance vector Protocols. RIP uses the number of hops as a metric.
RIP:
_ Based on distance vector Logic
_ Uses hop count for the metric
_ Sends periodic full routing updates every 30 seconds
_ Converges slowly, often taking 3 to 5 minutes

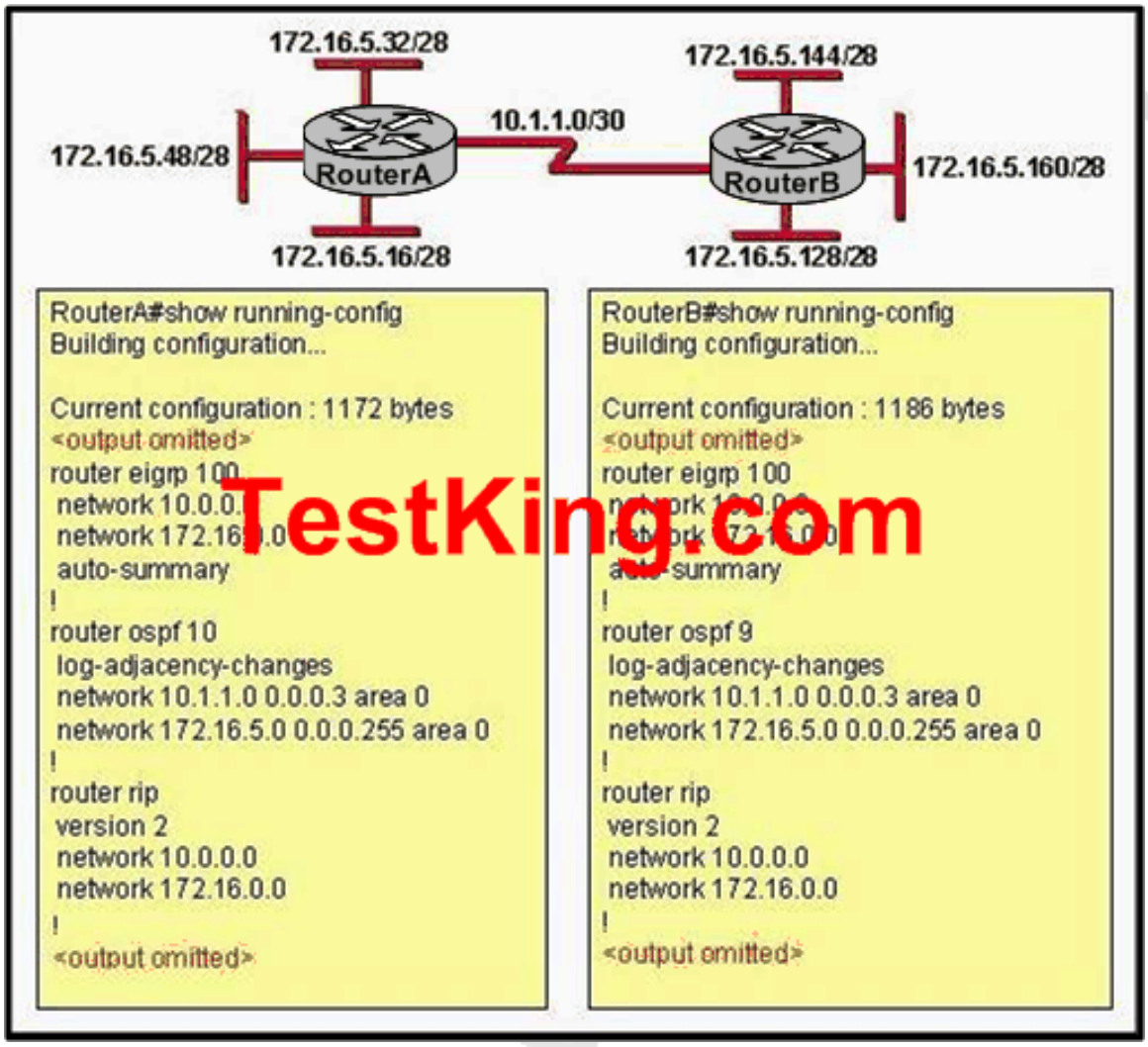
_ Does not support VLSM, also making it a classful routing protocol (RIP V)
IGRP
IGRP calculates the metric based on a mathematical formula that you do not really need to know for the exam. The formula uses bandwidth and delay as input and results in an integer value, the metric, between 1 and 4,294,967,295.
When RIP is used as the Routing Protocol, it selects TK1-TK5 because it has less hops. When IGRP uses as Routing Protocol, it select TK1-TK3-TK4-TK5 because having more bandwidth. IGRP uses bandwidth to calculate the path.

QUESTION NO: 30
A large corporation that frequently integrates networks from newly acquired businesses has just decided to use OSPF as the corporate routing protocol instead of EIGRP. What two benefits will the change from EIGRP to OSPF provide to the corporation? (Choose two)

A. The ability to automatically summarize networks
B. The ability to redistribute default and static routes
C. The ability to use VLSM
D. The ability to support multi-vendor routers
E. The ability to create a hierarchical design using areas

Answer: D, E
Explanation:
Open Shortest Path First (OSPF) is a routing protocol developed for Internet Protocol (IP) networks by the Interior Gateway Protocol (IGP) working group of the Internet Engineering Task Force (IETF). Unlike, EIGRP, OSPF is standards based which is supported by multiple router vendors.
Unlike RIP and EIGRP, OSPF can operate within a hierarchy. The largest entity within the hierarchy is the autonomous system (AS), which is a collection of networks under a common administration that share a common routing strategy. OSPF is an intra-AS (interior gateway) routing protocol, although it is capable of receiving routes from and sending routes to other AS's.
An AS can be divided into a number of areas, which are groups of contiguous networks and attached hosts. Routers with multiple interfaces can participate in multiple areas. These routers, which are called Area Border Routers, maintain separate topological databases for each area.

QUESTION NO: 31
Please study the exhibit shown below carefully:



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Given the partial output from the show running-config command displayed on both TestKing routers, which routing protocol would be used to route packets to the 172.16.5.48/28 network from RouterB?

A. OSPF
B. RIP

C. EIGRP
D. No route will be installed to 172.16.5.48/28.
E. Unable to determine based on the information provided

Answer: A
Explanation:
Normally, routers will choose EIGRP routes over OSPF and RIP routes because EIGRP has a lower administrative distance than the other two. However, in this case, auto summarization has been turned on, so the routers will automatically summarize at the network boundary. This will result in each router sending out only the summarized, 172.16.0.0/16 route.
However, OSPF does not summarize by default so RouterB will receive the specific 172.16.5.48/28 announcement from RouterA via OSPF. Because routers always choose the most specific route to the destination, regardless of the administrative distance, RouterB will use this OSPF route.

QUESTION NO: 32
Which characteristics are representative of link-state routing protocols? (Choose three)

A. Provides common view of entire topology
B. Utilizes event-triggered updates
C. Exchanges routing tables with neighbors
D. Calculates shortest path
E. Utilizes frequent periodic updates

Answer: A, B, D
Explanation:
Link-state algorithms (also known as shortest path first algorithms) flood routing information to all nodes in the internetwork. Each router, however, sends only the portion of the routing table that describes the state of its own links. In link-state algorithms, each router builds a picture of the entire network in its routing tables. Distance vector algorithms (also known as Bellman-Ford algorithms) call for each router to send all or some portion of its routing table, but only to its neighbors. In essence, link-state algorithms send small updates everywhere, while distance vector algorithms send larger updates only to neighboring routers. Distance vector algorithms know only about their neighbors.

The primary advantage of link-state routing is that it reacts more quickly, and in a bounded amount of time, to connectivity changes. Also, the link-state packets that are sent over the network are smaller than the packets used in distance-vector routing. Distance-vector routing requires a node's entire routing table to be transmitted, while in link-state routing only information about the node's immediate neighbors are transmitted. Therefore, these packets are small enough that they do not use network resources to any significant degree. The primary disadvantage of link-state routing is that it requires more storage and more computing to run than distance-vector routing.

Incorrect Answers:

C, E: These are characteristics of distance vector routing protocols.

Section 12: Configure, verify, and troubleshoot OSPF (35 questions)

QUESTION NO: 1

Exhibit:

You work as a network technician at TestKing.com. Study the exhibit carefully. A network associate has configured OSPF with the command:

TestKing2(Config-router)#network 192.168.12.64 0.0.0.63 area 0

After completing the configuration, the associate discovers that not all interfaces are participating in OSPF. Which three of the interfaces shown in the exhibit will participate in OSPF according to this configuration statement? (Choose three.)

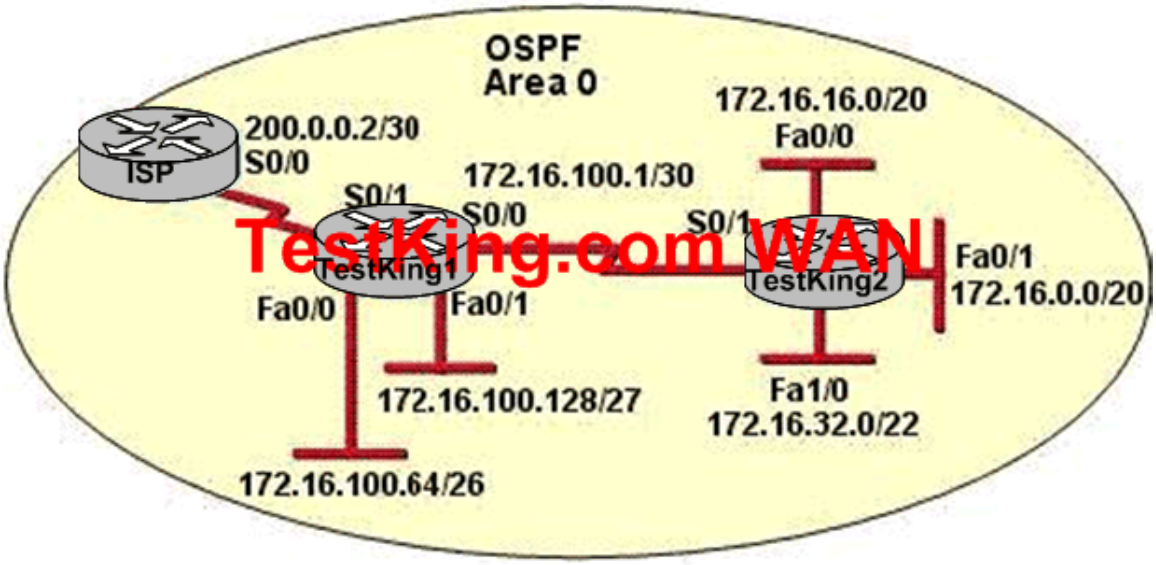
A. Serial0/1.103
B. FastEthernet 0/1
C. Serail0/1.102
D. Serial0/0
E. FastEthernet 0/0

Answer: B, C, D
Explanation:
OSPF uses the concept of wildcard masks much like access list filters. OSPF network matches are done using the network number and wildcard bits. The network number is the network portion of the IP address, with the host bits all set to zero. The wildcard bits determine which portion of the address the access list will act on. Only bits set to zero are acted upon (bits set to one are ignored.) This is the exact opposite of a netmask. Remember that this number is in bits, and you will always have all zeros to the left of the first one, and all ones to the right of the last zero. The table below shows some examples of netmasks and wildcard bits.

Type of network	Netmask	Wildcard Bits
Class A	255.0.0.0	0.255.255.255
Class B	255.255.0.0	0.0.255.255
Class C	255.255.255.0	0.0.0.255
Class C 2-bit subnet	255.255.255.192	0.0.0.63
Class B 4-bit subnet	255.255.240.0	0.0.31.255

In this example, the 192.168.12.64 0.0.0.63 will comprise of all interfaces with an IP address in the 192.168.12.64-127 range.

QUESTION NO: 2
Part of the TestKing OSPF network is shown below:



Configuration exhibit:

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You work as a network technician at TestKing.com. Study the exhibits carefully. Assume that all router interfaces are operational and correctly configured. In addition, assume that OSPF has been correctly configured on Router TestKing2. How will the default route configured on TestKing1 affect the operation of TestKing2?

A. Any Packet destined for a network that is not referenced in the routing table of Router TestKing2 will be directed to TestKing1. TestKing1 will then send that packet back to TestKing2 and a routing loop will occur
B. Any packet destined for a network that is not directly connected to router TestKing1 will be dropped
C. The networks directly connected to router TestKing2 will not be able to communicate with the 172.16.100.0, 172.16.100.128 and 172.16.100.64 subnetworks
D. Any packet destined for a network that is not directly connected to Router TestKing2 will be dropped immediately because of the lack of a gateway on TestKing1
E. Any packet destined for a network that is not directly connected to router TestKing2 will be dropped immediately
F. None of the above

Answer: A

QUESTION NO: 3
TestKing1 is a Backup Designated Router on the TestKing OSPF network. On which types of network will OSPF elect a BDR?

A. Nonbroadcast and broadcast multi-access

B. Point-To-Multipoint and multi-access
C. Point-To-Point and Point-To-multipoint
D. Point-To-Point and multi-access
E. NonBroadcast and Broadcast multipoint
F. None of the above

Answer: A
Explanation:
DR and BDR are elected on broadcast and nonbroadcast multi-access networks.
Reference: Sybex CCNA Study Guide 4th Edition (Page 283)

QUESTION NO: 4
The OSPF interface status of two TestKing devices is shown below:

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You work as a network technician at TestKing and are responsible for the OSPF network. You are troubleshooting the OSPF configuration of routers TestKing1 and TestKing2. The routers can't establish an adjacency relationship on their common Ethernet link. The graphic shows the output of the "show ip ospf interface eth0" command for routers TestKing1 and TestKing2. Based on the information in the graphic, what is the cause of this problem?

A. The priority on TestKing1 should bet set higher
B. A backup designated router needs to be added to the network
C. The cost on TestKing1 should be set higher
D. The OSPF area is not configured properly
E. The hello and dead timers are not configured properly
F. The OSPF process ID numbers must match
G. None of the above

Answer: E
Explanation:
As can be seen above, the hello interval for TK1 has been set to 5 seconds, while it is set to 10 for TK2. Also, the dead interval on TK1 is set at 20 seconds while on router TK2 it is set to 40 seconds. In order for two routers to establish an OSPF neigh adjacency, the hello and dead timers must match.

QUESTION NO: 5
Which of the following OSPF commands, when used together, will put the network 192.168.10.0/24 into OSPF area 0? (Select all valid responses)

A. Router(config-router)# network 192.168.10.0 0.0.0.255 0
B. Router(config-router)# network 192.168.10.0 0.0.0.255 area 0
C. Router(config-router)# network 192.168.10.0 255.255.255.0 area 0
D. Router(config)# router ospf 0
E. Router(config)# router ospf 1

Answer: B, E
Explanation:

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B. The network command specifies the IP address (192.168.10.0) followed by the wildcard mask (not the subnet mask), and the area that is to be associated with the OSPF address range (in this case, area 0). The wildcard mask indicates in binary how much of the IP address much be matched with 0s indicating that the bits must match and 1 indicating that they may vary. Thus 0.0.0.255 or 00000000.00000000.00000000.11111111 indicates that any bit in the last octet can vary while all bits in the first 3 octets must match the network address (in other words, 192.168.10.xx)
E. The router ospf command enables OSPF routing and enters router configuration mode. This command takes a <process-id> argument which identifies the OSPF process.
Incorrect Answers:
A. This command is correct, except for the fact that the keyword "area" is missing and needs to be inserted.
C. For OSPF, the inverse mask must be used, not the regular subnet mask.
D. OSPF can not use process ID 0, and the goal of this question is to put a specific network in area 0, not the entire routing process.

QUESTION NO: 6
Under which circumstance, i.e. network type, would an OSPF router establish a neighbor adjacency, even though the DR/BDR election process was not performed?

A. Point-to-point
B. Broadcast multicast
C. Nonbroadcast multicast
D. Backbone area 0
E. Virtual Link

Answer: A
Explanation: If there's a point to point connection, there's no need for a designated router or a backup designated router election. By definition, only two routers exist on a point to point connection.
Incorrect Answers:
B, C. In these network types, the potential for more than two routers on the segment exist, so the Designated Router and Backup Designated Routers are elected.
D. This is not a network type. Area 0 is the backbone of any OSPF network.
E. Virtual Links are used in OSPF to link an area to area 0. Every area must be directly connected to area 0 at some point, and virtual links are used for areas that do not meet this requirement.

QUESTION NO: 7
On the assumption that every OSPF router in a particular area is configured with the same priority value; which secondary value would be used as a router ID when there is no loopback interface set?

A. The IP address of the first Fast Ethernet interface.
B. The IP address of the console management interface.
C. The highest IP address among its active interfaces.
D. The lowest IP address among its active interfaces.
E. There will be no router ID until a loopback interface is configured.

Answer: C
Explanation: Ordinarily the loopback interface would be selected as the router ID. In the event that no loopback interface is configured, the router ID will be the first active interface that comes up on the router. If that particular interface has more then one IP address, then the highest address will be selected as the Router ID.
Incorrect Answers:
B. Putting an IP address on the management console is a concept that is configured on a Catalyst switch, not a router.

QUESTION NO: 8
On the topic of OSPF routing; which of the following are the traits of an OSPF area? (Select all that apply)

A. Each OSPF area requires a loopback interface to be configured.
B. Areas may be assigned any number from 0 to 65535.
C. Area 0 is called the backbone area.
D. Hierarchical OSPF networks do not require multiple areas.
E. Multiple OSPF areas must connect to area 0.
F. Single area OSPF networks must be configured in area 1.
G. None of the above

Answer: C, E
Explanation:
OPSF uses areas in a hierarchical fashion, and the backbone area is always area 0. All other areas have at least one connection to area 0.

Incorrect Answers:
A. Loopback interfaces are often used in OSPF networks, so that the router ID can be configured. However, this is not a requirement.
B. The area-id can be an integer between 0 and 4294967295.
F. Single area OSPF networks do not have to be configured with the backbone area 0. Although area 1 can indeed be used, it is not required that area 1 is used. Single area OSPF networks can be any integer from 0-4294967295.

QUESTION NO: 9
If the bandwidth of an OSPF interface on a TestKing router is configured with the "bandwidth 64" command, what would be the calculated cost of the link?

A. 1
B. 64
C. 1562
D. 64000
E. 1500
F. None of the above

Answer: C
Explanation: The question states that OSPF interface has been configured with the bandwidth 64command. Cisco IOS always interprets the values for the bandwidth command as being in kbps, so the bandwidth is configured as 64 kbps. The metric for any OSPF defaults to 100,000,000/bandwidth. So, in this example:

100,000,000 / 64000 = 1562.5

Reference: Sybex CCNA Study Guide edition 4, page 284.

QUESTION NO: 10
TestKing is using OSPF as the routing protocol in their network. What are some of the characteristics of this routing protocol? (Select all valid answer choices)

A. It confines network instability to a single area of network.
B. It increases the routing overhead of the network
C. It supports VLSM
D. It routes between Autonomous Systems.

E. It allows extensive control of routing updates
F. None of the above

Answer: A, C, E
Explanation:
The following describes some of the features and functionality of the OSPF protocol:
Open Shortest Path First
* Each router discovers its neighbors on each interface. The list of neighbors is kept in a neighbor table.
* Each router uses a reliable protocol to exchange topology information with its neighbors.
* Each router places the learned topology information into its topology database.
* Each router runs the SPF algorithm against its own topology database.
* Each router runs the SPF algorithm against its own topology database to calculate the best routes to each subnet in the database.
* Each router places the best roué to each subnet into the IP routing table.

The following list points out some of the key features of OSPF:
* Converges very quickly - from the point of recognizing a failure, it often can converge in less than 10 seconds.
* Supports VLSM.
* Uses short Hello messages on a short regular interval, with the absence of hello messages indicating that a neighbor is no longer reachable.
* Sends partial updates when link status changes and floods full updates every 30 minutes. The flooding, however, does not happened all at once, so the overhead s minimal.
* Uses cost for the metric.

Incorrect Answers:
B. This is incorrect because the hierarchical design characteristics of OSPF actually reduce the overhead on larger networks.
D. This is not true as OSPF doesn't route between Autonomous Systems. OSPF is an IGP. Routing between autonomous systems is reserved for EGP protocols such as BGP.

QUESTION NO: 11
Which of the following are true statements regarding the characteristics of OSPF areas? (Select all that apply)

A. All OSPF networks require the use of multiple areas

B. Multiple OSPF areas must connect to area 0
C. Single area OSPF networks must be configured in area 1
D. Areas can be assigned any number from 0 to 63535
E. Area 0 is called the backbone area
F. Each OSPF area need to be configured with a loopback interface

Answer: B, E
Explanation:
OSPF divides its routing domain into areas. Area 0, the backbone, is required. This divides interior routing into two levels. If traffic must travel between two areas, the packets are first routed to the backbone. This may cause non-optimal routes, since interarea routing is not done until the packet reaches the backbone. Once there, it is routed to the destination area, which is then responsible for final delivery. This layering permits addresses to be consolidated by area, reducing the size of the link state databases. All areas must be connected to area 0, either directly or through the use of virtual links.
Incorrect Answers:
A. OSPF network can only consist of a single area.
C. Single area networks can use any area number. If more than one area is configured in the network, then at least one of the areas must be area 0.
D. The area-id can be an integer between 0 and 4294967295.
F. While loopback interfaces are commonly used in OSPF networks, it is not a requirement.

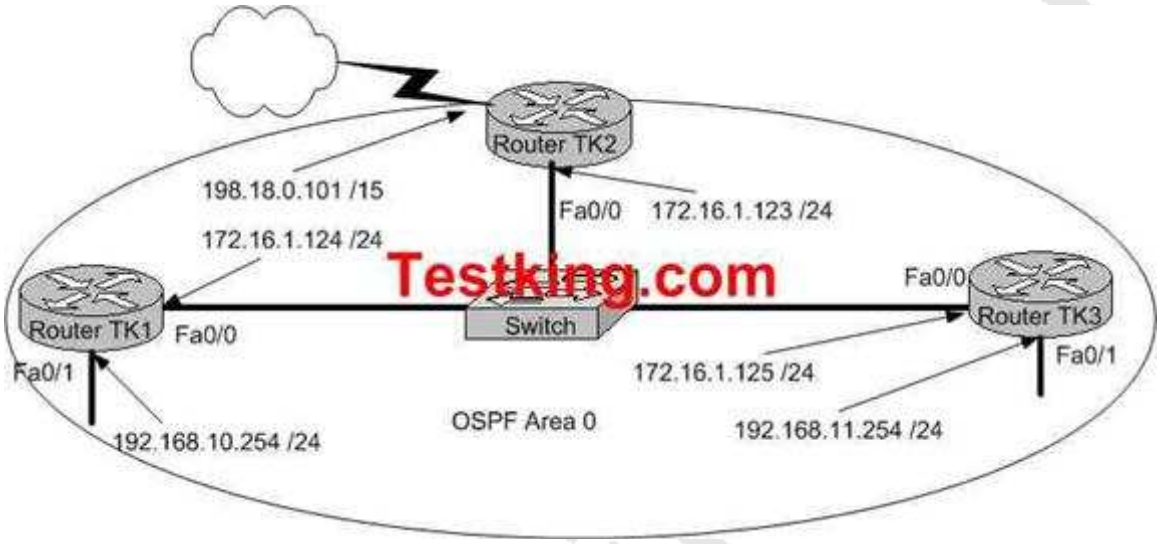
QUESTION NO: 12
On what kinds of networks does the OSPF protocol elect a backup designated router? (Select all that apply)

A. Point-to-point
B. Point to multipoint
C. Broadcast
D. Non-broadcast multi-access
E. None of the above

Answer: C, D
Explanation:
The DR and BDR election process is performed on broadcast and non-broadcast multi-access networks.
Incorrect Answers:

A, B: There is no DR or BDR on point to point and point to multipoint links. On a point to point link, only two routers exist so there is no need for a DR or BDR.

QUESTION NO: 13
Three TestKing routers are configured for OSPF area 0 as shown in the diagram below:



You wish to ensure that router TK2 will be preferred as the designated router (DR) for the 172.16.1.0 /24 LAN segment.
What configuration tasks could be used to establish this preference? (Choose all that apply)

A. Configure the priority value of the Fa0/0 interface of RouterTK2 to a higher value than any other interface on the Ethernet network.
B. Change the router id for Router TK2 by assigning the IP address 172.16.1.130/24 to the Fa0/0 interface of RouterTK2.
C. Configure a loopback interface on RouterTK2 with an IP address higher than any IP address on the other routers.
D. Change the priority value of the Fa0/0 interface of RouterTK2 to zero.
E.

Change the priority values of the Fa0/0 interfaces of RouterTK1 and RouterTK3 to zero.

F. No further configuration is necessary.
G. All of the above will make TK2 the DR

Answer: A, C, E
Explanation:
In order to ensure that a router will become the OSPF DR for any given segment, there are a number of options. One way is to manually configure the interface priority as described in option A above using the "ip ospf priority" interface configuration command. The second method is described in option C. OSPF routers will always use the loopback interface IP address as the router ID, when configured, and the router with the highest IP address will be chosen as the DR when the priorities are the same. The final method is to change the priority of the other routers in the segment to zero. When the OSPF priority is set to 0, the router is ineligible to become the DR or the BDR. Important Note: The OSPF DR/BDR election process is not pre-emptive, so any changes to the network regarding the DR/BDR election process will only occur when the routers are restarted.
Incorrect Answers:
B. This method will not work as the router ID is taken by using the highest IP address of all interfaces in the router, or from the loopback interface if it is configured. Although choosing this option will give router TK2 the highest IP address on the LAN segment, the router ID will be taken from the highest IP address in the router, which as shown will be 192.168.0.101.
D. This will make TK2 ineligible to become either the DR or the BDR.

QUESTION NO: 14
TestKing uses OSPF in their WAN. The OSPF Hello protocol performs which of the following tasks in this network? (Choose two)

A. It maintains neighbor relationships.
B. It broadcasts hello packets throughout the internetwork to discover all routers that are running OSPF.
C. It uses timers to elect the router with the fastest links as the designated router.
D. It negotiates correctness parameters between neighboring interfaces.
E. It detects unreachable neighbors in 90 second intervals.
F. It provides dynamic neighbor discovery.
G. It is only used once when the router boots up

Answer: A, F

QUESTION NO: 15
TK1 and TK2 are OSPF routers on a point-point link. On this point-to-point network, OSPF hello packets are addressed to which address?

A. 192.168.0.5
B. 254.255.255.255
C. 223.0.0.1
D. 172.16.0.1
E. 224.0.0.5
F. 127.0.0.1
G. None of the above

Answer: E
Explanation:
The multicast IP address 224.0.0.5 is known as 'AllSPFRouters.' All routers running OSPF should be prepared to receive packets sent to this address since hello packets are always sent to this destination. Also, certain OSPF protocol packets are sent to this address during the flooding procedure.
Incorrect Answers:
A. This is the IP address reserved for the internal loopback on PC hosts. All windows based PC's will use this internal IP address, assuming that the TCP/IP stack is correctly installed.
B, D. These addresses are part of the range of addresses reserved for internal use, as defined in RFC 1918.

QUESTION NO: 16
Which of the following statements below best describe the process identifier that is used to run OSPF on a TestKing router? (Choose two)

A. It is an optional parameter required only if multiple OSPF processes are running on the router.
B. It is locally significant.
C. It is needed to identify a unique instance of an OSPF database.
D. All routers in the same OSPF area must have the same process ID if they are to exchange routing information.

E. It is globally significant.
F. It is shared among all OSPF routers

Answer: B, C
Explanation:
The OSPF process ID is locally significant, and is only used by the local router to discriminate between multiple OSPF processes. In any given OSPF network, the process ID's do not need to match between neighboring routers. This is in contrast to other routing protocols, such as EIGRP.
Additional info:
router ospf process-id
no router ospf process-id
process-id
Internally used identification parameter for an OSPF routing process. It is locally assigned and can be any positive integer. A unique value is assigned for each OSPF routing process.
Reference:
http://www.cisco.com/en/US/products/sw/iosswrel/ps1826/products_command_summary_chapter09186a0

QUESTION NO: 17
The interface information for router TestKing3 is displayed below:

```
TestKing3 # show ip interface brief

Interface              IP-Address      OK? Method Status                Protocol
Ethernet0              190.172.32.10   YES NVRAM  up                    up
Loopback0              208.149.23.162  YES NVRAM  up                    up
Loopback1              208.149.23.194  YES NVRAM  up                    up
Serial0                220.173.149.10  YES manual down                  down
Serial1                unassigned      YES NVRAM  administratively down down
```

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.
Router TestKing3 was just successfully rebooted. Based on the information shown above, correctly identify the current OSPF router ID for Router TestKing3.

A. 220.173.149.10
B. 208.149.23.194
C. 208.149.23.162
D. 190.172.32.10
E. None of the above

Answer: B

QUESTION NO: 18
The interface status for router TestKing3 is as follows:

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Prior to the command shown above, you had configured OSPF with the command:

TestKing3(config-router)# network 192.168.12.64 0.0.0.63 area 0

After completing the configuration, you now discover that not all the interfaces are participating in OSPF. Based on the information shown above, which three of the interfaces will participate in OSPF according to this configuration statement? (Choose three)

A. Serial0/1.104
B. Serial0/1.102
C. Serial0/0

D. Serial0/1.103
E. FastEthernet0 /1
F. FastEthernet0 /0

Answer: B, C, E

QUESTION NO: 19
Which one of the following privileged EXEC mode IOS show commands will display the state of the OSPF DR/BDR (designated router / backup designated router) election process?

A. TK1# show ip ospf interface
B. TK1# show ip ospf priority
C. TK1# show ospf neighbor detail
D. TK1# show ospf processes
E. TK1# show ospf neighbor state
F. None of the above

Answer: A
Explanation:
This command will display the router ID of both the DR and the BDR on the network segment that the particular interface is connected to.
Example:
Router1#show ip ospf interface ethernet 0Ethernet0 is up, line protocol is upInternet Address 10.10.10.1/24, Area 0Process ID 1, Router ID 192.168.45.1, Network Type BROADCAST, Cost: 10 Transmit Delay is 1 sec, State BDR, Priority 1**Designated Router (ID) 172.16.10.1, Interface address 10.10.10.2 Backup Designated router (ID) 192.168.45.1, Interface address 10.10.10.1** Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5 Hello due in 00:00:06 Index 1/1, flood queue length 0 Next 0x0(0)/0x0(0) Last flood scan length is 2, maximum is 2 Last flood scan time is 0 msec, maximum is 4 msec Neighbor Count is 1, Adjacent neighbor count is 1**Adjacent with neighbor 172.16.10.1 (Designated Router) Suppress hello for 0 neighbor(s)**

QUESTION NO: 20
On your OSPF network, routers TK1 and TK2 belong to the same Ethernet network. However, they are unable to establish an adjacency over this link. While troubleshooting this problem, you issue the "show ip ospf interface Ethernet 0" command on each router. The output from these commands is displayed below:

TK1: Ethernet is up, line protocol is up
Internet address 192.168.1.2/24, Area 0
Process ID 1, Router ID 192.168.31.33, Network Type BROADCAST, Cost: 10
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 192.168.31.33, Interface address 192.168.1.2
No backup designated router on this network
Time intervals configured, Hello 5, Dead 20, Wait 20, Retransmit 5

TK2: Ethernet0 is up, line protocol is up
Internet address 192.168.1.1/24, Area 0
Process ID 2, Router ID 192.168.31.11, Network Type BROADCAST, Cost: 10
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 192.168.31.11, Interface address 192.168.1.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

What is the underlying cause of the routers failing to become adjacent?

A. The OSPF area is misconfigured.
B. The priority on TK2 should be set lower.
C. The cost on TK2 should be set lower.
D. The hello and dead timers are misconfigured.
E. You need to add a backup designated router to the network.
F. The OSPF process ID numbers do not match.

Answer: D
Explanation:
OSPF routers must have the same hello intervals and the same dead intervals to exchange information. By default, the dead interval is four times the value of the hello interval. This means that a router has four chances to send a hello packet before being declared dead.
On broadcast OSPF networks, the default hello interval is 10 seconds and the default dead interval is 40 seconds. On nonbroadcast networks, the default hello interval is 30 seconds and the default dead interval is 120 seconds. These default values result in efficient OSPF operation and seldom need to be modified. As shown in the output, the hello timer on router TK1 was changed to 5 seconds, with the dead timer being set to 20 seconds.
Incorrect Answers:
A. Both routers are configured to be in area 0.
B. In this example the adjacency should come up regardless of which one was the DR/BRD. Therefore, setting the priority on one router will not solve this problem.

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C. This will not solve the adjacency issue.
E. Only the DR is absolutely required on the Ethernet subnet, not the BDR.
F. Unlike other protocols, the routing process ID's do not necessarily need to match in OSPF for routing to work.

QUESTION NO: 21
Router TK1 is being installed. You wish to add this router to your existing OSPF network. In doing so, you configure the following:

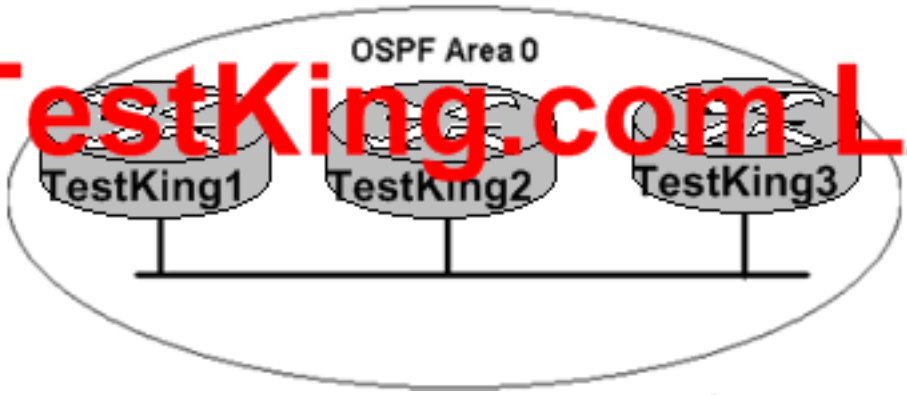
```
TK1(config)# router ospf 1
TK1(config-router)# network 10.10.10.0 255.255.255.0 area 0
```

After making this change, you notice that the networks attached to TK1 are not being learned by the other OSPF routers. What could be the cause of this?

A. The AS is not correctly configured
B. The network subnet mask is incorrectly configured
C. The network wildcard mask is configured incorrectly
D. The network number is not correctly configured
E. The process id is configured incorrectly
F. None of the above

Answer: C
Explanation:
The network command specifies the IP address (10.10.10.0) followed by the wildcard mask (not the subnet mask) and the area that is to be associated with the OSPF address range (in this case, area 0). The wildcard mask indicates in binary how much of the IP address much be matched with 0s indicating that the bits must match and 1 indicating that they may vary. Thus 0.0.0.255 or 00000000.00000000.00000000.11111111 indicates that any bit in the last octet can vary while all bits in the first 3 octets must match the network address (in other words, 10.10.10.xx)
Incorrect Answers:
A. Here the process ID is 99, which is valid.
B. Area 0 is the backbone area, so configuring the network to be in area 0 should be acceptable.
D. This is not the problem, assuming that all 10.X.X.X networks are to be configured for OSPF.
E. The AS number, as called the process ID in OSPF is 99.
F. OSPF uses wildcard masks, not the usual subnet masks

QUESTION NO: 22
The TestKing OSPF Backbone network is displayed below:



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TESTKING1 is unable to establish an OSPF neighbor relationship with TESTKING3. What are possible reasons for this problem? (Choose Two).

A. All of the routers need to be configured for backbone Area1.
B. TESTKING1 and TESTKING2 are the DR and BDR, so OSPF will not establish neighbor adjacency with TESTKING3
C. A static route has been configured from TESTKING1 to TESTKING3 and prevents the neighbor adjacency from being established.
D. The hello and dead interval timers are not set to the same values on TESTKING1 and TESTKING3.
E. EIGRP is also configured on these routers with a lower administrative distance.
F. TESTKING1 and TESTKING3 are configured in different areas.

Answer: D, F
Explanation:
In order for two OSPF routers to establish a neighbor adjacency, they must agree on a number of things, including the hello intervals, dead intervals, and the area ID's. Although a router can be configured for multiple OSPF areas, a neighbor relationship will only be built on interfaces that share the same area.

QUESTION NO: 23
The TestKing OSPF network is shown below:

Based on the output from the show ip ospf neighbor command on TK-2, what must a network administrator do to ensure that TK-2 will always be the DR and TK-3 will never be the DR or BDR for OSPF area 0? (Choose three.)

A. Set the TK-3 OSPF priority to 0 on the serial interface.
B. Change the TK-2 FastEthernet IP address to 192.168.0.27.
C. Set the TK-2 OSPF priority to 255 on the FastEthernet interface.
D. Change the TK-3 FastEthernet IP address to 192.168.0.27.
E. Set the TK-3 OSPF priority to 0 on the FastEthernet interface.
F. Set the TK-1 OSPF priority to 0 on the FastEthernet interface.

Answer: C, E, F
Explanation:
In OSPF, the DR is the router responsible for making adjacencies with all neighbors on a multiaccess network, such as Ethernet or FDDI. The DR represents the multiaccess network, in that it ensures that every router on the link has the same topology database.

The BDR is the backup to the designated router (DR), in case the DR fails. The BDR performs none of the DR functions while the DR is operating correctly.

Router(config-if)#ip ospf priority number

The number in the **priority** command can be set between 0-255, where the higher the number, the greater the likelihood that this router will be selected as the DR.

To determine manually which router will be the DR, it is necessary to set the priority of the router. A router interface can have a priority of 0 to 255. The value of 0 means that the router cannot be a DR or BDR; otherwise, the higher the priority, the more favorable the chances are of winning the election. If there is more than one router on the segment with the same priority level, the election process picks the router with the highest router ID. The default priority on a Cisco router is 1.

If Priority value is same then goes to the highest IP address assigned in loopback interface then any interface.

QUESTION NO: 24

Referring to the Testking Border router shown below, what can be concluded from the output of this debug command?

Exhibit:

A. The output represents normal OSPF operation.
B. The OSPF router connected to interface Serial0/1 has NOT formed a neighbor relationship with the Border router.
C. The interfaces of two OSPF routers connected to the Border router are in the same subnet.
D. A router is connected to interface Serial0/3 of the Border router. The OSPF router ID of the connected router is the IP address of the connected interface.
E. None of the above

Answer: B
Explanation:
This "debug ip ospf events" output shown might appear if any of the following situations occurs:
1. The IP subnet masks for routers on the same network do not match.
2. The OSPF hello interval for the router does not match that configured for a neighbor.
3. The OSPF dead interval for the router does not match that configured for a neighbor.
If a router configured for OSPF routing is not seeing an OSPF neighbor on an attached network, perform the following tasks:
1. Make sure that both routers have been configured with the same IP mask, OSPF hello interval, and OSPF dead interval.
2. Make sure that both neighbors are part of the same area type.

QUESTION NO: 25
The TestKing OSPF network is displayed below:

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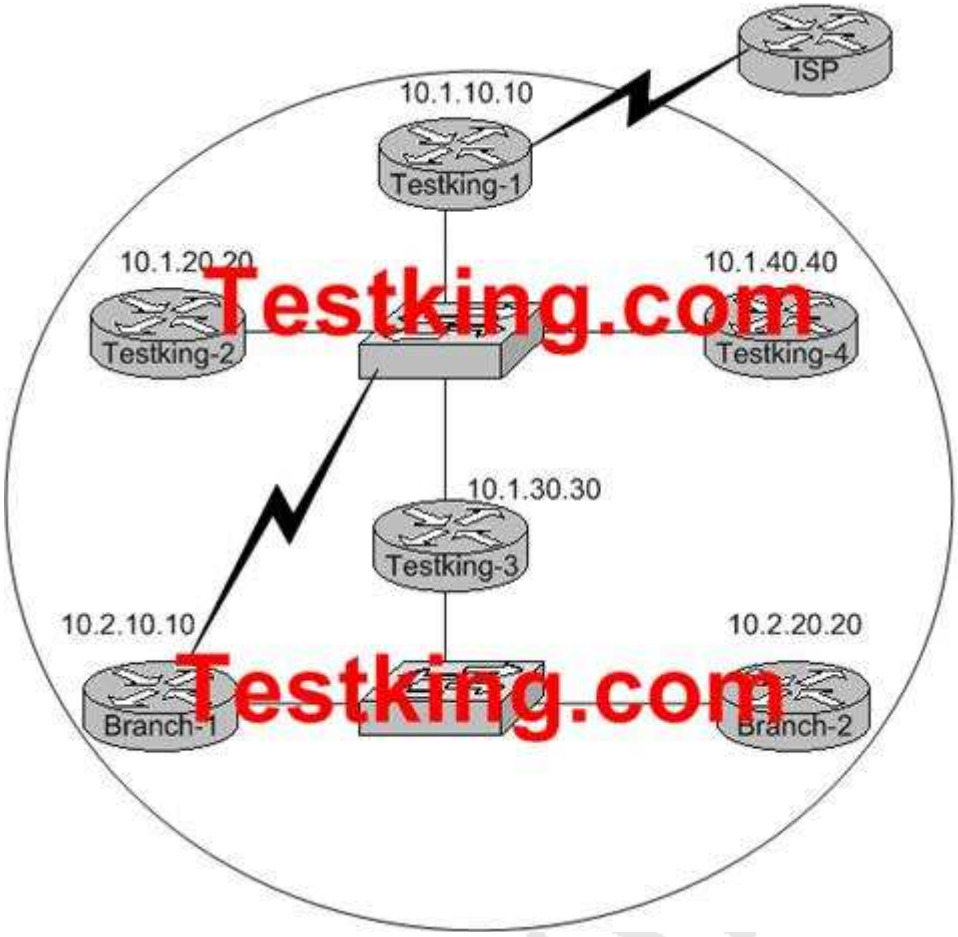

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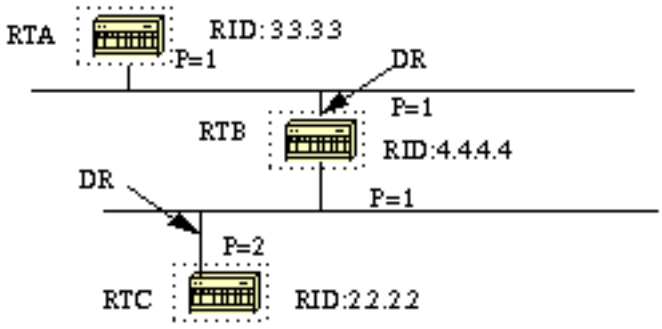
The internetwork infrastructure of TestKing consists of a single OSPF area as shown in the graphic. There is concern that a lack of router resources is impeding internetwork performance. As part of examining the router resources, the OSPF DRs need to be known. All the router OSPF priorities are at the default and the router IDs are shown with each router.
Which routers are likely to have been elected as DR? (Choose two)

A. Testking-1
B. Testking-2

C. Testking-3
D. Testking-4
E. Branch-1
F. Branch-2

Answer: D, F
Explanation:
DR and BDR election is done via the Hello protocol. Hello packets are exchanged via IP multicast packets (Appendix B) on each segment. The router with the highest OSPF priority on a segment will become the DR for that segment. The same process is repeated for the BDR. In case of a tie, the router with the highest RID will win. The default for the interface OSPF priority is one. Remember that the DR and BDR concepts are per multi-access segment. Setting the OSPF priority on an interface is done using the **ip ospf priority <value>** interface command.
A priority value of zero indicates an interface which is not to be elected as DR or BDR. The state of the interface with priority zero will be DROTHER. The following diagram illustrates the DR election:



In the above diagram, RTA and RTB have the same interface priority but RTB has a higher RID. RTB would be DR on that segment. RTC has a higher priority than RTB. RTC is DR on that segment.
The default RID is the highest IP address that is active in the router. Based on this info, router Testking-4 and Branch-2 will most likely be elected as the DR in their respective networks.

QUESTION NO: 26

TestKing is using OSPF in their WAN. What is the maximum number of hops OSPF allows before it deems a network unreachable?

A. 15
B. 16
C. 99
D. 255
E. Unlimited
F. None of the above

Answer: E
Explanation:
OSPF is a link state protocol. Link state protocols do not use hops to mark networks as unreachable. Instead OSPF implements a steady state operation to its adjacent neighbors by sending and receiving small Hello packets periodically. When an OSPF router does not receive a Hello packet for a specified time period, it assumes that the neighbor is down. The router then runs the SPF algorithm to calculate new routes.
Reference:
TestKing 640-801 Study Guide, Section 5.2 "Steady State Operation".
Incorrect Answers:
A. This is the maximum number of hops that a RIP network could use before the route is deemed unreachable.
B. When a RIP routes receives a routing update for a route that shows a hop count of 16, the route is considered to be unreachable. RIP routers use this to prevent packets from looping through the network indefinitely, but OSPF routers do not.

QUESTION NO: 27
On the topic of the OSPF hello protocol; which of the statements below are true? (Select two answer choices)

A. The OSPF Hello protocol provides dynamic neighbor discovery.
B. The OSPF Hello protocol detects unreachable neighbors in 90 second intervals.
C. The OSPF Hello protocol maintains neighbor relationships.
D. The OSPF Hello protocol negotiates correctness parameters between neighboring interfaces.
E. The OSPF Hello protocol uses timers to elect the router with the fastest links at the designated router.
F. The OSPF Hello protocol broadcast hello packets throughout the internetwork to discover all routers that are running OSPF.

Answer: A, C
Explanation:
The Hello Packet
OSPF contains a protocol (the Hello protocol) that is used to establish and maintain relationships between neighboring nodes. These relationships are called adjacencies. Adjacencies are the basis for the exchange of routing data in OSPF.
It is through the use of this protocol, and packet type, that an OSPF node discovers the other OSPF nodes in its area. Its name is intentionally significant; the Hello protocol establishes communications between potential neighboring routers. The Hello protocol uses a special subpacket structure that is appended to the standard 24-octet OSPF header. Together, these structures form a hello packet.
All routers in an OSPF network must adhere to certain conventions that must be uniform throughout the network. These conventions include the following:
1. The network mask
2. The interval at which hello packets will be broadcast (the hello interval)
3. The amount of time that must elapse before a non responding router will be declared dead (that is, the router dead interval) by the other routers in the network
4. All routers in an OSPF network must agree to use the same value for each of these parameters; otherwise, the network might not operate properly. These parameters are exchanged using hello packets. Together, they comprise the basis for neighborly communications. **They ensure that neighbor relationships (known as adjacencies) are not formed between routers in different subnets and that all members of the network agree on how frequently to stay in contact with each other.**

The hello packet also includes a listing of other routers (using their unique router IDs) that the source router has recently been in contact with. This field, the Neighbor field, facilitates the neighbor discovery process. The hello packet also contains several other fields such as Designated Router and Backup Designated Router. These fields are useful in maintaining adjacencies and support the operation of the OSPF network in both periods of stability and convergence.

QUESTION NO: 28
You are an administrator and you've just configured OSPF on a router with both physical and logical interfaces. Which of the following factors determine the router ID?

A. The lowest network number of any interface.

B. The highest network number of any interface.
C. The highest IP address of any logical interface.
D. The middle IP address of any logical interface.
E. The lowest IP address of any physical interface.
F. The highest IP address of any physical interface.
G. The lowest IP address of any logical interface.

Answer: C
Explanation:
Physical interface address is used only if there are no loopback addresses.

Sybex 5th p. 308:
"Router ID The Router ID (RID) is an IP address used to identify the router. Cisco chooses the Router ID by using the highest IP address of all configured loopback interfaces. If no loopback interfaces are configured with addresses, OSPF will choose the highest IP address of all active physical interfaces."

QUESTION NO: 29
Under which network type circumstance would an OSPF router establish router adjacencies while not performing the DR/BDR election process?

A. Point-to-point
B. Broadcast
C. Non-broadcast multi-access
D. Backbone area 0
E. None of the above

Answer: A
Explanation:
If there's a point to point connection, there's no need for a designated router or a backup designated router election since only two routers can exist on a point to point network segment.
Incorrect Answers:
B, C. All OSPF routers in a broadcast and non-broadcast multi-access network go through the DR and BDR election process.

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D. The backbone area is not a network type, but a collection of OSPF networks links. Area 0 is reserved as the backbone area, and routers within area 0 may or may not go through the DR/BDR election process, depending on the network type.

QUESTION NO: 30
On the topic of OSPF routing; which of the following are the traits of an OSPF area? (Select three)

A. Each OSPF area requires a loopback interface to be configured.
B. Areas may be assigned any number from 0 to 65535.
C. Area 0 is called the backbone area.
D. OSPF networks do not require multiple areas.
E. Multiple OSPF areas must connect to area 0.
F. Single area OSPF networks must be configured in area 1.

Answer: C, D, E
Explanation:
OPSF uses areas in a hierarchical fashion, and the backbone area is always area 0. All other areas have at least one connection to area 0. If, for some reason, any area does not have a direct connection to the backbone area 0, then an OSPF virtual link must be configured. OSPF networks do not require multiple areas, as all routers can be contained within a single area. If an OSPF network is configured as a single area, then area 0 does not need to be used.
Incorrect Answers:
A. Loopback interfaces are often used in OSPF networks, so that the router ID can be configured. However, this is not a requirement.
B. The area-id can be an integer between 0 and 4294967295.
F. Single area OSPF networks do not have to be configured with the backbone area 0. Although area 1 can indeed be used, it is not required that area 1 is used. Single area OSPF networks can be any integer from 0-4294967295.

QUESTION NO: 31
Router TK1 is running OSPF. What is the default administrative distance (AD) of this protocol?

A. 90
B. 100

C. 110
D. 120
E. 170
F. None of the above

Answer: C
Explanation:
The administrative distance values are configured on a single router and are not exchanged with other routers. Table lists the various sources of routing information, along with the default administrative distance.

Default Administrative Distances

Route Type	Administrative Distance
Connected	0
Static	1
EIGRP summary route	5
EBGP	20
EIGRP (internal	90
IGRP	100
OSPF	110
IS-IS	115
RIP	120
EIGRP (external)	170
iBGP (external)	200

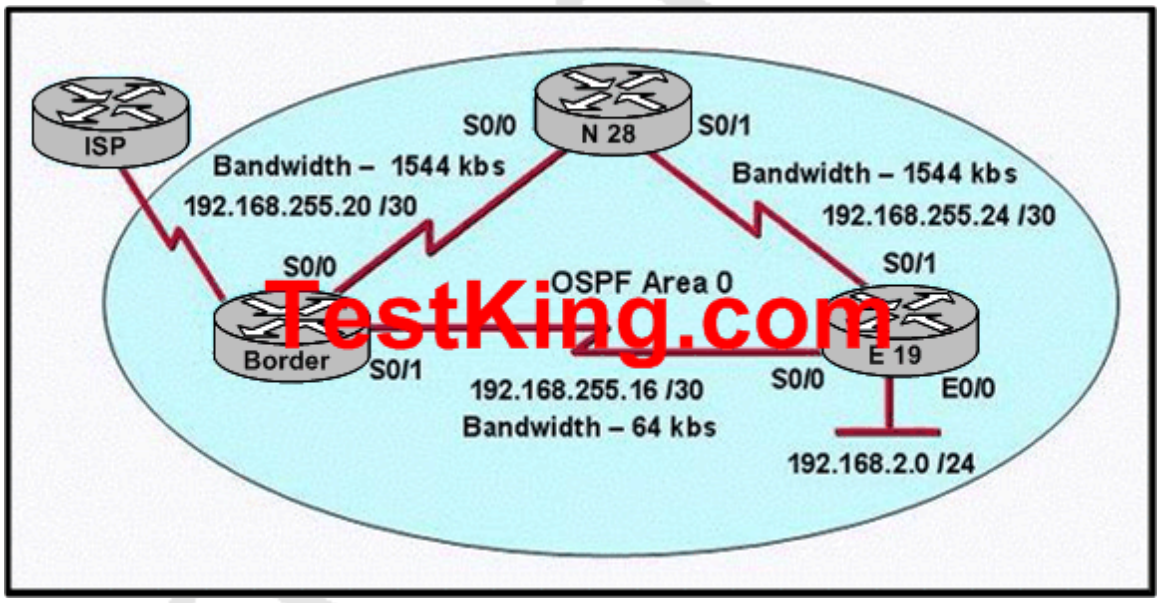
QUESTION NO: 32
Router TK1 is running OSPF. On this router, what kind of packets does OSPF send to keep up connectivity with its neighboring routers?

A. SPF packets
B. hello packets
C. keepalive packets
D. dead interval packets
E. LSU packets

F. None of the above

Answer: B
Explanation:
Hello packets simply identify the subnet, the router sending the packets and a few other details. As long as a router continues to receive Hellos form existing neighbors, the attached link must still be usable, and the neighbor that sent the Hello must still be up and working.
Reference: CCNA Self-Study CCNA ICND Exam Certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 192 -193
Incorrect Answers:
A, E. SPF (shortest path first) and LSU (link state update) packets are not used to maintain connectivity between neighbors.
C. Keepalive packets do not exist. Hello packets perform the functions of a keepalive packet.

QUESTION NO: 33
Part of the TestKing OSPF network is shown below:



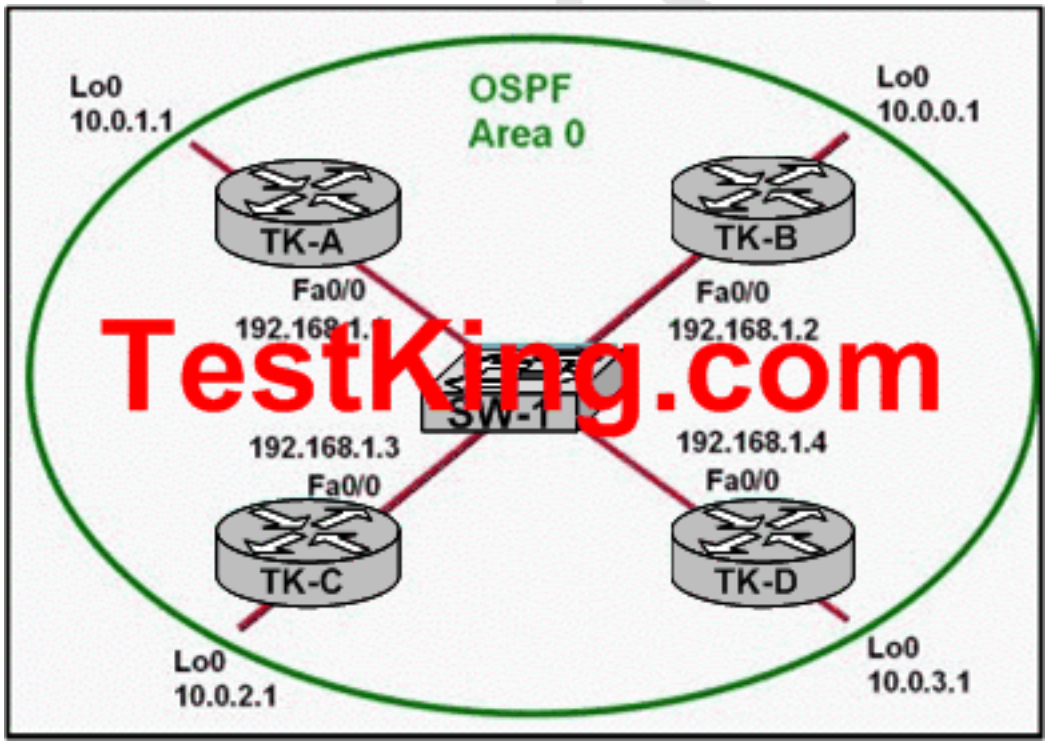
In the TestKing network shown above, all of the routers are operational and OSPF has converged, what will be the output from the show ip route command issued on the Border router?

A. Gateway of last resort is 10.10.10.6 of network 0.0.0.0
10.0.0.0/30 is subnetted, 1 subnets
C 10.10.10.4 is directly connected, Serial0/2
192.168.255.0/30 is subnetted, 3 subnets
C 192.168.255.20 is directly connected, Serial0/0
C 192.168.255.16 is directly connected, Serial0/1
O 192.168.255.24[110/128]via 192.168.255.22, 00:12:40, Serial0/0
O 192.168.2.0/24[110/138]via 192.168.255.22, 00:12:40, Serial0/0
S* 0.0.0.0/0[1/0] via 10.10.10.6
B. Gateway of last resort is 10.10.10.6 of network 0.0.0.0
10.0.0.0/30 is subnetted, 1 subnets
C 10.10.10.4 is directly connected, Serial0/2
192.168.255.0/30 is subnetted, 3 subnets
C 192.168.255.20 is directly connected, Serial0/0
C 192.168.255.16 is directly connected, Serial0/1
O 192.168.255.24[110/128]via 192.168.255.22, 00:12:40, Serial0/1
O 192.168.2.0/24[110/1572]via 192.168.255.18, 00:00:11, Serial0/0
S* 0.0.0.0/0[1/0] via 10.10.10.6
C. Gateway of last resort is 10.10.10.6 of network 0.0.0.0
10.0.0.0/30 is subnetted, 1 subnets
C 10.10.10.4 is directly connected, Serial0/2
192.168.255.0/30 is subnetted, 3 subnets
C 192.168.255.20 is directly connected, Serial0/0
C 192.168.255.16 is directly connected, Serial0/1
O 192.168.255.24[110/128]via 192.168.255.22, 00:12:40, Serial0/0
O 192.168.2.0[110/1572]via 192.168.255.18, 00:00:11, Serial0/1
S* 0.0.0.0/0[1/0] via 10.10.10.6
D. Gateway of last resort is 10.10.10.6 of network 0.0.0.0
10.0.0.0/30 is subnetted, 1 subnets
C 10.10.10.4 is directly connected, Serial0/2
192.168.255.0/20 is subnetted, 3 subnets
C 192.168.255.20 is directly connected, Serial0/0
C 192.168.255.16 is directly connected, Serial0/1
O 192.168.255.24[110/128]via 192.168.255.22, 00:12:40, Serial0/0
O 192.168.2.0[110/1572]via 192.168.255.18, 00:00:11, Serial0/1
[110/1572]via 192.168.255.22, 00:00:07, Serial0/0

S* 0.0.0.0/0[1/0] via 10.10.10.6
E. None of the above

Answer: A
Explanation:
The key to this question lies in the cost of the route to the 192.168.2.0/24 network. With OSPF, the cost of a link is 10,000,000/BW. Here we can see that the best path is over the two T1 links instead of the single 64K circuit. The OSPF cost of a link on a 1544kbps T1 line is 64. Since there are two T1 links, the cost now becomes 128. Finally, when we add the cost of the Ethernet link (10) the cost then becomes 138. Since choice A is the only option with the correct cost to this network it is correct. The other answers assume that the single 64K link is best, which is why the cost to the 192.168.2.0/24 network shows as 1572.
Note: If this were a RIP network, then the best path would indeed be over the single slower link as RIP does not consider the bandwidth of the link, only the number of hops.

QUESTION NO: 34
Please study the exhibit carefully.



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Based on the information shown above, which two statements are true about the loopback address that is configured on TK-B? (Choose two)

A. It indicates that TK-B should be elected the DR for the LAN.
B. It provides stability for the OSPF process on TK-B.
C. It ensures that data will be forwarded by TK-B.
D. It decreases the metric for routes that are advertised from TK-B.
E. It specifies that the router ID for TK-B should be 10.0.0.1.

Answer: B, E
Explanation:
A loopback interface is virtual in nature, and thus will never go down as long as the router is powered on. It doesn't rely on any physical network or cable to be plugged in. This makes it a prime choice for any good reference point. That brings us to the "why" about using it.
When OSPF routers talk to one another, they all identify themselves. That is done by a RID, or Router ID value. An OSPF router may talk to many neighbors out multiple interfaces, but it only has one Router ID it uses for all conversations.
How does a router choose its identifier? Well, there are a couple ways. Typically, the router chooses its highest IP address of all physical interfaces. However, if there's a loopback interface (seen as a manual intervention), the OSPF process will always use the loopback address as its RID value.
In this network, stability is ensured for TK-B as it will not become the DR or the BDR because the other routers will have a higher router ID since the have a higher loopback IP address. The DR/BDR election process is as follows:
A designated router (DR) is the router elected by the network by elections. The DR is elected based on the following default criteria:
* If the priority setting on a OSPF router is set to 0, that means it can NEVER become a DR or BDR.
* When a DR fails and the BDR takes over, there is another election to see who becomes the replacement BDR.
* The router sending the Hello packets with the highest priority.
* If two or more routers tie with the highest priority setting, the router sending the Hello with the highest RID (Router ID) wins.
* (NOTE) A RID is the highest logical (loopback) IP address configured on a router, if no logical/loopback IP address is set then the Router uses the highest IP address configured on its interfaces. (e.g. 192.168.0.1 would be higher than 10.1.1.2)
* Usually the router with the second highest priority number becomes the BDR (Backup Designated Router)
*

The range of priority values range from 1 - 255, with a higher value increasing its chances of becoming DR or BDR.
* IF a HIGHER priority OSPF router comes online AFTER the election has taken place, it will not become DR or BDR until (at least) the DR and BDR fail.

QUESTION NO: 35
Exhibit:

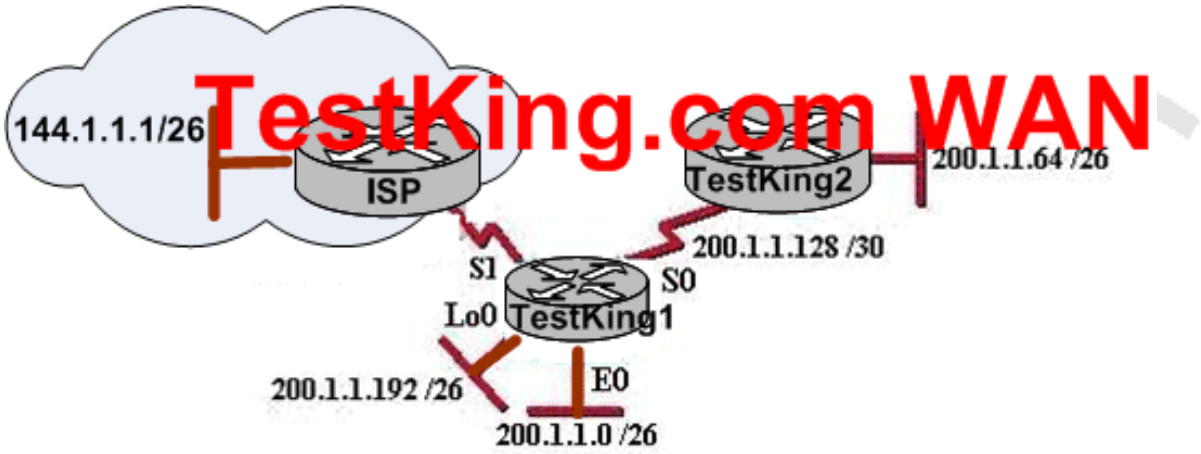
While troubleshooting an issue with the TestKing OSPF network, you notice that there are two OSPF designated routers identified on TestKing4. What could explain this fact?

A. Two Router IDs have the same OSPF priority and are therefore tied for DR election.
B. TestKing4 is connected to more than one multi-access network.
C. The DR election is still underway and there are two contenders for the role.
D. The router at 208.149.23.130 is a secondary DR in case the primary fails.
E. None of the answer choices are correct.

Answer: B
Explanation:
OSPF elects a DR and BDR for each multi-access network that the routers are connected to. In this case, we can see that the first neighbor is the DR associated with the LAN connected to interface Ethernet1, while the last neighbor is the DR associated with the Ethernet0 LAN.

Section 13: Configure, verify, and troubleshoot EIGRP (23 questions)

QUESTION NO: 1
Network topology exhibit:



Configuration exhibit (Routing Table):

```
Gatew[illegible]f last resort is [illegible].0.0.0 to network 0.0.0.0

     200.1.1.0/24 is variably subnetted, 5 subnets, 5 masks
C       200.1.1.192/26 is directly connected, Loopback0
C       200.1.1.128/30 is directly connected, Serial0
D       200.1.1.64/26 [90/2195456] via 200.1.1.130, 00:02:15, Serial0
D       200.1.1.0/24 is a summary, 00:00:41, Null0
C       200.1.1.0/26 is directly connected, Ethernet0
     200.1.2.0/30 is subnetted, 1 subnets
C       200.1.2.4 is directly connected, Serial1
S*   [illegible].0.0.0/0 is directly connected, Serial1
```

You work as a network technician at TestKing and you need to troubleshoot an issue with the network.
Based on the information provided above, what can be determined from the router output shown in the graphic?

A. 200.1.1.64 is a default route
B. EIGRP is in use in this network
C. The output came from a router that has four physical interfaces
D. The output shows that there are three default routes
E. The output came from router TestKing2
F. None of the above

Answer: B
Explanation:
In the routing table the "D" letter marks the route learned from EIGRP routing protocol. Based on the routing table above, there are 4 directly connected IP interfaces, 2 EIGRP learned routes (which means that EIGRP is in use on this network) and a static default route was also configured.

QUESTION NO: 2
You are troubleshooting a routing issue in the TestKing EIGRP network. In this network, which statements are true about EIGRP successor routes? (Choose two)

A. Successor routes are flagged as "active" in the routing table
B. Successor routes are saved in the topology table to be used if the primary route fails
C. A successor route is used by EIGRP to forward traffic to a destination
D. A successful route may be backed up by a feasible successor route

Answer: C, D
Explanation:
The DUAL finite state machine embodies the decision process for all route computations. It tracks all routes advertised by all neighbors. The distance information, known as a metric, is used by DUAL to select efficient loop free paths.

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DUAL selects routes to be inserted into a routing table based on feasible successors. A successor is a neighboring router used for packet forwarding that has a least cost path to a destination that is guaranteed not to be part of a routing loop. When there are no feasible successors but there are neighbors advertising the destination, a recomputation must occur. This is the process where a new successor is determined. The amount of time it takes to recompute the route affects the convergence time. Even though the recomputation is not processor-intensive, it is advantageous to avoid recomputation if it is not necessary. When a topology change occurs, DUAL will test for feasible successors. If there are feasible successors, it will use any it finds in order to avoid any unnecessary recomputation. Feasible successors are defined in more detail later in this document.

Feasible Successors

A destination entry is moved from the topology table to the routing table when there is a feasible successor. All minimum cost paths to the destination form a set. From this set, the neighbors that have an advertised metric less than the current routing table metric are considered feasible successors.

Feasible successors are viewed by a router as neighbors that are downstream with respect to the destination. These neighbors and the associated metrics are placed in the forwarding table.

When a neighbor changes the metric it has been advertising or a topology change occurs in the network, the set of feasible successors may have to be re-evaluated. However, this is not categorized as a route recomputation.

Reference:

http://www.cisco.com/en/US/tech/tk365/tk207/technologies_tech_note09186a0080093f07.shtml#feasible

QUESTION NO: 3

Three TestKing routers are connected as show below:

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Part of their configurations are shown below:

```
TestKing1# showrunning-config
  <output omitted>
  router eigrp 10
    network 10.0.0.0
    network 192.168.1.0
    network 192.168.3.0
    no auto-summary
```

```
TestKing2# showrunning-config
  <output omitted>
  router eigrp 10
    network 192.168.1.0
    network 192.168.2.0
    no auto-summary
```

```
TestKing3# showrunning-config
  <output omitted>
  router eigrp 10
    network 10.0.0.0
    network 192.168.2.0
    no auto-summary
```

```
TestKing1# show ip eigrp neighbors
  Address      Interface   Holdtime Uptime   Q      Seq SRTT RTO
                           (secs)   (h:m:s)  Count  Num (ms) (ms)
  192.168.1.2  Se0         13       01:10:20 106    636   0   30
```

IP Addresses and routing for the network are configured as shown above. The TestKing network administrator issued the "show ip eigrp neighbors" command from router TestKing1 and receives the output shown. Based on all the information provided above, which statement is true?

A. It is normal for TestKing1 to show once active neighbor at a time to prevent routing loops
B. The IP addresses are not configured properly on the TestKing1 and TestKing3 interfaces
C. The "no auto-summary" command configured on the routers prevents TestKing1 and TestKing2 from forming a neighbor relationship
D. Routing is not completely configured on TestKing3
E. None of the above

Answer: D
Explanation:
The Router TestKing3 is connected to three different networks: 192.168.3.1/30, 192.168.2.2/30, and 10.0.4.0/24 but only 10.0.4.0 and 192.168.2.0 are being advertised via EIGRP. In TestKing3, the "network 192.168.3.0" command should be placed under the EIGRP 10 process.

QUESTION NO: 4
The topology table for the TestKing EIGRP network is shown below from router TestKing3:

```
TestKing3# show ip eigrp topology
IP-EIGRP Topology Table for AS(109)/ID(192.168.80.28)

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
       r - reply Status, s - sia Status

P 192.168.90.0 255.255.255.0, 2 successors, FD is 0
        via 192.168.80.28 (46251776/46226176), Ethernet0
        via 192.168.81.28 (46251776/46226176), Ethernet1
        via 192.168.80.31 (46277376/46251776), Serial0
P 192.168.81.0 255.255.255.0, 1 successors, FD is 307200
        via Connected, Ethernet1
        via 192.168.81.28 (307200/281600), Ethernet1
        via 192.168.80.28 (307200/281600), Ethernet0
        via 192.168.80.31 (332800/307200), Serial0
```

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You are troubleshooting a routing issue with the TestKing network. Why does Router TestKing3 show multiple unequal cost paths to network 192.168.81.0/24?

A. Because the EIGRP topology table displays all routes to a destination
B. Because the EIGRP topology table shows only backup routes to a destination
C. Because variance was configured for EIGRP autonomous system 109
D. Because multiple floating static routes were configured to network 192.168.81.0 via interface Serial0
E. None of the above

Answer: A

QUESTION NO: 5
The routing table of router TK1 is shown below:

```
Gateway of last resort is not set
     192.168.25.0/30 is subnetted, 4 subnets
D       192.168.25.20 [90/2681856] via 192.168.15.5, 00:00:10, Serial0/1
D       192.168.25.16 [90/1823638] via 192.168.15.5, 00:00:50, Serial0/1
D       192.168.25.24 [90/3837232] via 192.168.15.5, 00:05:23, Serial0/1
D       192.168.25.28 [90/8129325] via 192.168.15.5, 00:06:45, Serial0/1
C    192.168.15.4/30 is directly connected, Serial0/1
C    192.168.2.0/24 is directly connected, FastEthernet0/0
```

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Based on the routing table of TK1 shown above, which address and mask combination represents a summary of the routes learned by EIGRP?

A. 192.168.25.28 255.255.255.252
B. 192.168.25.28 255.255.255.240
C. 192.168.25.16 255.255.255.252
D. 192.168.25.0 255.255.255.252
E. 192.168.25.16 255.255.255.240
F. 192.168.25.0 255.255.255.240

Answer: E

QUESTION NO: 6
You need to configure EIGRP on a new TestKing router. What parameters must you specify when you enable EIGRP routing?

A. The broadcast address, and AS number
B. The network number and AS number
C. EIGRP routing, network number and passive interface
D. EIGRP routing, network number, and AS
E. None of the above.

Answer: D
Explanation:
To enable EIGRP on your router, you must specify EIGRP routing, the network number, and the AS system number.

Example:
Router EIGRP 33
Network 10.0.0.0

In the case above the AS process number is 33.

QUESTION NO: 7
The TestKing router has been configured for EIGRP. Information relating to the configuration is displayed in the output shown below:

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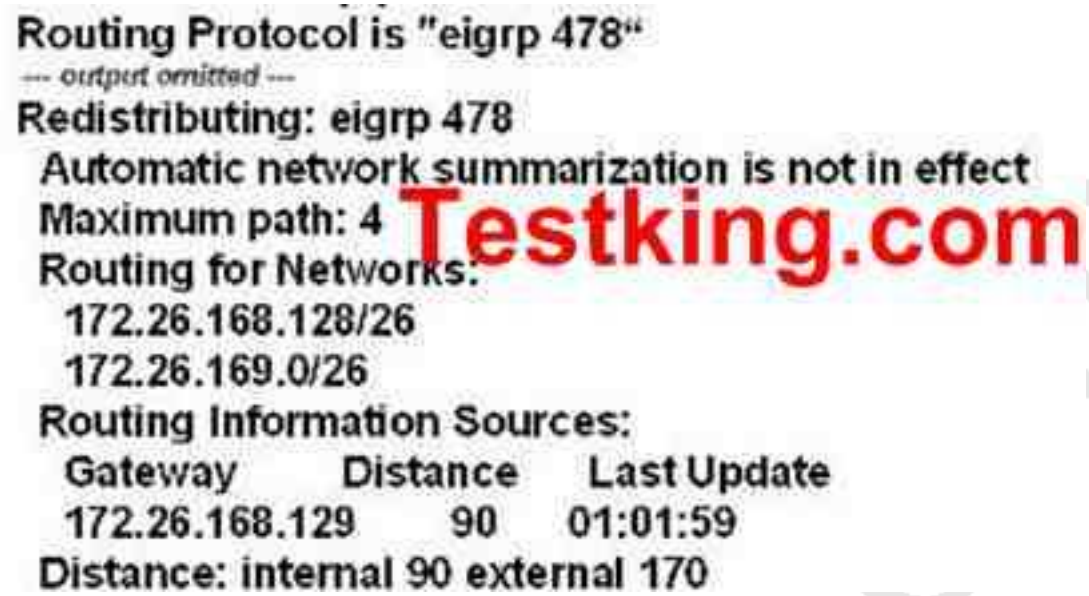

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The EIGRP configuration in the TestKing router used a single network statement. From the output shown in the graphic, which network statement was used to advertise these networks in EIGRP?

A. network 172.26.168.128 0.0.0.127
B. network 172.26.168.128 area 478
C. network 172.26.0.0
D. network 172.26.168.0 area 478
E. None of the above

Answer: C
Explanation:
The correct configuration statements used in the above were:

Router eigrp 478
Network 172.26.0.0

Incorrect Answers:
A. A wildcard mask is not required at the end of the network statement in order to configure EIGRP. It is only required for an OSPF configuration. Although a wildcard mask is now supported with EIGRP, the mask used in this example is incorrect.
B, D: In EIGRP, the concept of an area does not exist. This is only used by OSPF.

QUESTION NO: 8
Router TK1 is configured to run EIGRP. Which tables of EIGRP route information are held in RAM and maintained through the use of hello and update packets in this router? (Choose two)

A. SPF table
B. Query table
C. RTP table
D. Neighbor table
E. DUAL table
F. Topology table
G. State Table

Answer: D, F
Explanation:
In EIGRP the only two tables of significance are the neighbor table and the topology table.
Reference: Sybex CCNA Study Guide edition 4, Page 271.

QUESTION NO: 9
The TestKing network is shown in the following exhibit:

TestKing1(config)# **router eigrp 20**
TestKing1(config-router)# **network 192.168.20.0**
TestKing1(config-router)# **network 10.0.0.0**
TestKing1(config)# **interface fastethernet 0/0**
TestKing1(config-if)# **ip address 192.168.20.65 255.255.255.192**
TestKing1(config)# **interface serial 0/0**
TestKing1(config-if)# **ip address 10.1.1.1 255.255.255.252**

TestKing2 (config)# **router eigrp 20**
TestKing2 (config-router)# **network 192.168.20.0**
TestKing2 config-router)# **network 10.0.0.0**
TestKing2 (config)# **interface fastethernet 0/0**
TestKing2 (config-if)# **ip address 192.168.20.129 255.255.255.192**
TestKing2 (config)# **interface serial 0/0**
TestKing2 (config-if)# **ip address 10.1.1.2 255.255.255.252**

Based on the TestKing router configurations shown above, why has this network failed to converge?

A. The no auto-summary command needs to be applied to the routers
B. The network numbers have not been properly configured on the router s
C. The subnet masks for the network numbers have not been properly con figured
D. The autonomous system number has not been properly configured
E. The bandwidth values have not been properly configured on the serial interfaces

Answer: A
Explanation:
To restore the default behavior of automatic summarization of subnet routes into network-level routes, use the auto-summary command in router configuration mode. To disable this function and transmit subprefix routing information across classful network boundaries, use the no form of this command. Without disabling auto summarization, each router will advertise the 192.168.20.0/24 route, and the specific /26 networks will not be known.

QUESTION NO: 10
Which statements are true about EIGRP successor routes? (Choose two)

A. A successor route is used by EIGRP to forward traffic to a destination.
B. Successor routes are saved in the topology table to be used if the primary route fails.
C. Successor routes are flagged as "active" in the routing table.
D. A successor route may be backed up by a feasible successor route.
E. Successor routes are stored in the neighbor table following the discovery process.
F. Successors are not used in EIGRP.

Answer: A, D
Explanation:
The following are some terms relating to EIGRP:
1. Feasible Distance: The lowest calculated metric to each destination
2. Feasibility Condition: A condition that is met if a neighbor's advertised distance to a destination is lower that the router's Feasible Distance to that same destination.
3. Successor: The neighbor that has been selected as the next hop for a given destination based on the Feasibility Condition.
Reference: Jeff Doyle, Routing TCP/IP, Volume I, Chapter 8: Enhanced Interior Gateway Routing Protocol (EIGRP), p.336-337, Cisco Press, (ISBN 1-57870-041-8)
Additional info:

The Feasible Condition is met when the receiving router has a Feasible Distance (FD) to a particular network and it receives an update from a neighbor with a lower advertised or Reported Distance (RD) to that network. The neighbor then becomes a Feasible Successor (FS) for that route because it is one hop closer to the destination network. There may be a number of Feasible Successors in a meshed network environment.
The RD for a neighbor to reach a particular network must always be less than the FD for the local router to reach that same network. In this way EIGRP avoids routing loops. This is why routes that have RD larger than the FD are not entered into the Topology table.
Reference: Ravi Malhotra, IP Routing, Chapter 4: Enhanced Interior Gateway Routing Protocol (EIGRP), O'Reilly Press, January 2002 (ISBN 0-596-00275-0)

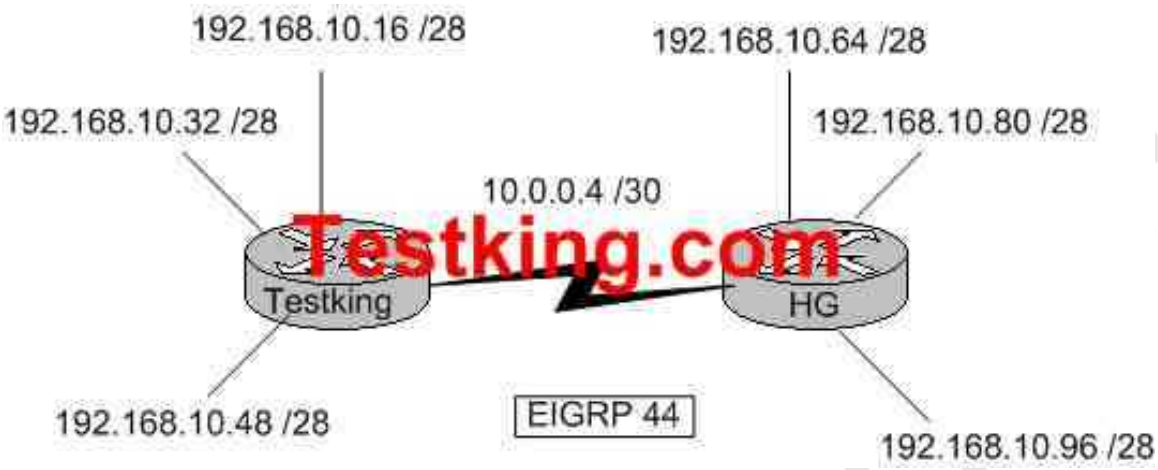
QUESTION NO: 11
Which one of the following EIGRP commands can check the IP addresses of the adjacent neighbors, as well as verifying the EIGRP retransmit intervals and queue counts?

A. TK1#show ip eigrp adjacency
B. TK1#show ip eigrp topology
C. TK1#show ip eigrp interfaces
D. TK1#show ip eigrp neighbors
E. None of the above

Answer: D
Explanation:
The topology database contains information from all of the LSA packets that have been received for an area. The topology database is updated by the LSAs. Each router within the area has exactly the same topology database. All routers must have the same vision of the networks; otherwise, confusion, routing loops, and loss of connectivity will result.
Note: The topology database is the router's view of the network within the area. It includes every OSPF router within the area and all the connected networks. This database is indeed a routing table, but a routing table for which no path decisions have been made; it is at present a topology database.
Reference: "CCNP BSCI Exam Certification Guide Third Edition" by Clare Gough, CCIE No. 2893, Page 197.

QUESTION NO: 12

The Testking network consists of two routers as shown below:



Both routers Testking and HG are configured for EIGRP. Unfortunately, users on the Testking networks are unable to reach users on the HG networks. Which command could you enter on Testking to correct this problem?

A. Testking(config-router)# version 2
B. Testking(config-router)# no auto-summary
C. Testking(config-router)# redistribute eigrp 44
D. Testking(config-router)# EIGRP log-neighbor-changes
E. Testking(config-router)# default-information originate

Answer: B
Explanation:
By default, EIGRP will auto-summarize IP information at the network boundaries. In this example, the 192.168.10.0 network is subnetted into 6 separate networks. Therefore, each router will only advertise the 192.168.10.0/24 network to each other by default. To disable this function and transmit sub-prefix routing information across classful network boundaries, auto summarization must be disabled.
Incorrect Answers:
A. There is only one version of EIGRP.
C. Based on the diagram, each router is already configured for EIGRP 44.
D. This will have no impact on the routes.

E. This will generate a default route, which will be advertised to the other router. However, a default route is not needed, as the individual subnets need to be advertised, not a default route.

QUESTION NO: 13
TestKing.com has a large corporate network that uses multiple routing protocols. Hosts in a portion of the network that uses EIGRP have become unreachable. Which router command will allow you, the network technician, to view the status of these routes?

A. TestKing# show eigrp entries
B. TestKing# show protocols
C. TestKing# debug eigrp routes
D. TestKing# show ip route eigrp
E. TestKing# show route eigrp

Answer: D
Explanation:
The show ip route and show ip route eigrp commands both list the EIGRP-learned routes with a D beside them. D signifies EIGRP. The letter E was already being used for Exterior Gateway Protocol (EGP) when Cisco created EIGRP, so it choose the next-closest letter to denote EIGRP-learned routes. You can see information about EIGRP neighbors with the show ip eigrp neighbors command, and the number of active neighbors (called peers in the command ouput) with the show ip eigrp interfaces command.
Reference: Cisco CCNA ICND 640-811 p.211

QUESTION NO: 14
Which command displays EIGRP-related router activities as they occur?

A. TestKing# show ip route *
B. TestKing# debug eigrp route
C. TestKing# debug ip eigrp
D. TestKing# debug ip protocols eigrp
E. TestKing# show ip route eigrp
F. None of the above

Answer: C
Explanation:
The debug ip eigrp command helps you analyze the packets that are sent and received on an interface. Because the debug ip eigrp command generates a substantial amount of output, only use it when traffic on the network is light.

Examples:
The following is sample output from the debug ip eigrp command:

TestKing# debug ip eigrp

IP-EIGRP: Processing incoming UPDATE packet

IP-EIGRP: Ext 192.168.3.0 255.255.255.0 M 386560 - 256000 130560 SM 360960 - 256000 104960

IP-EIGRP: Ext 192.168.0.0 255.255.255.0 M 386560 - 256000 130560 SM 360960 - 256000 104960

IP-EIGRP: Ext 192.168.3.0 255.255.255.0 M 386560 - 256000 130560 SM 360960 - 256000 104960

IP-EIGRP: 172.69.43.0 255.255.255.0, - do advertise out Ethernet0/1

IP-EIGRP: Ext 172.69.43.0 255.255.255.0 metric 371200 - 256000 115200

IP-EIGRP: 192.135.246.0 255.255.255.0, - do advertise out Ethernet0/1

IP-EIGRP: Ext 192.135.246.0 255.255.255.0 metric 46310656 - 45714176 596480

IP-EIGRP: 172.69.40.0 255.255.255.0, - do advertise out Ethernet0/1

IP-EIGRP: Ext 172.69.40.0 255.255.255.0 metric 2272256 - 1657856 614400

IP-EIGRP: 192.135.245.0 255.255.255.0, - do advertise out Ethernet0/1

IP-EIGRP: Ext 192.135.245.0 255.255.255.0 metric 40622080 - 40000000 622080

IP-EIGRP: 192.135.244.0 255.255.255.0, - do advertise out Ethernet0/1

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QUESTION NO: 15
Refer to the TestKing network shown below:

TK2# show ip route
Gateway of last resort is not set

172.168.0.0/16 is variably subnetted, 2 subnets, 2 masks
C 172.168.10.4/30 is directly connected, Serial0/1
C 172.168.10.64/26 is directly connected, FastEthernet 0/0

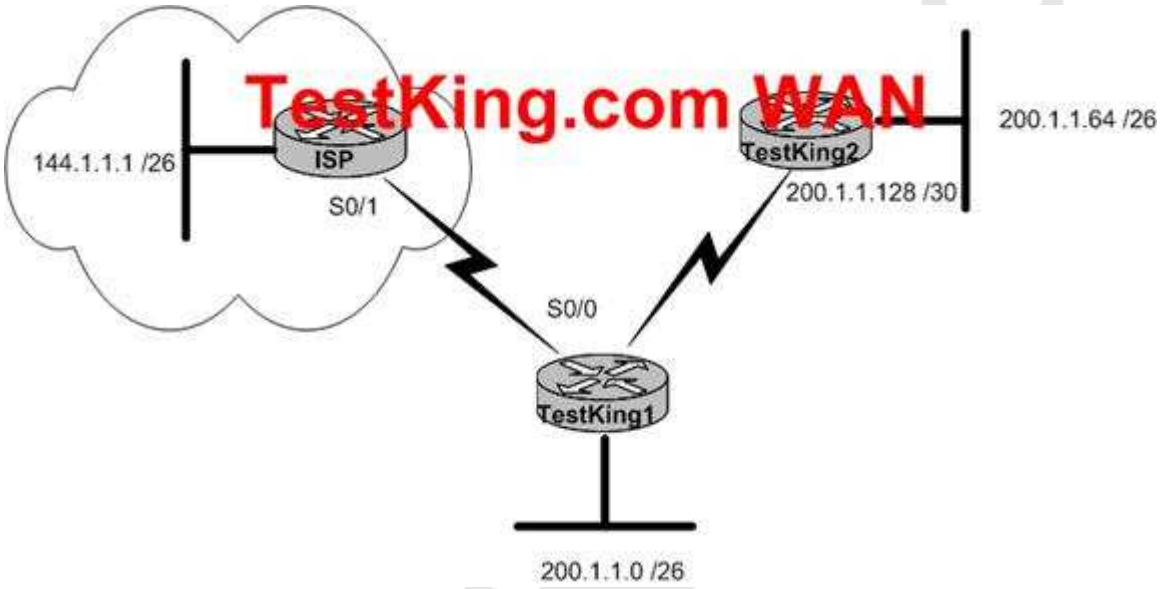
In this network, TK1 can ping across the serial link to 172.168.10.5, but cannot ping the FastEthernet interface of TK2 (172.168.10.65). The routing protocol being used is EIGRP, and the routing table of TK2 is shown. Which two statements could be the cause of this problem? (Choose two)

A. The serial interface does not have the clockrate set.
B. EIGRP is not enabled on one of the routers.
C. The IP addressing scheme has overlapping subnetworks.
D. The IP addressing scheme is using subnet zero but the ip subnet-zero command has not been enabled on one or both of the routers.
E. The FastEthernet interface of TK2 is administratively shutdown.
F. The EIGRP autonomous system numbers configured on the two routers do not match.

Answer: B, F
Explanation:

You can successfully ping over the serial link, which tells us the serial interface is properly configured, but you are unable to ping a network that is not directly connected. Since no EIGRP routes appear in the routing table, this tells us there is something wrong with the EIGRP configuration on either router. The most likely problem is that EIGRP is not enabled on one of the routers, or the EIGRP AS numbers do not match on each router.

QUESTION NO: 16
The TestKing EIGRP network is displayed in the following diagram:



Refer to the graphic. TestKing is running EIGRP. Hosts from the 200.1.1.0/26 subnet cannot access a server located on the 200.1.1.64 subnet. The users have previously been able to access this server. After router Testking1 is accessed with the use of Telnet, which of the following commands would be a logical first choice in troubleshooting this problem?

A. Testking1# show interface s0/0
B. Testking1# show controllers
C. Testking1# show ip route
D. Testking1# show hosts

E. None of the above

Answer: C
Explanation:
Since the network was previously accessible, and users are only unable to reach a specific subnet, it can be safely assumed that a routing issue is the problem, so viewing the routing table to see how traffic destined to the 200.1.1.64/26 subnet is being routed would be a logical first step.
Incorrect Answers:
A, B. These commands would be used if we had a reason to believe that there was a physical problem with the circuit itself. However, since we can safely telnet into the router remotely, and users appear to be able to reach other networks, we can assume that the physical serial interface is working properly.
D. The "show hosts" command is used to display the default domain name, the style of name lookup service, a list of name server hosts, and the cached list of host names and addresses on the network to which you can connect. It will not help us in any way in this example.

QUESTION NO: 17
Three TestKing routers are connected as shown below:

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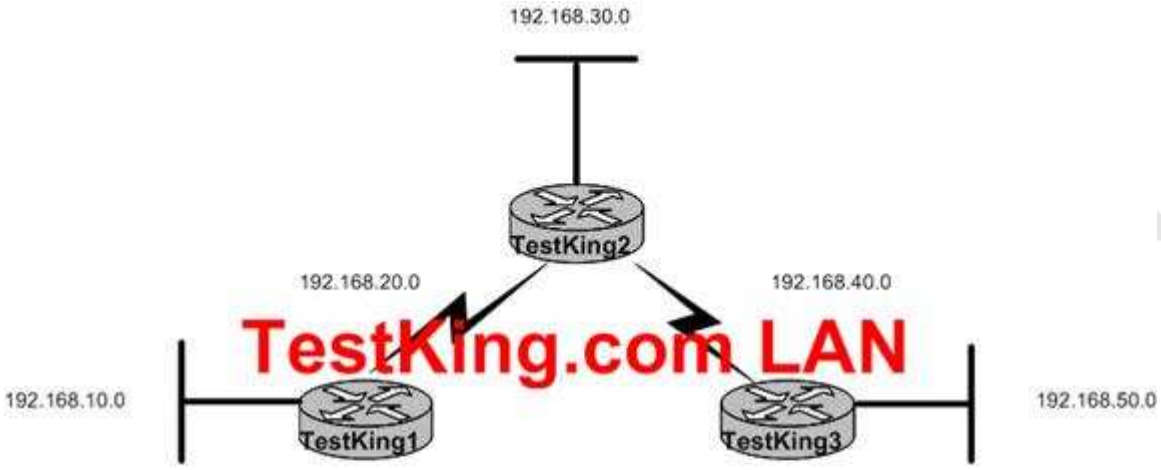


```
<some output text omitted>
P 192.168.40.0/24, 1 successor, FD is 21026560
   via 192.168..20.2(21026560/2051460),Serial 0/1
P 192.168.50.0/24, 1 successor, FD is 20514560
   via 192.168..20.2(20514560/28160),Serial 0/1
P 192.168.10.0/24, 1 successor, FD is 28160
   via Connected,FastEthernet0/0
P 192.168.30.0/24, 1 successor, FD is 21024000
   via 192.168..20.2(21024000/20512000),Serial 0/1
P 192.168.20.0/24, 1 successor, FD is 20512000
   via Connected,Serial 0/1
```

Based on the information shown above, which of the routers shown could produce the output shown?

A. TestKing1
B. TestKing2
C. TestKing3
D. Cannot be determined from the information shown

Answer: A
Explanation:
The following is sample output from the show ip eigrp topology command:
Router# show ip eigrp topology

IP-EIGRP Topology Table for process 77

Codes: P - Passive, A - Active, U - Update, Q - Query, R - Reply,
r - Reply status

P 172.16.90.0 255.255.255.0, 2 successors, FD is 0
via 172.16.80.28 (46251776/46226176), Ethernet0
via 172.16.81.28 (46251776/46226176), Ethernet1
via 172.16.80.31 (46277376/46251776), Serial0
P 172.16.81.0 255.255.255.0, 1 successors, FD is 307200
via Connected, Ethernet1
via 172.16.81.28 (307200/281600), Ethernet1
via 172.16.80.28 (307200/281600), Ethernet0
via 172.16.80.31 (332800/307200), Serial0
Since in our example, the networks listed are connected are 192.168.2.0 and 192.168.10.0, this command must have been issued on router TestKing1.

QUESTION NO: 18
The TestKing network topology is displayed below:

Exhibit, TestKing1 configuration

```
Gateway of last report is 0.0.0.0 to network 0.0.0.0

     200.1.1.0/24 is variably subnetted, 5 subnets, 3 masks
C       200.1.1.192/26 is directly connected, Loopback0
C       200.1.1.128/30 is directly connected, Serial0
D       200.1.1.64/26 [90/2195456] via 200.1.1.130, 00:02:15, Serial0
D       200.1.1.0/24 is a summary, 00:00:41, Null0
C       200.1.1.0/26 is directly connected, Ethernet0
     200.1.2.0/30 is subnetted, 1 subnets
C       200.1.2.4 is directly connected, Serial1
S*   0.0.0.0/0 is directly connected, Serial1
TestKing1#
```

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Based on the output of the TestKing1#show ip routecommand shown above and the information displayed in the network topology exhibit, which of the following is a potential routing problem?

A. The use of summarization for discontiguous networks
B. the use of CIDR with a routing protocol that does not support it
C. the use of VLSM with a routing protocol that does not support it
D. The use of the no auto-summary command with a protocol that does not support summarization
E. the use of the ip route 0.0.0.0 0.0.0.0 command with a routing protocol that does not support it

Answer: A
Explanation:
By default, EIGRP will automatically summarize networks at their network boundary, which can cause problems with dis-contiguous IP networks. Since the IP routing table does indeed show a summary route to null 0, the default behavior of EIGRP was not modified. In this network, it would be best to disable the automatic summarization feature of EIGRP.

QUESTION NO: 19
The TestKing WAN is using EIGRP. Which two of the following are valid characteristics of this routing protocol? (Select two answer choices)

A. Has a maximum hop count of 25
B. Can differentiate between internal and external routes
C. Uses a 32-bit metric
D. Can maintain only one routing table
E. Need all networks to use the same subnet mask
F. Supports only one routed protocol

Answer: B, C
Explanation:
By default, the EIGRP composite metric is a 32-bit quantity that is a sum of the segment delays and the lowest segment bandwidth.
Enhanced IGRP supports internal and external routes. Internal routes originate within an Enhanced IGRP AS. Therefore, a directly attached network that is configured to run Enhanced IGRP is considered an internal route and is propagated with this information throughout the Enhanced IGRP AS. External routes are learned by another routing protocol or reside in the routing table as static routes. These routes are tagged individually with theidentity of their origin.
Incorrect Answers:
A. This choice is wrong since it does not use hop count but a metrics that includes: bandwidth*, delay*, load, reliability, and MTU size. (* used by default).
D. This choice is wrong since we know that it keeps a three tables (neighbor table, topology table, and route table) and if you want to be a nit pick and say it still only supports one route table, then if you configure IP and IPX on the router, you will have two route tables one for each protocol.
E. This choice is wrong since we know that EIGRP supports VLSM.
F. This choice is wrong since we know it supports IP, IPX and AppleTalk.

QUESTION NO: 20
Router TK1 is running EIGRP. In EIGRP; what is a feasible successor (FS) and where is it stored in this router?

A. A FS is a primary route, stored in the routing table
B. A FS is a backup route, stored in the routing table
C. A FS is a backup route, stored in the topology table
D. A FS is a primary route, stored in the topology table
E. None of the above

Answer: C

Explanation:
The following are some terms relating to EIGRP:
1. Feasible Distance: The lowest calculated metric to each destination
2. Feasibility Condition: A condition that is met if a neighbor's advertised distance to a destination is lower that the router's Feasible Distance to that same destination.
3. Successor: The neighbor that has been selected as the next hop for a given destination based on the Feasibility Condition.
Reference: Jeff Doyle, Routing TCP/IP, Volume I, Chapter 8: Enhanced Interior Gateway Routing Protocol (EIGRP), p.336-337, Cisco Press, (ISBN 1-57870-041-8)
Additional info:
The Feasible Condition is met when the receiving router has a Feasible Distance (FD) to a particular network and it receives an update from a neighbor with a lower advertised or Reported Distance (RD) to that network. The neighbor then becomes a Feasible Successor (FS) for that route because it is one hop closer to the destination network. There may be a number of Feasible Successors in a meshed network environment.
The RD for a neighbor to reach a particular network must always be less than the FD for the local router to reach that same network. In this way EIGRP avoids routing loops. This is why routes that have RD larger than the FD are not entered into the Topology table.
Reference: Ravi Malhotra, IP Routing, Chapter 4: Enhanced Interior Gateway Routing Protocol (EIGRP), O'Reilly Press, January 2002 (ISBN 0-596-00275-0)

QUESTION NO: 21
Router TK1 is running EIGRP. In what location are EIGRP successor routes stored in this router?

A. In the routing table only.
B. In the neighbor table only.
C. In the topology table only.
D. In the routing table and neighbor table.
E. In the routing table and topology table.
F. In the topology table and neighbor table.
G. None of the above

Answer: E
Explanation:

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A destination entry is moved from the topology table to the routing table when there is a feasible successor. All minimum cost paths to the destination form a set. From this set, the neighbors that have an advertised metric less than the current routing table metric are considered feasible successors.
Feasible successors are viewed by a router as neighbors that are downstream with respect to the destination. These neighbors and the associated metrics are placed in the forwarding table. Successor information is needed by the routing table and by the topology table, so they are stored in both.

QUESTION NO: 22
Router TK1 has EIGRP configured as the only routing protocol. How does EIGRP respond if there is no feasible successor route to a destination network and the successor route fails?

A. It immediately sends its entire routing table to its neighbors.
B. EIGRP sends a Hello packet to the DR to inform it of the route failure.
C. It automatically forwards traffic to a fallback default route until a successor route is found.
D. It sends queries out to neighbors until a new successor route is found.
E. It places the route in holddown until LSA updates inform it of a new route to the network.
F. None of the above

Answer: D
Explanation:
EIGRP will send queries for successor if it can't find a path to destination (if no feasible successors already exist).

QUESTION NO: 23
EIGRP is configured on router TK1. What does this router do if it has no EIGRP feasible successor route to a destination network and the successor route to that destination network is inactive status?

A. It routes all traffic that is addresses to the destination network to the interface indicates in the routing table.
B. It sends a copy of its neighbor table to all adjacent routers.
C.

It sends a multicast query packet to all adjacent neighbors requesting available routing paths to the destination network.
D. It broadcasts Hello packets to all routers in the network to re-establish neighbor adjacencies.
E. None of the above

Answer: C
Explanation:
When the primary route is not available, EIGRP immediately uses the feasible successor as the backup route. This shortens convergence time. Now, if the primary route is gone and no feasible successor is available, the route is in active state. The only way for EIGRP to converge quickly is to query its neighbors about the unavailable route. If the neighbor doesn't know the status of the route, the neighbor asks its neighbors, and so on, until the edge of the network is reached. The query stops if one of the following occurs:
All queries are answered from all the neighbors.
The end of network is reached.
The lost route is unknown to the neighbors.
Reference:
http://www.ciscopress.com/articles/article.asp?p=27839&rl=1

Section 14: Verify network connectivity (including: using ping, traceroute, and telnet or SSH) (5 questions)

QUESTION NO: 1
As a network administrator, you use a telnet program often. What are two characteristics of Telnet? (Choose two.)

A. It is no longer supported on Cisco network devices
B. It is more secure than SSH
C. It requires that the destination device be configured to support Telnet connections
D. It requires an enterprise license in order to be implemented
E. It sends data in clear and text format

Answer: C, E

QUESTION NO: 2
Which of the following IOS commands could you use to troubleshoot a router connectivity problem on an IP network? (Select all valid answers)

A. show ip route
B. ipconfig
C. tracert
D. show interfaces
E. traceroute
F. ping
G. All of the above

Answer: A, D, E, F
Explanation:
A. The show ip route command displays the IP route table.
D. The show interfaces EXEC command to display statistics for all interfaces configured on the router or access server.
E. Traceroute is a valid router command, used to trace the path to a destination, and provide the latency associated with each hop.
F. The ping command tests connectivity to a remote node.
Incorrect Answers:
B, C. These are commands used on PC hosts. They are invalid router commands.

QUESTION NO: 3
What IOS command verifies connectivity between two hosts on the TestKing network by sending and receiving ICMP echo messages?

A. ping
B. tracert
C. netstat
D. show cdp neighbors detail
E. show ip route
F. traceroute
G. ipconfig

Answer: A

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Explanation:
Packet Internet Groper (PING) uses ICMP echo requests and replies to verify network connectivity. It is most commonly used to verify connectivity to another device and to monitor the operational status of a device.

QUESTION NO: 4
Part of the TestKing network is shown below:

In this network segment, host TestKingA is trying to communicate with Host TestKingB. The e0 interface on Router TestKing3 is down. Which of the following are true? (Choose two.)

A. Router TestKing3 will send a Source Quench message type.
B. Router TestKing3 will use ICMP to inform Host TestKingA, Router TestKing1, and Router TestKing2 that Host TestKingB cannot be reached.
C. Router TestKing3 will send a Router Selection message type.
D. Router TestKing3 will send a Destination Unreachable message type.
E. Router TestKing3 will use ICMP to inform Router TestKing2 that Host TestKingB cannot be reached.
F. Router TestKing3 will use ICMP to inform Host TestKingA that Host TestKingB cannot be reached.

Answer: D, F

QUESTION NO: 5
What kind of message does a PING send out to test connectivity?

A. ICMP echo request
B. Information interrupt request
C. Timestamp reply
D. Source quench
E. None of the above

Answer: A
Explanation:
The ping command sends an ICMP echo request packet to the stated destination address. The TCP/IP software at the destination then replies to the ping echo request packet with a similar packet, called the ICMP echo reply.
Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 146

Section 15: Troubleshoot routing issues (5 questions)

QUESTION NO: 1
The topology table for the TestKing EIGRP network is shown below from router TestKing3:

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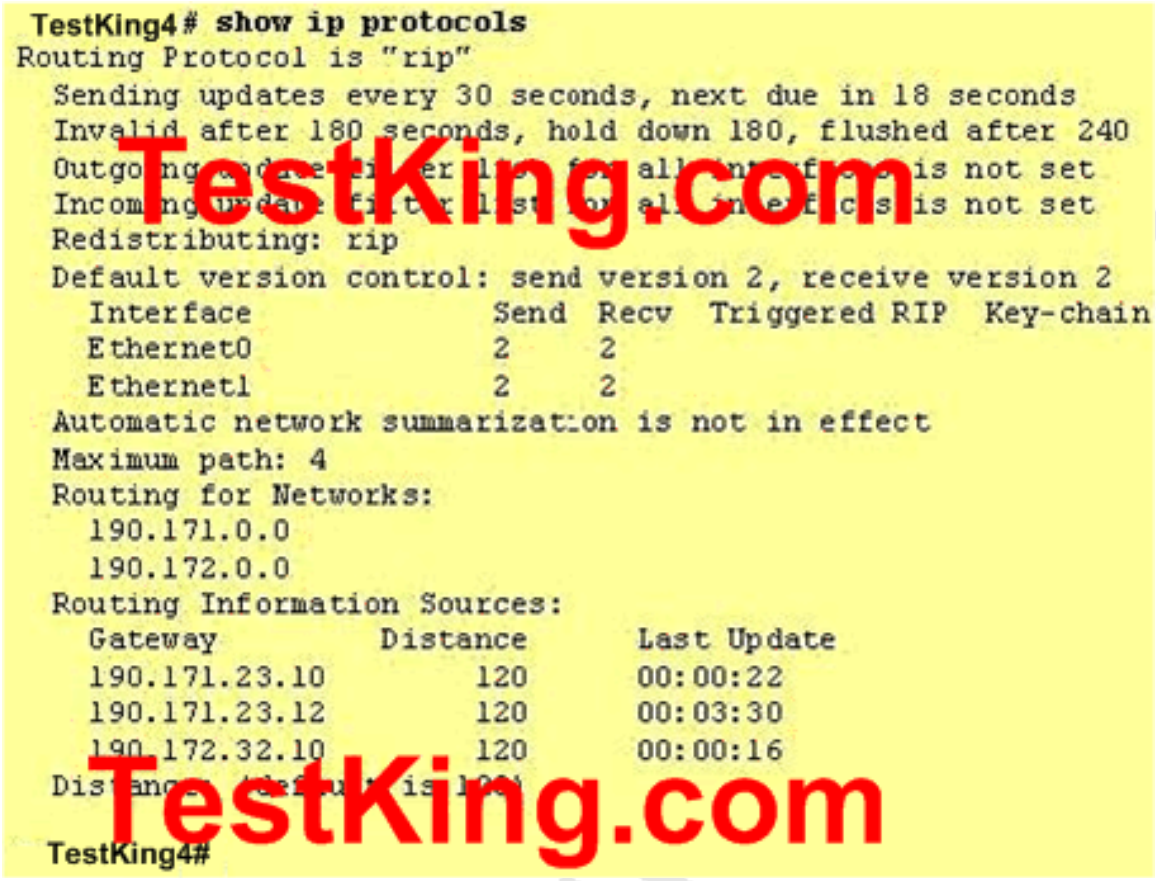
Based on the information shown above, how many broadcast domains exist in the TestKing EIGRP topology?

A. Six
B. One
C. Three
D. Two
E. Five
F. Four
G. None of the above

Answer: C

QUESTION NO: 2
The following output was shown on router TestKing4:

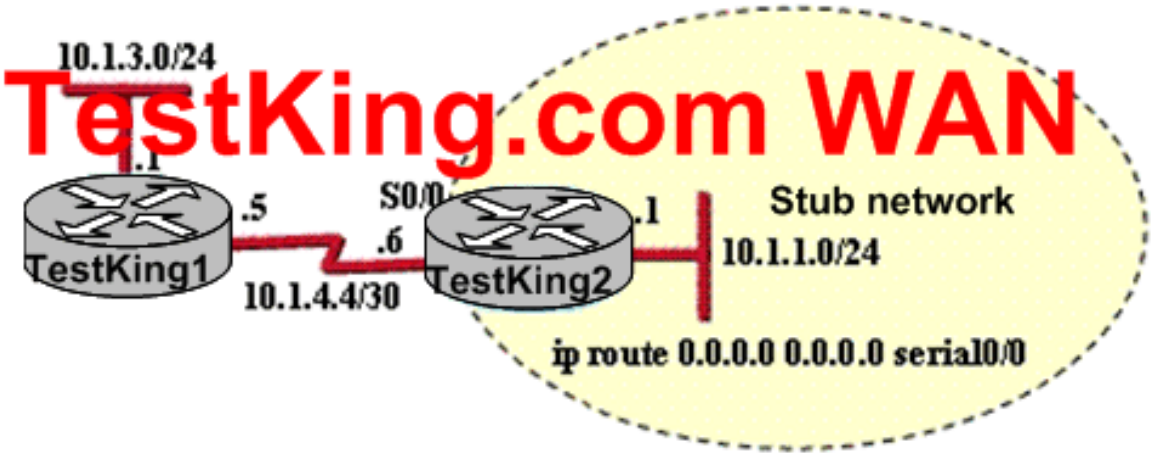


Based on the output of TestKing4 shown above, what can be determined about routes that are learned from the router at IP address 190.171.23.12?

A. If TestKing4 Router does not receive an update from 190.171.23.12 in 30 seconds, all routes from that source will be removed from the routing table
B. TestKing4 Router last received an update from 190.171.23.12 at 3:30am
C. 190.171.23.12 is expected to send an update to TestKing4 Router for network 190.172.0.0 in 3 minutes and 30 seconds
D. If TestKing4 Router does not receive an update from 190.171.23.12 in 30 seconds, all routes from that source will be flagged with a hold-down timer
E. None of the above

Answer: A

QUESTION NO: 3
Part of the TestKing WAN is shown below:

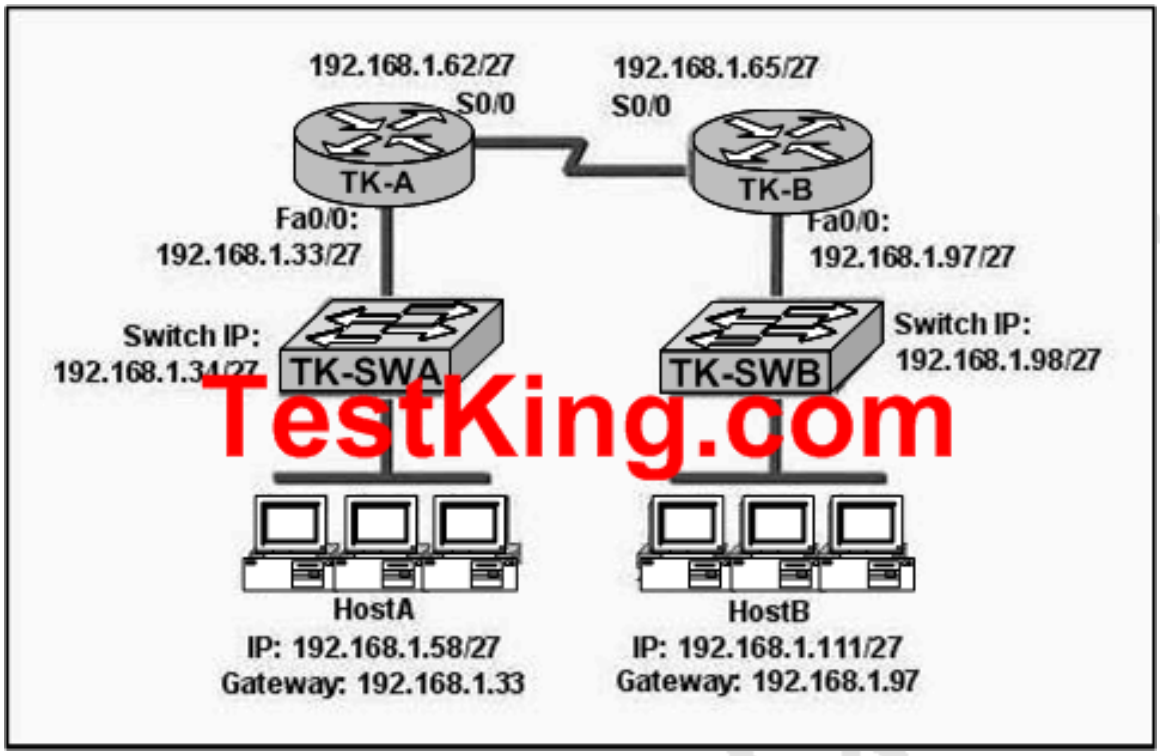


In this TestKing network segment, subnet 10.1.3.0/24 is unknown to router TestKing2. Which router command will prevent router TestKing2 from dropping a packet destined for the 10.1.3.0/24 network if a default route is configured?

A. ip default-network
B. network 10.1.1.0
C. ip classless
D. network 10.1.1.0 0.0.0.255 area 0
E. None of the above

Answer: C

QUESTION NO: 4
In the network below, HostA cannot ping HostB. Assuming routing is properly configured, what could be the cause of this problem?



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A. The Fa0/0 interface on TK-B is using a broadcast address.
B. The serial interfaces of the routers are not on the same subnet.
C. The address of SwitchA is a subnet address.
D. The Fa0/0 interface on router TK-A is on a subnet that can't be used.
E. HostA is not on the same subnet as its default gateway.
F. None of the above

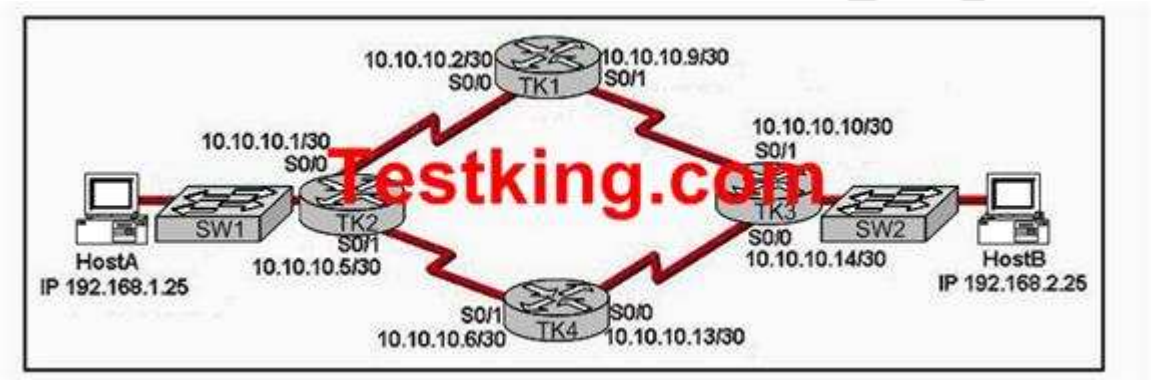
Answer: B
Explanation:
A subnet mask of /27 (255.255.255.224) will have 3 bits used for the network portion and 5 bits for the host portion. This will create 2^3 = 8 networks with 2^5 = 32 hosts per network. From this we know that the number of subnets will be a multiple of 32, making the subnets:

1. 192.168.1.0
2. 192.168.1.32
3. 192.168.1.64
4. 192.168.1.96

5. 192.168.1.128
6. 192.168.1.160
7. 192.168.1.192
8. 192.168.1.224

From this, we can see that the serial interface of router TK-A lies within the second network shown above while the serial interface of TK-B lies within the third. For directly connected routers they should be in the same IP subnet.

QUESTION NO: 5
The TestKing network is shown in the exhibit below:



The show ip route command was issued from one of the routers shown in the exhibit and the following output was displayed:

10.0.0.0/30 is subnetted, 4 subnets
O 10.10.10.8 [110/128] via 10.10.10.2, 00:02:44, Serial0/0
O 10.10.10.12 [110/128] via 10.10.10.6, 00:02:44, Serial0/1
C 10.10.10.0 is directly connected, Serial0/0
C 10.10.10.4 is directly connected, Serial0/1
C 192.168.1.0/24 is directly connected, FastEthernet0/0
O 192.168.2.0/24 [110/138] via 10.10.10.6, 00:02:44, Serial0/1 [110/138] via 10.10.10.2, 00:02:44, Serial0

Which router produced this output?

A. TK1
B. TK2
C. TK3
D. TK4

Answer: B
Explanation:
You can see the host having address 192.168.1.25 is connected to the TK2 router through switch SW1 in the ethernet port of the router. Based on the diagram, the 192.168.1.0 is connected to the LAN port of TK2, and in the routing table we see that this network is indeed shown as a connected route on the Fa 0/0 interface.

Section 16: Verify router hardware and software operation using SHOW & DEBUG commands. (8 questions)

QUESTION NO: 1
The following debug was used on a TestKing router:

```
TestKing3 #debug ip rip
        RIP protocol debugging is on
        TestKing3#
        1d05h: RIP: sending v1 update to 255.255.255.255 via FastEthernet0/0 (172.16.1.1)
        1d05h: RIP: build update entries
        1d05h:  network 10.0.0.0 metric 1
        1d05h:  network 192.168.1.0 metric 2
        1d05h: RIP: sending v1 update to 255.255.255.255 via Serial0/0 (10.0.8.1)
        1d05h: RIP: build update entries
        1d05h:  network 172.16.0.0 metric 1
        TestKing3#
        1d05h: RIP: received v1 update from 10.0.15.2 on Serial0/0
        1d05h:      192.168.1.0 in 1 hops
        1d05h:      192.168.168.0 in 16 hops (inaccessible)
```

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Based on the information shown above, which of the following statement are true regarding the command output shown in the exhibit? (Choose two)

A. There are at least two routers participating in the RIP process
B. A ping to 10.0.15.2 will be successful
C. A ping to 192.168.168.2 will successful
D. RtrA has three interfaces participating in the RIP process

Answer: A, B

QUESTION NO: 2
The "show interface Ethernet 0" command was issued on a TestKing router as shown below:

```
router# show interfaces ethernet 0
Ethernet 0 is up, line protocol is up
Hardware is MCI Ethernet, address is aa00.0400.0134 (via 0000.0c00.4369
Internet address is 131.108.1.1, subnet mask is 255.255.255.0
MTU 1500 bytes, BW 10000 Kbit,DLY 1000 usec,rely 255/255,load 1/255
Encapsulation ARPA, loopback not set, keepalive set (10 sec)
ARP type: ARPA, PROBE, ARP Timeout 4:00:00
Last input 0:00:00, output 0:00:00,output hang never
Output queue 0/40, 0 drops; input queue 0/75, 2 drops
Five minute input r
Five-minute outp
2295197 packets input, 305539992 bytes,
Received 1925500 broadcasts, 534 runts, 0 giants
3 input errors, 3 CRC, 0 frame, 0 overrun, 0 ignored, 0 abort
0 input packets with dribble condition detected
3594664 packets output, 436549843 bytes, 0 underruns
8 output errors,1790 collisions,10 interface resets,0 restarts
```

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The router output shown in the graphic indicates that 534 runts have been detected by the router interface. What are possible causes of this condition?

A. A large number of collisions

B. A faulty network interface card
C. A decrease in the size of the collision domain
D. Fragment-free switching
E. Incorrect network addressing
F. TTL failures

Answer: A, B
Explanation:
Runts are packets that are discarded because they are smaller than the medium's minimum packet size. Any Ethernet packet that is less than 64 bytes is considered a runt.
In half-duplex environments, it is possible for both the switch and the connected device to sense the wire and transmit at exactly the same time and result in a collision. Collisions can cause runts, FCS, and alignment errors, caused when the frame is not completely copied to the wire, which results in fragmented frames.
Runts are the result of collisions, faulty NIC's, duplex mismatch, IEEE 802.1Q (dot1q), or an Inter-Switch Link Protocol (ISL) configuration issue.
Reference:
http://www.cisco.com/en/US/products/hw/switches/ps700/products_tech_note09186a00800a7af0.shtml

QUESTION NO: 3
Why was the "show processes" command used on a TestKing router before a debug command was entered on it?

A. To verify that the CPU utilization is low enough to handle the effects of a debug command
B. To verify the amount of space in flash memory
C. To view the number of timers that are currently in use
D. To check if the load meter file has enough space left to store the output of the debug command
E. To verify the IOS version that is running
F. None of the above

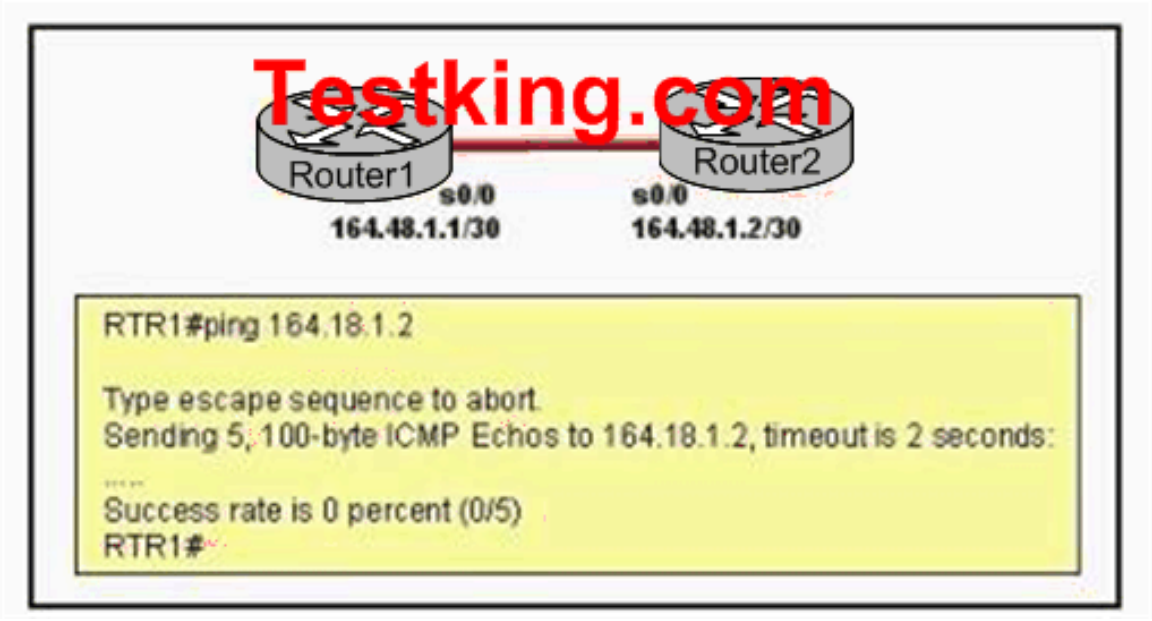
Answer: A
Explanation:
The show processes command displays information about the active processes. Issue the show processes cpu command to display detailed CPU utilization statistics on these processes and the

show processes memory command to show the amount of memory used.
The following is a sample output of the show processes command:
TK1#show processes

```
CPU utilization for five seconds: 0%/0%; one minute: 0%; five
minutes: 0%
PID Q Ty PC Runtime(ms) Invoked uSecs Stacks TTY Process
1 C sp 602F3AF0 0 1627 0 2600/3000 0 Load Meter
2 L we 60C5BE00 4 136 29 5572/6000 0 CEF Scanner
3 L st 602D90F8 1676 837 2002 5740/6000 0 Check heaps
4 C we 602D08F8 0 1 0 5568/6000 0 Chunk Manager
5 C we 602DF0E8 0 1 0 5592/6000 0 Pool Manager
6 M st 60251E38 0 2 0 5560/6000 0 Timers
7 M we 600D4940 0 2 0 5568/6000 0 Serial Backgroun
8 M we 6034B718 0 1 0 2584/3000 0 OIR Handler
9 M we 603FA3C8 0 1 0 5612/6000 0 IPC Zone Manager
```

It is always a good idea to check the CPU utilization levels before doing anything that may increase the CPU load, such as using debug commands.

QUESTION NO: 4
Two TestKing routers are directly connected as shown below:



A network administrator cannot access Router2 from Router1. The interface is up and the line protocol is up on interface serial 0/0 on Router1. What command can the administrator enter on Router1 to verify the IP address of the serial interface on Router2?

A. telnet 164.18.1.2
B. show arp
C. show cdp neighbors detail
D. show interfaces
E. show ip route
F. trace 164.18.1.2
G. None of the above

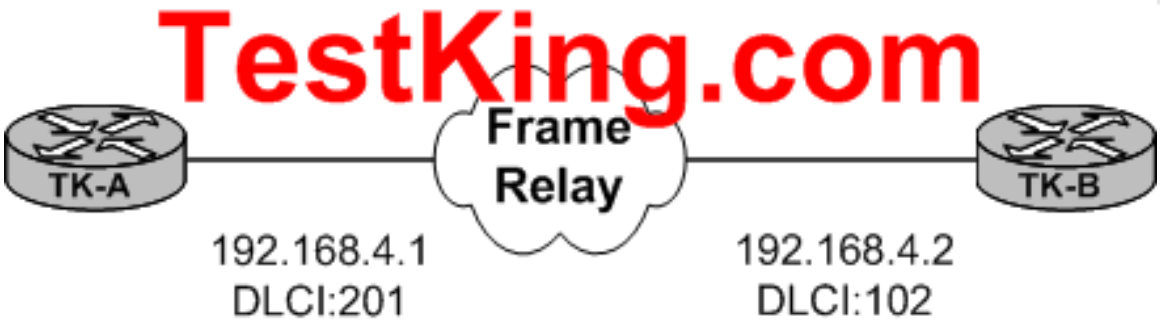
Answer: C
Explanation:
CDP is the cisco proprietary protocol developed by cisco is used to collect the information of locally attached or remote devices. If you unable to ping but connected interface's status for interface and line is up then you can use the show cdp neighbor detail to collect the Router's ID interface, assigned IP Address, platform etc.
The following is sample output for the show cdp neighbors detail command.

```
router#show cdp neighbors detail
-------------------------
Device ID: lab-7206
Entry address(es):
IP address: 172.19.169.83
Platform: cisco 7206VXR, Capabilities: Router
Interface: Ethernet0, Port ID (outgoing port): FastEthernet0/0/0
Holdtime : 123 sec
Version :
Cisco Internetwork Operating System Software
IOS (tm) 5800 Software (C5800-P4-M), Version 12.1(2)
Copyright (c) 1986-2002 by Cisco Systems, Inc.
advertisement version: 2
Duplex: half
```

QUESTION NO: 5

Refer to the TestKing network shown below. A ping from 192.168.4.1 to 192.168.4.2 was unsuccessful. Which three commands will provide the most useful troubleshooting information? (Choose three)

Exhibit:



A. show interfaces
B. show protocols
C. show ip route
D. show frame-relay map
E. show frame-relay pvc
F. show ip protocols

Answer: A, D, E
Explanation:
When troubleshooting connections between two directly connected routers over a frame relay network, the first step would be to issue the "show interfaces" command to ensure that the interfaces and line protocol is up for each. If they are indeed up, then the next step would be to troubleshoot the frame relay connection itself and looking at the status of the PVC by using the "show frame-relay map" and "show frame-relay pvc" commands.
Commonly Used Frame Relay Commands:
This section describes two Cisco IOS commands that are especially useful when configuring Frame Relay.
show frame-relay pvc
This command shows the status of the permanent virtual circuit (PVC), packets in and out, dropped packets if there is congestion on the line via forward explicit congestion notification (FECN) and backward explicit congestion notification (BECN), and so on. For a detailed description of the fields used with the show frame-relay pvc command, click here.
show frame-relay map

Use this command to determine if frame-relay inverse-arp resolved a remote IP address to a local DLCI. This command is not enabled for point-to-point subinterfaces. It is useful for multipoint interfaces and subinterfaces only.

Reference:

http://www.cisco.com/en/US/partner/tech/tk713/tk237/technologies_tech_note09186a008014f8a7.shtml#t

QUESTION NO: 6

A network administrator is having trouble with a remote router. The administrator connects to the router via telnet and types a debug command, but no debug output appears on the screen. What command should the administrator type to view the debug output?

A. TestKing1# show debug
B. TestKing1# debug all
C. TestKing1# terminal monitor
D. TestKing1# no debug *
E. TestKing1# enable debug

Answer: C

Explanation:

To display debug command output and system error messages for the current terminal and session, use the terminal monitor command in EXEC mode.

Remember that all terminal parameter-setting commands are set locally and do not remain in effect after a session is ended. By default, debug messages can be seen when connected to the router via the console, but not when using telnet.

QUESTION NO: 7

In the network below, a TestKing user is trying to send a file from a host on Network A to a server on Network Z. The file transfer fails. The host on Network A can communicate with other hosts on Network A. Which command, issued from router TestKing1, would be the most useful for troubleshooting this problem?

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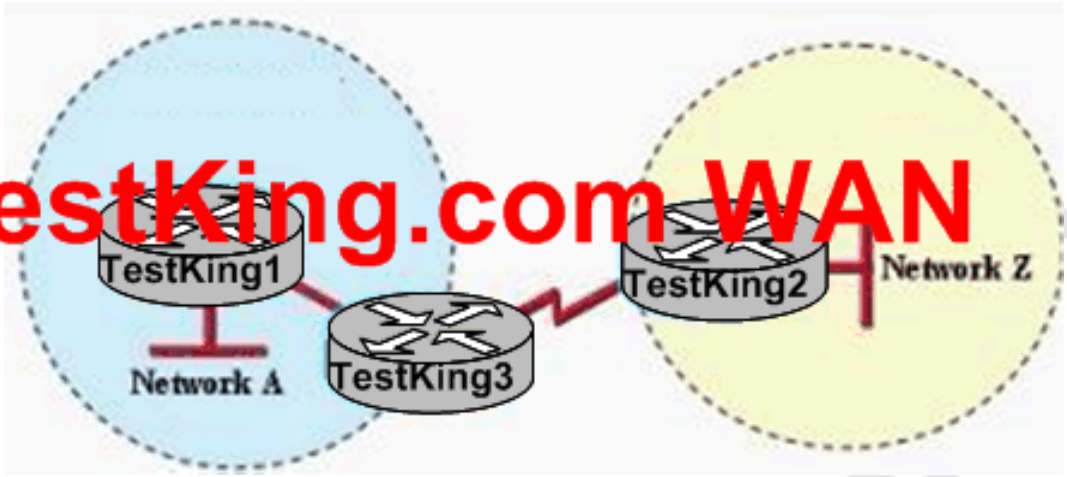

A. show version
B. show flash:
C. show interfaces
D. show history
E. show controllers serial
F. None of the above

Answer: C
Explanation:
This problem is most likely due to a communication problem with the ftp server. Using the show interface command can be used to verify the IP address, speed, errors,, configuration, etc. One of the first steps in troubleshooting any connectivity issue is to issue the "show interfaces" command to ensure that all of the interfaces are up and active.
Incorrect Answers:
A: This is used to verify the version of IOS that the router is using.
B: This is used to see the contents of the flash memory.
D: This command displays the past commands that were issued in the router.
E: This should only be used after it has been determined that the serial interface is indeed faulty.

QUESTION NO: 8
Exhibit:

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While troubleshooting an issue on router TK1, you notice the console screen is rapidly displaying line after line of output similar to what is shown in the exhibit. The help desk has called to say that users are reporting a slowdown in the network. What will solve this problem while not interrupting network operation?

A. Enter the no debug all command.
B. Use the show processes command.
C. Save the configuration and reboot the router.
D. Press the CTRL+C keys.
E. Enter the terminal monitor command.
F. None of the above

Answer: A
Explanation:
The output shown in this example is a result of one or more debug commands that have been used to troubleshoot an issue. Using debug commands might slow down traffic on busy networks. To see the current debug command settings, enter the show debug command. To stop the debug output, enter the no debug command. To stop all debug messages from being displayed, enter the no debug all command.

Section 17: Implement basic router security (9 questions)

QUESTION NO: 1

In order to allow the establishment of a Telnet session with the TestKing2 router, which set of commands shown below, must be configured on it?

A. TestKing2(Config)#line vty 0
TestKing2(Config-line)#password cisco
TestKing2(Config-line)#login

B. TestKing2(Config)#line console 0
TestKing2 (Config-line)#enable password cisco

C. TestKing2(config)#line vty 0
TestKing2(Config-line)#enable secret cisco
TestKing2(Config-line)#login

D. TestKing2(Config)#line vty 0
TestKing2(Config-line)#enable password cisco

E. TestKing2(config)#line console 0
TestKing2(Config-line)#enable secret cisco
TestKing2(Config-line)#login

F. TestKing2(Config)#line console 0
TestKing2(Config-line)#password cisco
TestKing2(Config-line)#login

G. None of the above

Answer: A

QUESTION NO: 2
Refer to the output shown below. Why was this message received?

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A. The login command has not been set on CON 0.
B. The login command has not been set on the VTY ports.
C. No enable password has been set.
D. No VTY password has been set.
E. No enable secret password has been set.
F. No console password has been set.

Answer: D
Explanation:
This error is generated due to no telnet being set. For security reasons, the Cisco router will not allow telnet access until a password has been set. You need to set the telnet password using the following example:
Router(config)#line vty 0 4
Router(config-line)#password telnet
Router(Config-line)#login

QUESTION NO: 3
You wish to increase the security of all of the routers within the TestKing network. What can be done to secure the virtual terminal interfaces on a router? (Choose two)

A. Administratively shut down the interface.
B. Physically secure the interface.
C. Create an access list and apply it to the virtual terminal interfaces with the access-group command.
D. Configure a virtual terminal password and login process.
E. Enter an access list and apply it to the virtual terminal interfaces using the access-class command.

Answer: D, E
Explanation:
There are a total of 5 logical Virtual terminal interfaces in a Cisco router (lines 0-4) and they are used for remote access into the device via telnet. Configuring these interfaces correctly with a login and password information can be used for security, as each user will be prompted for a password in order to obtain access. A second method is to use the "access-class" command. Combined with an access list, this command can be used to specify the hosts or networks that will be allow access to the device.
Incorrect Answers:
A. Virtual terminal interfaces are logical interfaces that can not be manually shut down.
B. Virtual terminal lines are logical interfaces that reside within a router, so there is nothing that can be physically secured.
C. This command is used with access-lists for LAN and WAN interfaces, but is not used for the VTY lines.

QUESTION NO: 4
On router TK1, the TestKing network administrator issued the "service password-encryption" command. What is the effect of this configuration command?

A. Only passwords configured after the command has been entered will be encrypted.
B. Only the enable password will be encrypted.
C. It will encrypt all current and future passwords.
D. Only the enable secret password will be encrypted.
E. It will encrypt the secret password and remove the enable secret password from the configuration.
F. None of the above

Answer: C

QUESTION NO: 5
You want the text "Unauthorized access prohibited!" to be displayed before the login prompt every time someone tries to initiate a Telnet session to a TestKing router, as shown in the example below:

```
Router#telnet 192.168.15.1
Trying 192.168.15.1 ... Open

Unauthorized access prohibited!

User Access Verification

Password:
```

Which command can be used to configure this message?

A. login banner x Unauthorized access prohibited! X
B. banner exec y Unauthorized access prohibited! Y
C. banner motd x Unauthorized access prohibited! X
D. vty motd "Unauthorized access prohibited!"
E. None of the above

Answer: C
Explanation:
The message text that is displayed when users log into the router is called the "message of the day" banner, and is it can be changed with the "banner motd" command as shown in answer choice C.

QUESTION NO: 6
A TestKing router was configured as shown below:

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```
TestKingC(config)# enable password testking1
TestKingC(config)# enable secret testking2
TestKingC(config)# line vty 0 4
TestKingC(config-line)# password testking3
TestKingC(config-line)# exit
TestKingC(config)# no enable testking2
```

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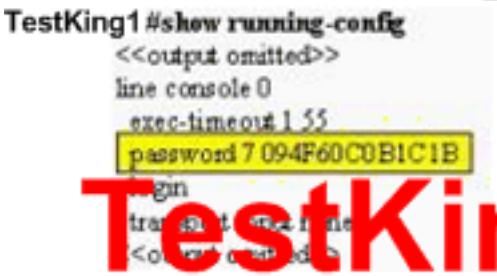
A TestKing.com technician is connected to the router console port. After configuring the commands displayed in the exhibit, the technician log out and then logs back in at the console. Which password does the technician need to enter at the router prompt get back into the privileged EXEC mode?

A. testking1
B. testking2
C. testking3
D. A password would not be required.

Answer: B
Explanation:
testking2 is the answer because the enable secret password is used to log back to the router before the enable password is used. The enable secret password always overwrites the enable password.
Answer C is incorrect because this is for the vty and not the console, so it will be required for the initial telnet login.

QUESTION NO: 7
Refer to the graphic. Although the console password was set to "testking", it displays in the router configuration as shown. What command caused the password to be stored like this?



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A. TestKing1(config)# encrypt password
B. TestKing1(config)# password-encryption md 7
C. TestKing1(config-line)# exec-timeout 1 55
D. TestKing1(config)# service password-encryption
E. None of the above

Answer: D
Explanation:
Certain types of passwords, such as Line passwords, by default appear in clear text in the configuration text file. You can use the service password-encryption command to make them more secure. Once this command is entered, each password configured is automatically encrypted and thus rendered illegible inside the configuration file (much as the Enable/Enable Secret passwords are). Securing Line passwords is doubly important in networks on which TFTP servers are used, because TFTP backup entails routinely moving config files across networks-and config files, of course, contain Line passwords.

QUESTION NO: 8
The TestKing1 and TestKing2 routers are connected together as shown below:

Users on the TestKing1 LAN are able to successfully access the resources on the TestKing2 network. However, users on TestKing1 are unable to telnet to the TestKing2 router. What do you suspect are the likely causes of this problem? (Select two answer choices)

A. PPP authentication configuration problem.
B. A misconfigured IP address or subnet mask
C. An access control list
D. A defective serial cable.
E. No clock rate on interface s0 on TestKing2
F. A missing vty password.

Answer: C, F
Explanation:
An ACL or a router configured without a VTY password will prevent users from being able to telnet into a router.
Incorrect Answers:
A, B, D, E. We know that the network is connected together and communicating back and forth because of the two way CHAP authentication happening. In addition, the LAN users are able to get to each other with no problems. Therefore A is incorrect, B is incorrect, D is incorrect, and E is incorrect.

QUESTION NO: 9 DRAG DROP
You work as a network administrator at TestKing.com.
Your boss, Mrs. Tess King, is interested in password configuration commands.
Match the commands below with the appropriate tasks. Note that one of the commands will not be used.

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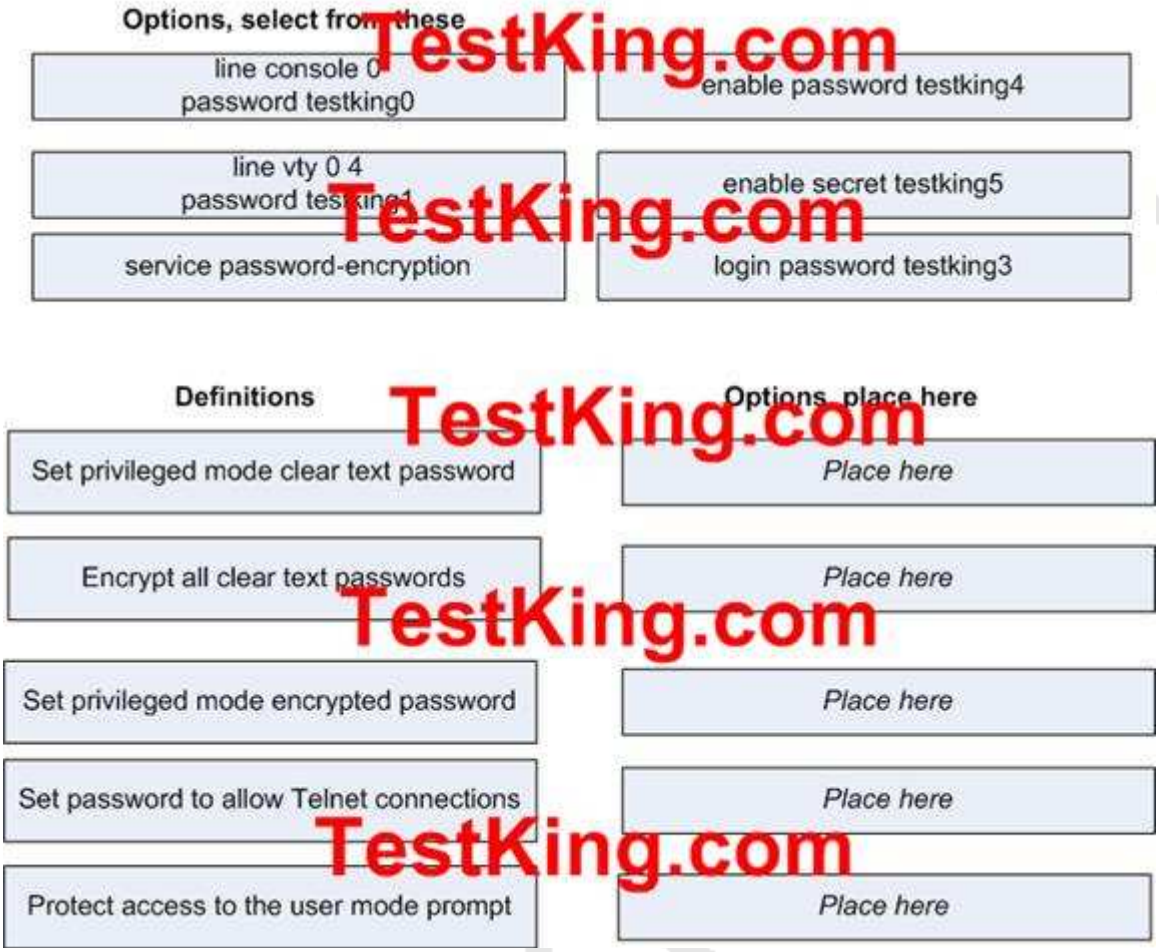

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Answer:

Explanation:

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Topic 5, EXPLAIN AND SELECT THE APPROPRIATE ADMINISTRATIVE TASKS REQUIRED FOR A WLAN (14 questions)

Section 1: Describe standards associated with wireless media (including: IEEE WI-FI Alliance, ITU/FCC) (2 questions)

QUESTION NO: 1
A new TestKing is using an IEEE 802.11b a wireless LAN. What is the maximum data rate specified for this WLAN?

A. 11 mbps
B. 100 mbps
C. 54 mbps
D. 10 mbps
E. 1000 mbps
F. 16 mbps
G. None of the above

Answer: A
Explanation:
The maximum speed for 802.11b is 11 Mbps.
Incorrect Answers:
A. This is the maximum speed for legacy Ethernet networks.
C. This is the maximum speed supported by the other prevalent wireless standards, 802.11a and 802.11g.
D, E. This is the maximum speed of Ethernet and Gig E connections.
F. This is the maximum data rate for token ring.

QUESTION NO: 2
Which IEEE standard is used to define Wi-Fi?

A. IEEE 802.3

B. IEEE 802.5
C. IEEE 802.11h
D. IEEE 802.11c
E. IEEE 802.11

Answer: E
Explanation:
IEEE 802.11 was the original standard for wireless networks. However, the standard had a few ambiguities allowed for potential problems with compatibility between devices. To ensure compatibility, a group of companies formed the Wireless Ethernet Compatibility Alliance (WECA), which has come to be known as the Wi-Fi Alliance, to ensure that their products would work together. The term Wi-Fi is now used to refer to any IEEE 802.11 wireless network products that have passed the Wi-Fi Alliance certification tests.
Incorrect Answers:
A. This is the standard used for Ethernet networks.
B. This is the standard used in Token Ring networks.
C, D: These standards are not currently used. The most prevalent types of wireless 802.11 networks are 802.11a, 802.11b, and 802.11g.

Section 2: Identify and describe the purpose of the components in a small wireless network. (Including: SSID, BSS, ESS) (3 questions)

QUESTION NO: 1
802.1b is being utilized in the TestKing wireless network. Which spread spectrum technology does the 802.1b standard define for operation in this network?

A. FHSS
B. IR
C. DSSS and FHSS
D. DSSS
E. IR, FHSS and DSSS
F. None of the above

Answer: D
Explanation:

In telecommunications, direct-sequence spread spectrum (DSSS) is a modulation technique. As with other spread spectrum technologies, the transmitted signal takes up more bandwidth than the information signal that is being modulated. The name 'spread spectrum' comes from the fact that the carrier signals occur over the full bandwidth (spectrum) of a device's transmitting frequency.

QUESTION NO: 2
Two TestKing workers have established wireless communication directly between their wireless laptops. What type of wireless topology has been created by these TestKing employees?

A. ESS
B. IBSS
C. SSID
D. BSS
E. None of the above

Answer: B
Explanation:
An independent BSS (IBSS) is an ad-hoc network that contains no access points, which means they can not connect to any other basic service set.

QUESTION NO: 3
Three access points have been installed and configured to cover a small office. What term defines the wireless topology?

A. ESS
B. IBSS
C. SSID
D. BSS

Answer: A
Explanation:
Extended service set:

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An extended service set (ESS) is a set of connected Basic Service Sets. Access points in an ESS are connected by a distribution system. Each ESS has an ID called the SSID which is a 32-byte (maximum) character string. For example, "linksys" is the default SSID for Linksys routers.

Section 3: Identify the basic parameters to configure on a wireless network to ensure that devices connect to the correct access point (2 questions)

QUESTION NO: 1
A single 802.11g access point has been configured and installed in the center of a square shaped TestKing office. A few wireless TestKing users are experiencing slow performance and drops while most users are operating at peak efficiency. From the list below, what are three likely causes of this problem? (Choose three)

A. Null SSID
B. Mismatched TKIP encryption
C. Cordless phones
D. Antenna type or direction
E. Mismatched SSID
F. Metal file cabinets
G. Microwave ovens in the break room

Answer: C, D, F
Explanation:
C: If you have cordless phones or other wireless electronics in your home or office, your computer might not be able to "hear" your router over the noise from the other wireless devices. To quiet the noise, avoid wireless electronics that use the 2.8GHz frequency. Instead, look for cordless phones that use the 5.8GHz or 900MHz frequencies.
D: The antennas supplied with your router are designed to be omni-directional, meaning they broadcast in all directions around the router. If your router is near an outside wall, half of the wireless signals will be sent outside your office, and much of your router's power will be wasted.

Since most users operate at peak efficiency in our example, it could be that a few of the users are simply placed too far from the antenna, or the antenna is not placed in the center of the office.
F: Metal, walls, and floors will interfere with your router's wireless signals. The closer your router is to these obstructions, the more severe the interference, and the weaker your connection will be.

QUESTION NO: 2
Part of the TestKing wireless LAN is shown below:

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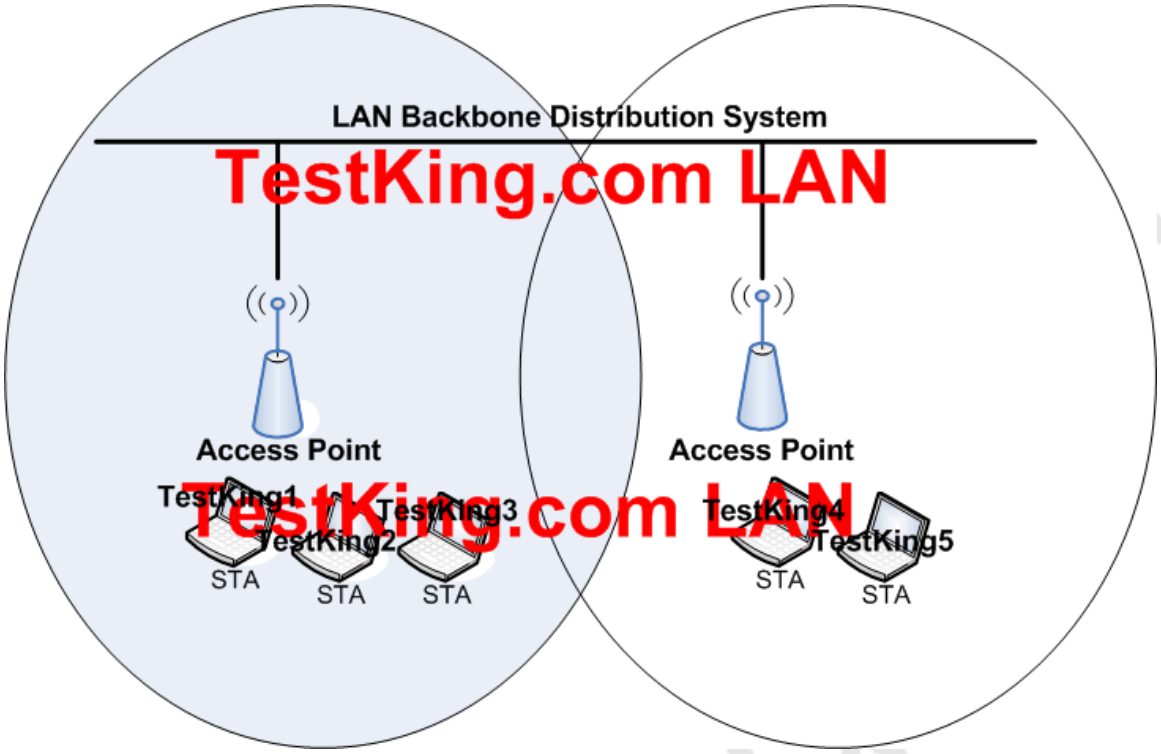

What two facts can be determined from the diagram of the TestKing WLAN shown above? (Choose two)

A. Access points in each cell must be configured to use channel 1
B. The network diagram represents an extended service set (ESS)
C. The two AP's should be configured to operate on different channels
D. The area of overlap of the two cells represents a basic service set (BSS)
E. The area of overlap must be less than 10% of the area to ensure connectivity

F. There are too many hosts on this WLAN

Answer: B, C

Section 4: Compare and contrast wireless security features and capabilities of WPA security (including: open, WEP, WPA-1/2) (4 questions)

QUESTION NO: 1
You are responsible for securing the TestKing Wireless LAN using WPA. Which two statements best describe the wireless security standard that is defined by WPA? (Choose two)

A. It requires use of an open authentication method
B. It specifies the use of a dynamic encryption keys that change each time a client establishes a connection
C. It includes authentication by PSK
D. It specifies use of a static encryption key that must be changed frequently to enhance security

Answer: B, C
Explanation:
WPA is a more powerful security technology for Wi-Fi networks than WEP. It provides strong data protection by using encryption as well as strong access controls and user authentication. WPA utilizes 128-bit encryption keys and dynamic session keys to ensure your wireless network's privacy and enterprise security.
There are two basic forms of WPA:
- WPA Enterprise (requires a Radius server)
- WPA Personal (also known as WPA-PSK)

Either can use TKIP or AES for encryption. Not all WPA hardware supports AES.

WPA-PSK is basically an authentication mechanism in which users provide some form of credentials to verify that they should be allowed access to a network. This requires a single password entered into each WLAN node (Access Points, Wireless Routers, client adapters, bridges). As long as the passwords match, a client will be granted access to a WLAN.
Encryption mechanisms used for WPA and WPA-PSK are the same. The only difference between the two is in WPA-PSK, authentication is reduced to a simple common password, instead of user-specific credentials.
The Pre-Shared Key (PSK) mode of WPA is considered vulnerable to the same risks as any other shared password system - dictionary attacks for example. Another issue may be key management difficulties such as removing a user once access has been granted where the key is shared among multiple users, not likely in a home environment.
Reference: http://www.dslreports.com/faq/wifisecurity/2.2_WPA

QUESTION NO: 2
In an effort to increase security within the TestKing wireless network, WPA is being utilized. Which two statements shown below best describe the wireless security standard that is defined by WPA? (Choose two)

A. It requires use of an open authentication method
B. It specifies use of a static encryption key that must be changed frequently to enhance security
C. It includes authentication by PSK
D. It specifies the use of dynamic encryption keys that change each time a client establishes a connection
E. It requires that all access points and wireless devices use the same encryption key
F. WPA works only with Cisco access points

Answer: C, D

QUESTION NO: 3
TestKing has chosen WPA over WEP in their wireless network. What is one reason why WPA encryption is preferred over WEP in this network?

A. The WPA key values remain the same until the client configuration is changed.
B. The values of WPA keys can change dynamically while the system is used.

C. The access point and the client are manually configured with different WPA key values.
D. A WPA key is longer and requires more special characters than the WEP key.
E. None of the above

Answer: B

QUESTION NO: 4
You need to determine the proper security settings on a new TestKing WLAN-capable office. Which encryption type would WPA2 use in this office?

A. PSK
B. AES-CCMP
C. PPK via IV
D. TKIP/MIC
E. None of the above

Answer: B
Explanation:
In 2004, the IEEE 802.11i task group responsible for Wi-Fi security for the WLAN provided a series of recommendations to fix known problems with Wireless Equivalent Privacy (WEP). Its recommendations included using encryption techniques known as Advanced Encryption Standard Counter-Mode Cipher Block Chaining (AES-CCMP) or AES for short.
AES is not the end of the story, as the industry had a problem when it moved from WEP to AES. What could be done, for example, about legacy devices that could not support the upgrade to AES? The IEEE 802.11i task group recommended using the Temporal Key Integrity Protocol (TKIP). As a patch, TKIP is not as secure as AES, but it protects against all currently known attacks.
The urgent need to fix WEP caused the Wi-Fi Alliance to develop security patch recommendations for Wi-Fi Protected Access (WPA) before the IEEE finalized standards. WPA was drawn from an early draft of the IEEE 802.11i standard, and there are significant differences between WPA and TKIP. What is similar is that neither the WPA patch for WEP nor the TKIP patch is as secure as AES.
The Wi-Fi Alliance later came out with a new security recommendation-WPA, version 2 (WPA2)-to make WPA consistent with IEEE 802.11i standards. One improvement to WPA2 was the recommendation to use AES-CCMP encryption mode. WPA2 has thus become synonymous with AES.

The table below summarizes the different encryption algorithms used for WLAN privacy.

WLAN Encryption Options		
Most secure	AES-CCMP/WPA2	They are resistant to all known crypto-analysis
Believed secure	TKIP and WPA patch to WEP	They offer defense against currently known attacks
Weak security	WEP	They can be cracked by analyzing a sufficient amount of data transmission.

Reference: http://www.convergedigest.com/bp-bbw/bp1.asp?ID=465&ctgy=Mesh

Section 5: Identify common issues with implementing wireless networks. (Including: Interface, missconfiguration) (3 questions)

QUESTION NO: 1
You need to add a wireless access point to a new TestKing office. Which additional configuration step is necessary in order to connect to an access point that has SSID broadcasting disabled?

A. Configure open authentication on the AP and the client
B. Set the SSID value in the client software to public
C. Set the SSID value on the client to the SSID configured on the AP
D. Configure MAC address filtering to permit the client to connect to the AP
E. None of the above

Answer: C

QUESTION NO: 2

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Which of the following data network would you implement if you wanted a wireless network that had a relatively high data rate, but was limited to very short distances?

A. Broadband personal comm. Service (PCS)
B. Broadband circuit
C. Infrared
D. Spread spectrum
E. Cable

Answer: C
Explanation:
A good example of the range of an infrared is a television remote control or a garage door opener. Infrared networks are capable of high data rates, but they are limited in the distance between the infrared points, and also by the fact that a line of sight between the nodes is usually required.
Incorrect Answers:
A, D: Although these are both wireless methods, the data rate capabilities are somewhat limited, especially when compared to infrared links.
B, E: Although these are both capable of relatively high data rates, they do not use wireless technology.

QUESTION NO: 3
You need to troubleshoot an interference issue with the TestKing wireless LAN. Which two devices can interfere with the operation of this network because they operate on similar frequencies? (Choose two)

A. Microwave oven
B. AM radio
C. Toaster
D. Copier
E. Cordless phone
F. IP phone
G. I-pod

Answer: A, E

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Topic 6, IDENTIFY SECURITY THREATS TO A NETWORK AND DESCRIBE GENERAL METHODS TO MITIGATE THOSE THREATS (9 questions)

Section 1: Describe today's increasing network security threats and explain the need to implement a comprehensive security policy to mitigate the threats (2 questions)

QUESTION NO: 1
You need to create a security plan for the TestKing network. What should be part of a comprehensive network security plan?

A. Delay deployment of software patches and updates until their effect on end-user equipment is well known and widely reported
B. Minimize network overhead by deactivating automatic antivirus client updates
C. Encourage users to use personal information in their passwords to minimize the likelihood of passwords being forgotten
D. Physically secure network equipment from potential access by unauthorized individuals
E. Allow users to develop their own approach to network security
F. None of the above

Answer: D
Explanation:

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Computer systems and networks are vulnerable to physical attack; therefore, procedures should be implemented to ensure that systems and networks are physically secure. Physical access to a system or network provides the opportunity for an intruder to damage, steal, or corrupt computer equipment, software, and information. When computer systems are networked with other departments or agencies for the purpose of sharing information, it is critical that each party to the network take appropriate measures to ensure that its system will not be physically breached, thereby compromising the entire network. Physical security procedures may be the least expensive to implement but can also be the most costly if not implemented. The most expensive and sophisticated computer protection software can be overcome once an intruder obtains physical access to the network.

QUESTION NO: 2
As the TestKing network security administrator, you are concerned with the various possible network attacks. Which type of attack is characterized by a flood of packets that are requesting a TCP connection to a server?

A. Trojan Horse
B. Reconnaissance
C. Denial of Service
D. Brute Force
E. Virus
F. Worm

Answer: C
Explanation:
A denial-of-service attack (DoS attack) is an attempt to make a computer resource unavailable to its intended users. Although the means to, motives for and targets of a DoS attack may vary, it generally comprises the concerted, malevolent efforts of a person or persons to prevent an Internet site or service from functioning efficiently or at all, temporarily or indefinitely. Among these are Network connectivity attacks.
These attacks overload the victim with TCP packets so that its TCP/IP stack is not able to handle any further connections, and processing queues are completely full with nonsense malicious packets. As a consequence of this attack, legitimate connections are denied.
One classic example of a network connectivity attack is a SYN Flood

Section 2: Explain general methods to mitigate common security threats to network devices, hosts, and applications (2 questions)

QUESTION NO: 1
The TestKing administrator is concerned with enhancing network security. To do this, what are two recommended ways of protecting network device configuration files from outside security threats on the network? (Choose two)

A. Use a firewall to restrict access from the outside to the network devices
B. Allow unrestricted access to the console or VTY ports
C. Prevent the loss of passwords by disabling encryption
D. Always use Telnet to access the device command line because its data is automatically encrypted
E. Use SSH or another encrypted and authenticated transport to access device configurations
F. Use easy to remember passwords so that they are not forgotten

Answer: A, E
Explanation:
Whenever the trusted (inside) part of the network connects to an untrusted (outside, or internet) network, the use of a firewall should be implemented to ensure only legitimate traffic is allowed within the enterprise. SSH is a secure alternative to telnet that encrypts the traffic so that data carried within can not be "sniffed." It is always recommended to use SSH over telnet whenever possible.

QUESTION NO: 2
You want to enable telnet access to a TestKing router as securely as possible. Which of the following commands would you execute if you wanted to enable others to establish a telnet session on a Cisco router?

A. testking1(config)# line console 0
testking1(config-if)# enable password testking
B. testking1(config)# line vty 0
testking1(config-line)#enable password testking
C. testking1(config)# line vty 0
testking1(config-line)#enable secret testking

testking1(config-line)# login
D. testking1(config)# line console 0
testking1(config-line)#enable secret testking
testking1(config-line)#login
E. testking1(config)#line console 0
testking1(config-line)# password testking
testking1(config-line)#login
F. testking1(config)#line vty 0
testking1(config-line)#password testking
testking1(config-line)#login

Answer: F
Explanation:
Telnet sessions use virtual terminal sessions, which are configured under the "line vty" portion of the configuration. There are 5 total vty sessions that can be configured, numbered 0-4. In order to be prompted for a password, one must be configured. Choice F gives the 3 commands needed to allow a single telnet session.
Incorrect Answers:
A, B, C, D. The telnet password needs to be configured in addition to the enable password. Without the initial password configured, users that try to telnet to the router will receive a "password required, but none set" message.
D, E. Telnet uses VTY ports, not the console port.

Section 3: Describe the functions of common security appliances and applications (1 question)

QUESTION NO: 1
You want to increase the security in the TestKing network. What are the two security appliances that can be installed in this network? (Choose two)

A. SDM
B. ATM
C. IDS
D. IOX
E. IPS

F. IOS
G. FR

Answer: C, E

Section 4: Describe security recommended practices including initial steps to secure network devices (4 questions)

QUESTION NO: 1
TestKing University has a small campus where 25 faculty members are located. The faculty offices and student computers are currently on the same network. The faculty is concerned about students being able to capture packets going across the network and obtain sensitive material. What could a network administrator do to protect faculty network traffic from student connections?

A. Install anti-virus software on the student computers.
B. Put the faculty computers in a separate VLAN.
C. Power down the switches that connect to faculty computers when they are not in use.
D. Remove the student computers from the network and put them on a peer-to-peer network.
E. Create an access list that blocks the students from the Internet where the hacking tolls are located.
F. None of the above

Answer: B
Explanation:
Main Functions of a VLAN:
1. The VLAN can group several broadcast domains into multiple logical subnets.
2. You can accomplish network additions, moves, and changes by configuring a port into the appropriate VLAN.
1. You can place a group of users who need high security into a VLAN so that no users outside f the VLAN can communicate with them.
2. As a logical grouping of users by function, VLANs can be considered independent from heir physical or geographic locations.
3. VLANs can enhance network security.
4. VLANs increase the number of broadcast domains while decreasing their size.

QUESTION NO: 2
What are three valid reasons to assign ports on VLANs on a new TestKing LAN switch? (Choose three)

A. To make VTP easier to implement
B. To isolate broadcast traffic
C. To increase the size of the collision domain
D. To allow more devices to connect to the network
E. To logically group hosts according to function
F. To increase network security

Answer: B, E, F
Explanation:
Main Functions of a VLAN (see previous question):
1. The VLAN can group several broadcast domains into multiple logical subnets.
2. You can accomplish network additions, moves, and changes by configuring a port into the appropriate VLAN.
1. You can place a group of users who need high security into a VLAN so that no users outside f the VLAN can communicate with them.
2. As a logical grouping of users by function, VLANs can be considered independent from heir physical or geographic locations.
3. VLANs can enhance network security.
4. VLANs increase the number of broadcast domains while decreasing their size.

QUESTION NO: 3
What set of router configuration commands causes the message shown in the exhibit below?

A. TestKing1(config)# line console 0

TestKing1(config-line)# service password-encryption
TestKing1(config-line)# login
B. TestKing1(config)# line console 0
TestKing1(config-line)# enable password cisco
TestKing1(config-line)# login
C. TestKing1(config)# line console 0
TestKing1(config-line)# enable password cisco
TestKing1(config-line)# logging synchronous
D. TestKing1(config)# line console 0
TestKing1(config-line)# enable secret cisco
TestKing1(config-line)# login
E. TestKing1(config)# line console 0
TestKing1(config-line)# password cisco
TestKing1(config-line)# login
F. None of the above

Answer: E
Explanation:
Use the line con 0 command to configure the console line. Use the login and password commands to configure the console for login with a password. Here is an example using the Battle Creek router:
Battle>enable
Password:*******
TK1#conf term
TK1(config)#line con 0
TK1(config-line)#login
TK1(config-line)#password oatmeal
Tk1(config-line)#^Z
The "login" command is needed to enforce users to log in to the router using the console connection.

QUESTION NO: 4
Refer to the TestKing network shown below:

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For security reasons, information about TestKing1, including platform and IP addresses, should not be accessible from the Internet. This information should, however, be accessible to devices on the internal networks of TestKing1. Which command or series of commands will accomplish these objectives?

A. TestKing1(config)#no cdp enable
B. TestKing1(config)#no cdp run
C. TestKing1(config)#interface s0/0
TestKing1(config-if)#no cdp run
D. TestKing1(config)#interface s0/0
TestKing1(config-if)#no cdp enable
E. None of the above

Answer: D
Explanation:

CDP is a proprietary protocol designed by Cisco to help administrators collect information about both locally attached and remote devices. By using CDP, you can gather hardware and protocol information about neighbor devices which is useful info for troubleshooting and documenting the network.
To disable the CDP on particular interface use the "no cdp enable" command. To disable CDP on the entire router use the "no cdp run" in global configuration mode.

Topic 7, IMPLEMENT, VERIFY, AND TROUBLESHOOT NAT AND ACLs IN A MEDIUM-SIZED ENTERPRISE BRANCH NETWORK. (76 questions)

Section 1: Describe the purpose and types of ACLs (9 questions)

QUESTION NO: 1
An extended access list needs to be applied to a TestKing router. What three pieces of information can be used in an extended access list to filter traffic? (Choose three)

A. Source IP Address and destination IP address
B. Source MAC address and destination MAC address
C. Source switch port number
D. VLAN number
E. Protocol
F. TCP or UDP port numbers

Answer: A, E, F

QUESTION NO: 2
The TestKing administrator is implementing access control lists in the TestKing network. What are two reasons that the TestKing network administrator would use access lists? (Choose two.)

A. To filter traffic as it passes through a router
B. To filter traffic that originates from the router
C. To replace passwords as a line of defense against security incursions
D. To control broadcast traffic through a router
E. To control VTY access into a router
F. To encrypt traffic

Answer: A, E

QUESTION NO: 3
Router TK1 is configured with an inbound ACL. When are packets processed in this inbound access list?

A. Before they are routed to an outbound interface.
B. After they are routed for outbound traffic.
C. After they are routed to an outbound interface while queuing.
D. Before and after they are routed to an outbound interface.
E. Depends on the configuration of the interface
F. None of the above

Answer: A
Explanation:
When a packet is received on an interface with an inbound access list configured, the packets are matched against the access list to determine if they should be permitted or denied. After this check, the packets are processed by the routing function. The access list check is always done first.
Incorrect Answers:
B, C. The packets are always processed by the inbound access list prior to being routed.

D. All packets are always checked against a specific access list only once. While packets traversing through a router may be checked against different access lists for each interface and in each direction (inbound and outbound), each access list is always only consulted once.

QUESTION NO: 4
Many TestKing routers are configured using access lists. Which of the following are benefits provided with access control lists (ACLs)? (Select all that apply)

A. ACLs monitor the number of bytes and packets.
B. Virus detection.
C. ACLs identify interesting traffic for DDR.
D. ACLs provide IP route filtering.
E. ACLs provide high network availability.
F. ACLs classify and organize network traffic.

Answer: C, D
Explanation:
IP access control lists allow a router to discard some packets based on criteria defined by the network engineer. The goal of these filters is to prevent unwanted traffic in the network - whether to prevent hackers from penetrating the network or just to prevent employees from using systems they should not be using.
IP access lists can also be used to filter routing updates, to match packets for prioritization, to match packets for prioritization, to match packets for VPN tunneling, and to match packets for implementing quality of service features. It is also used to specify the interesting traffic, which is used to trigger ISDN and Dial on Demand Routing (DDR) calls.
Reference:
CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 427
Incorrect Answers:
A, F: ACLs do not provide for management and traffic analysis functions such as the monitoring and organization of network packets.
B. While ACLs can be used to filter out some unwanted traffic; they can not be used to routinely provide for virus detection and removal.
E. ACLs alone do not provide for any additional level of network availability.

QUESTION NO: 5
Router TK1 is configured using a named ACL. Which of the following answer choices are correct characteristics of named access list? (Select all that apply)

A. You can delete individual statements in a named access list
B. Named access lists require a numbered range from 1000 to 1099.
C. Named access lists must be specified as standard or extended.
D. You can use the ip access-list command to create named access lists.
E. You cannot delete individual statements in a named access list.
F. You can use the ip name-group command to apply named access lists.

Answer: A, C, D
Explanation:
Named access lists have two advantages over numbered access lists: the first one being that a name is easier to remember and the second being the fact that you can delete individual statements in a named access list. That makes A correct.
When you create a named access list you use the ip access-list command, and you have to specify whether it's standard or extended (since there are no numbers). So C and D are both correct. An example from the textbook is the command, "ip access-list extended Barney"
Incorrect Answers:
B. Named access lists don't require a number range from 1000 to 1099 so B is incorrect.
E. Answer choice E is not true.
F. This is incorrect because the command ip name-group is absolutely unnecessary.
Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Pages 443-445

QUESTION NO: 6
A standard IP access list is applied to an Ethernet interface of router TK1. What does this standard access list filter on?

A. The source and destination addresses
B. The destination port number
C. The destination address
D. The source address
E. All of the above

Answer: D

Explanation:
The standard IP access-list will only filter on the source address contained in the packet. Extended access lists can filter on the source and destination address and port information.

QUESTION NO: 7
What are two reasons that the TestKing network administrator would use access lists on a router? (Choose two.)

A. To filter traffic as it passes through a router
B. To filter traffic that originates from the router
C. To replace passwords as a line of defense against security incursions
D. To control vty access into a router
E. To control broadcast traffic through a router

Answer: A, D
Explanation:
Access lists are used to process data received by a router can be divided into two broad categories:
1. traffic that passes through the router via the forwarding path (choice A)
2. traffic destined for the router via the receive path for route processor handling, such as ssh/telnet vty access (Choice D)

In normal operations, the vast majority of traffic simply flows through a router en route to its ultimate destination.
Incorrect Answers:
B: Traffic originated by the router will bypass the access list.
C: Access lists can be used to permit or deny access, but it can not be used to replace the need for passwords for authorizing users into the system.
E: Routers do not forward broadcast traffic by default, and this is true regardless if access lists are configured or are not.

QUESTION NO: 8
Which of the following are characteristics of named access lists? (Choose three)

A. Individual statements in a named access list may be deleted.
B. They require a numbered range from 1000 to 1099.
C. When created, they must be specified as standard or extended.

D. They are created with the ip access-list command.
E. The entire access list must be deleted before editing.
F. They are applied with the ip name-group command.

Answer: A, C, D
Explanation:
You can identify IP access lists with an alphanumeric string (a name) rather than a number. Named access lists allow you to configure more IP access lists in a router than if you were to use numbered access lists. If you identify your access list with a name rather than a number, the mode and command syntax are slightly different. Currently, only packet and route filters can use a named list.
Consider the following guidelines before configuring named access lists:

Access lists specified by name are not compatible with Cisco IOS Releases prior to 11.2.

Not all access lists that accept a number will accept a name. Access lists for packet filters and route filters on interfaces can use a name.

A standard access list and an extended access list cannot have the same name.
To configure a named access list (standard and extended):

Router(config)# ip access-list standard *name*	Defines a standard IP access list using a name and enters standard named access list configuration mode.

Router(config)# ip access-list extended *name*	Defines an extended IP access list using a name and enters extended named access list configuration mode.

Reference:
http://www.cisco.com/en/US/products/ps6350/products_configuration_guide_chapter09186a0080430e5b.h

QUESTION NO: 9

What are the general recommendations regarding the placement of access control lists? (Choose two)

A. Standard ACLs should be placed as close as possible to the source of traffic to be denied.
B. Extended ACLs should be placed as close as possible to the source of traffic to be denied .
C. Standard ACLs should be placed as close as possible to the destination of traffic to be denied .
D. Extended ACLs should be placed as close as possible to the destination of traffic to be denied .

Answer: B, C
Explanation:
Standard Access Lists:
l Access-list list# {permit/deny} source IP [wildcard mask]
l interface [router port]
l ip access-group [list#] in|out (out is the default)
l If a match is made, the action defined in this access list statement is performed.
l If no match is made with an entry in the access list, the deny action is performed (implicit deny)
l Should be put close to the destination address because you can not specify the destination address, only the source information is looked at.

Extended Access List:
l Access-list list# {permit/deny} protocol source [source mask] destination [destination mask] operator [port]
l Should be put close to the source
l Since extended ACLs have destination information, you want to place it as close to the source as possible.
l Place an extended ACL on the first router interface the packet enters and specify inbound in the access-group command.

Section 2: Configure and apply ACLs based on network filtering requirements. (including: CLI/SDM) (24 questions)

QUESTION NO: 1
Part of the TestKing network is shown in the following topology exhibit:

In this network, an access list has been designed to prevent HTTP traffic from the accounting department from reaching the TestKingI server attached to the TestKing2 router. Which of the following access lists will accomplish this task when grouped with the e0 interface on the TestKing router?

A. permit ip any any
deny tcp 172.17.17.252 0.0.0.0 172.16.16.0 0.0.0.255 eq 80
B. deny tcp 172.17.17.252 0.0.0.0 172.16.16.0 0.0.0.255 eq 80
permit ip any any
C. deny tcp 172.16.16.0 0.0.0.255 172.17.17.252 0.0.0.0 eq 80
permit ip any any
D. permit ip any nay
deny tcp 172.16.16.0 0.0.0.255 172.17.17.252 0.0.0.0 eq 80
E. None of the above

Answer: C

QUESTION NO: 2
For security reasons, the TestKing network administrator needs to prevent pings into the corporate networks from hosts outside the internetwork. Using access control lists, which protocol should be blocked?

A. IP
B. UDP
C. TCP
D. ICMP
E. None of the above

Answer: D
Explanation:
A ping is a computer network tool used to test whether a particular host is reachable across an IP network. It works by sending ICMP "echo request" packets to the target host and listening for ICMP "echo response" replies. ping estimates the round-trip time, generally in milliseconds, and records any packet loss, and prints a statistical summary when finished.

ICMP ping packet				
	Bit 0 - 7	**Bit 8 - 15**	**Bit 16 - 23**	**Bit 24 - 31**
Header	Version/IHL	Type of service	Length	
Identification		flags et offset		
Time To Live(TTL)	Protocol	CRC		
Source IP address				
Destination IP address				
Payload	Type of message	Code	CRC	
Quench				
Data (optional)				

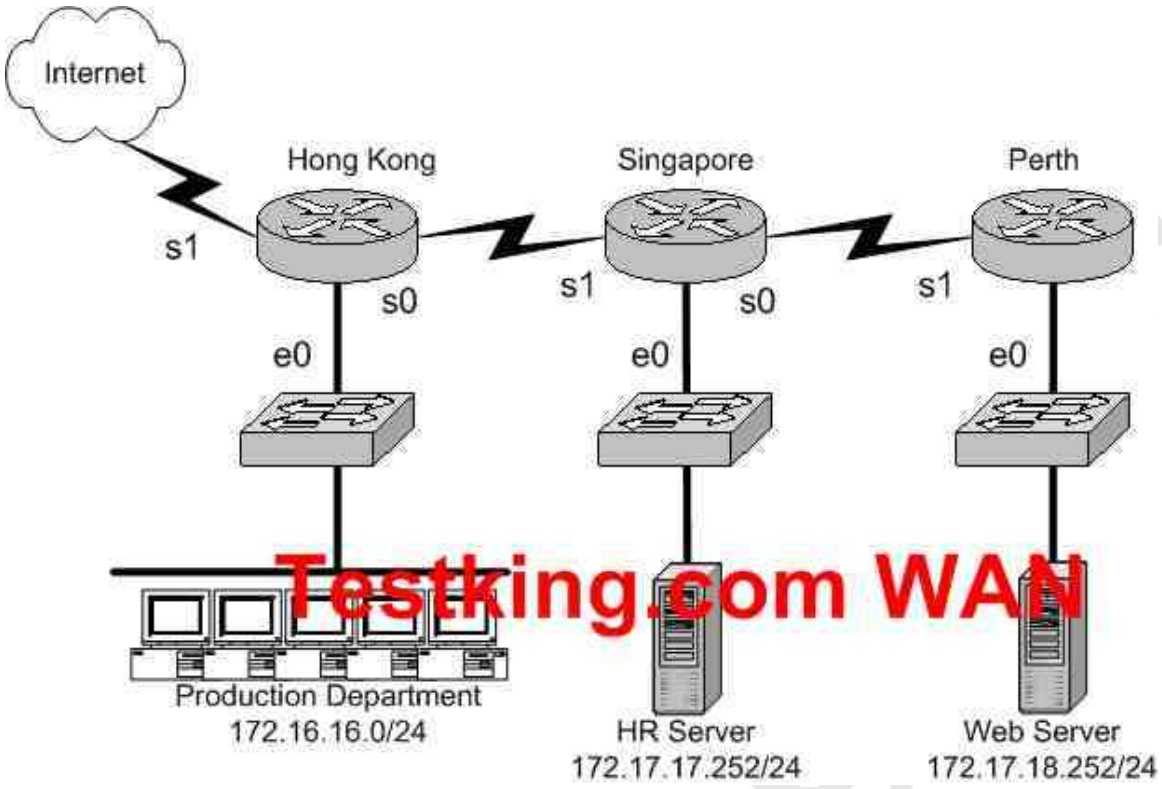
QUESTION NO: 3
Part of the TestKing network is shown below:

You work as a network technician at TestKing. TestKing is concerned about unauthorized access to the TestKingE server. The TestKing1, TestKing4, TestKing6 and TestKing7 PCs should be the only computers with access to the TestKingE server. What two technologies should be implemented to help prevent unauthorized access to this server? (Choose two)

A. Encrypted router passwords
B. VLANs
C. STP
D. VTP
E. Access lists
F. Wireless LANs
G. Switches

Answer: B, E

QUESTION NO: 4
The Testking worldwide WAN is shown in the exhibit below:



On the Hong Kong router an access list is needed that will accomplish the following:

1. Allow a Telnet connection to the HR Server through the Internet
2. Allow internet HTTP traffic to access the webserver
3. Block any other traffic from the internet to everything else

Which of the following access list statements are capable of accomplishing these three goals? (Select all that apply)

A. access-list 101 permit tcp any 172.17.18.252 0.0.0.0 eq 80

B. access-list 1 permit tcp any 172.17.17.252 0.0.0.0 eq 23
C. access-list 101 permit tcp 172.17.17.252 0.0.0.0 any eq 23
D. access-list 101 deny tcp any 172.17.17.252 0.0.0.0 eq 23
E. access-list 101 deny tcp any 172.17.18.252 0.0.0.0 eq 80
F. access-list 101 permit tcp any 172.17.17.252 0.0.0.0 eq 23

Answer: A, F
Explanation:
Because of the implicit deny rule at the end of every access list, only two choices need to be made, as the final requirement is automatic.
A. This is correct as we need to allow the access list to allow port 80 connections (port 80 = HTTP) from anywhere, to the web server's IP address.
F. This will fulfill the first requirement, as it allows port 23 (Telnet) traffic from anywhere.
Incorrect Answers:
B. The answer asks you to create an access list, a single one. The answer choices require you to choose two answers. For two statements to be on the same list, you need them to have the same number. So answer choice B can be ruled out by process of elimination. In addition to this, access list 1 is an illegal number, since we need an extended access list to use source and destination information, and extended access lists are in the 100-199 range.
C. This is incorrect as it allows telnet traffic from the HR server to the Internet, but we need it to be the other way around.
D, E: Because of the implicit deny any rule; we need to only be concerned with the access rules that permit traffic.

QUESTION NO: 5
The Testking WAN is displayed below:

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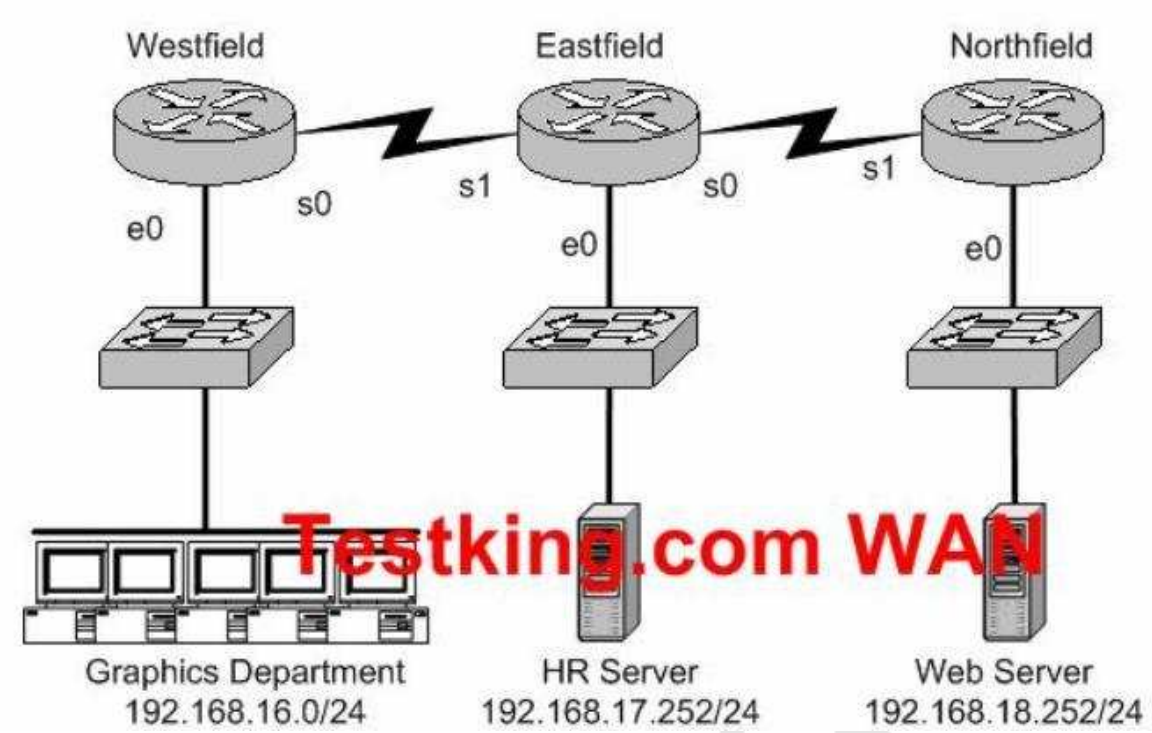

An access list needs to be implemented that will block users from the Graphics Department from telnetting to the HR server; and this list is to be implemented on the Ethernet 0 interface of the Westfield router for the inbound direction. All other office communications should be allowed. Which of the following answer choices would accomplish this?

A. deny tcp 192.168.16.0 0.0.0.255 192.168.17.252 0.0.0.0 eq 23
permit ip any any
B. permit ip any any
deny tcp 192.168.16.0 0.0.0.255 192.172.252 0.0.0.0 eq 23
C. permit ip any any

deny tcp 192.168.17.252 0.0.0.0 192.168.0 0.0.0.255 eq 23
D. deny tcp 192.168.18.262 0.0.0.0 192.168.16.0 0.0.0.255 eq 23
permit ip any any
E. None of the above

Answer: A
Explanation:
The syntax for an access list is the source address first then the destination address. In this case the source address is 192.168.16.0/24 and the destination address 192.168.17.252. The "permit ip any any" statement is required because of the implicit deny all at the end of every access list. Generally speaking, all access lists require at least one permit statement, otherwise all traffic will be denied through the interface.

QUESTION NO: 6
The Testking WAN is shown below:

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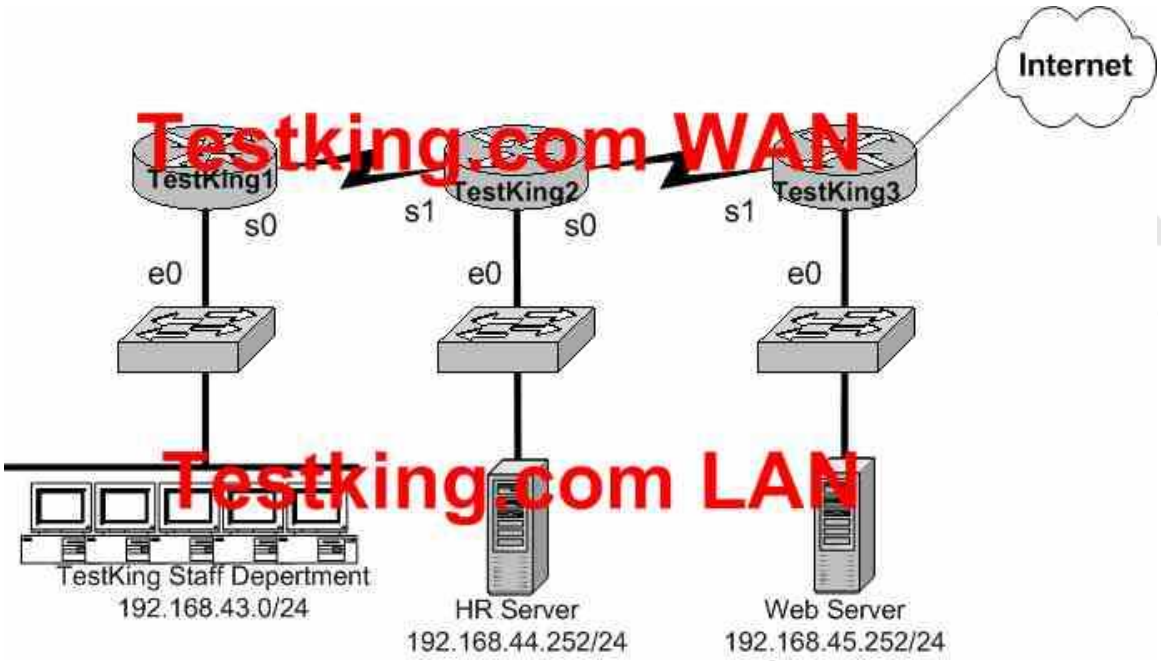


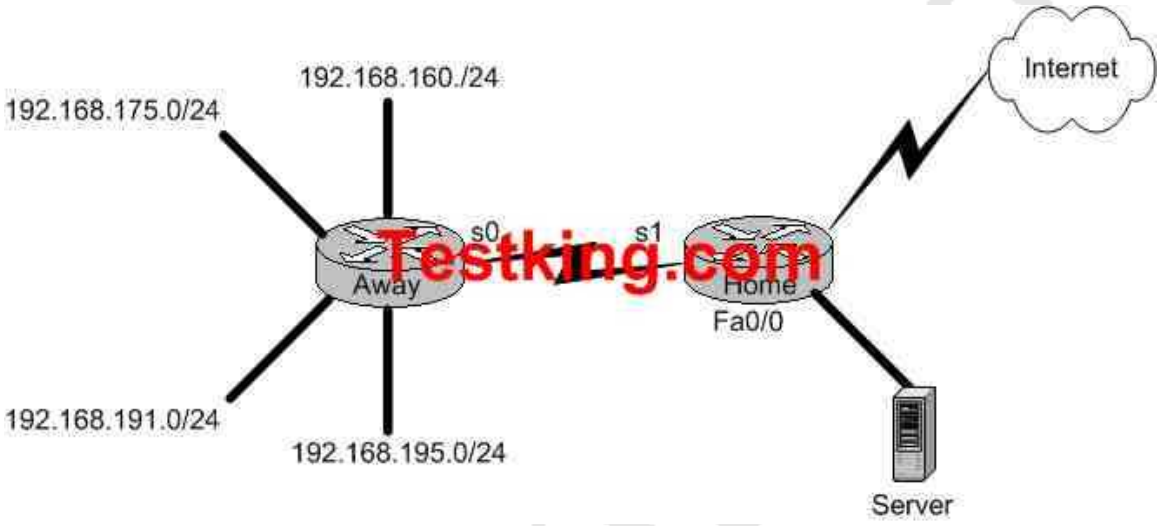
Your goal is to allow FTP access to the HR server, while blocking out all other traffic. Which of the access list configurations below will fulfill your goal? (Select two answer choices)

A. Access-list 101 Permit tcp any 192.168.44.252 0.0.0.0 eq 21
B. Access-list 101 Permit tcp any 192.168.44.252 0.0.0.0 eq 20
C. Access-list 101 Permit tcp 192.168.44.252 0.0.0.0 any eq 20
D. Access-list 101 Permit tcp 192.168.44.252 0.0.0.0 any eq 21
E. Access-list 101 Deny tcp any 192.168.44.255 0.0.0.0 gt 21
F. Access-list 101 Permit tcp 192.168.44.255 0.0.0.0 any gt 21

Answer: A, B

Explanation:
FTP uses two ports: TCP port 20 and TCP port 21. you want to allow all hosts (ANY) to access the HR server (192.168.44.252 0.0.0.0) through ftp (eq 20 & eq 21) and the implicit deny any rule will block everything else.

QUESTION NO: 7
The Testking Network is displayed in the flowing diagram:



You need to place an access list on the Fa0 interface of the Home router; that will deny access to all hosts that lie within the range 192.168.160.0-192.168.191.0. Hosts in the 192.168.195.0 network should be granted full access. Which one of the following answer choices fulfills your needs?

A. access-list 1 deny 192.168.163.0 0.0.0.255
B. access-list 1 deny 192.168.128.0 0.0.127.255
C. access-list 1 deny 192.168.160.0 0.0.255.255
D. access-list 1 deny 192.168.160.0 0.0.31.255
E. None of the above

Answer: D
Explanation:
This question is really more of an inverse subnet masking questions than a security question. Your goal is to block access to the host range 192.168.160.0- 192.168.191.0 while allowing everything else (including hosts from 192.168.195.0) full access. Answer choice D is correct because the address and mask are numbered correctly.

QUESTION NO: 8
Which of the following access list statements would deny traffic from a specific host?

A. Router(config)# access-list 1 deny 172.31.212.74 any
B. Router(config)# access-list 1 deny 10.6.111.48 host
C. Router(config)# access-list 1 deny 172.16.4.13 0.0.0.0
D. Router(config)# access-list 1 deny 192.168.14.132 255.255.255.0
E. Router(config)# access-list 1 deny 192.168.166.127 255.255.255.255

Answer: C
Explanation:
Only choice C is the correct syntax for a specific host. The access list is denying all traffic from the host with IP address 172.16.4.13. It is important to note that in an access list, the subnet mask is the inverse. Normally, a host subnet mask is 255.255.255.255, but in an access list it is 0.0.0.0.
Incorrect Answers:
A. The syntax is incorrect here, as there is no subnet mask at all specified.
B. This would be an acceptable choice, if the "host" keyword were placed in front of the IP address, not after.
D. The subnet mask here includes the entire class C network here, not an individual host.
E. In an access list, the subnet mask is an inverse mask. The mask specified here would be equivalent to all 0's in a subnet mask, meaning that the don't care bits apply to the entire address.

QUESTION NO: 9
Which IP address and wildcard mask would you use in your ACL to block all the hosts in the subnet 192.168.16.43/28?

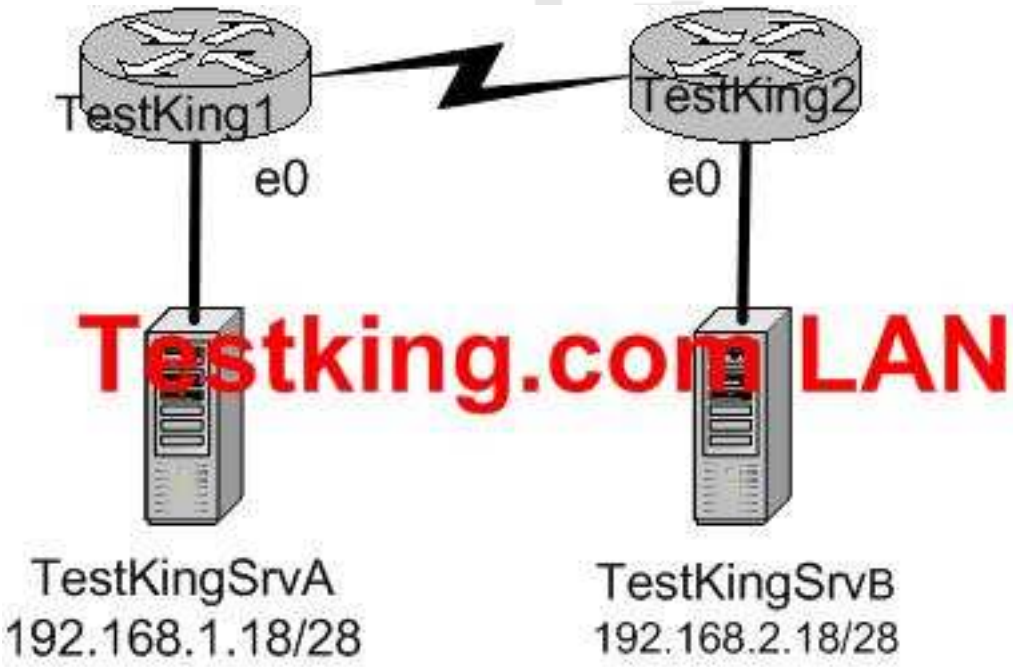
A. 192.168.16.32 0.0.0.16
B. 192.168.16.43 0.0.0.212
C. 192.168.16.0 0.0.0.15
D. 192.168.16.32 0.0.0.15
E. 192.168.16.0 0.0.0.31
F. 192.168.16.16 0.0.0.31

Answer: D
Explanation:
Since there are 28 bits in the subnet mask, we can find the inverse mask by reversing the 1's and 0's.

/28 = 11111111.11111111.11111111.11110000
/28 Inverse = 00000000.00000000.00000000.00001111 = 192.168.16.32/15

The address 192.168.16.32 and the wildcard mask 0.0.0.15 is the correct answer as shown. This will match all addresses in the 192.168.16.32-192.168.16.47 range.

QUESTION NO: 10
Two TestKing routers are connected together as shown below:



In order to control access on the Testking network, the following access list is created:

```
access-list 101 permit tcp 192.168.1.16 0.0.0.15 192.168.2 16
0.0.0.15 eq 23
```

What would happen if you applied the following ACL to any one of the TestKing routers in the above exhibit? On what interface and what direction should you apply it? Once applied, what will this access list accomplish? (Select all valid answer choices)

A. Telnet traffic from 192.168.1.16 0.0.0.15 to 168.2.16 0.0.0.15 is allowed.
B. SMTP traffic from 192.168.1.16 0.0.0.15 to 168.2.16 0.0.0.15 is allowed.
C. The ACL is configured to allow traffic from one specific host to another.
D. The ACL should be applied inbound to the e0 interface of Router TestKing1.
E. The ACL should be applied outbound to the e0 interface of Router TestKing1.

Answer: A, D
Explanation:
This is a two part question. The first part is the type of traffic that will match this specific access list entry. Since telnet uses TCP port 23, choice A is correct.
Next, to determine which interface and which direction to apply the access list, we see that the source of the traffic is the 192.168.1.16/28 network, while the destination is the 192.168.2.16/28 network. Therefore, only choice D makes sense.
Incorrect Answers:
B. SMTP uses TCP port 25.
C. There is a /15 network mask for both the source and destination in this access list, which translates to a /28 network.
E. This would not be useful if applied to the outbound, as no traffic would match then. Note that if this answer had stated that the access list be placed on the outbound serial (WAN) interface, then this would have been an acceptable choice.

QUESTION NO: 11
The TestKing network is subnetted using 29 bits for the subnet mask. Which wild card mask should be used to configure an extended access list to permit or deny access to an entire subnetwork?

A. 255.255.255.224
B. 255.255.255.248
C. 0.0.0.224
D. 0.0.0.8
E. 0.0.0.7
F. 0.0.0.3
G. None of the above

Answer: E
Explanation:
Class C wild card masks start with 0.0.0.x. The subnet used in this example is 29 bits, or subnet mask 255.255.255.248. Therefore, we are left with 7 hosts in the final octet (255-248) so the answer is 0.0.0.7.

QUESTION NO: 12
Part of the TestKing network is shown below:

The TestKing network administrator wants to prevent computers on the 192.168.23.64/26 subnet from accessing the 192.168.23.128/26 subnet via FTP. All other hosts should be allowed to access. What commands should be entered on the router to accomplish this task?

A. Router(config)#access-list 101 deny tcp 192.168.23.64 0.0.0.63 192.168.23.128 0.0.0.63 eq ftp
Router(config)#access-list 101 permit ip any any
Router(config)#interface fa0/0
Router(config-if)#ip access-group 101 in

B. Router(config)

#access-list 101 deny tcp 192.168.23.64 0.0.255 192.168.23.128 0.0.0.255 eq ftp
Router(config)#access-list 101 permit ip any any
Router(config)#interface fa0/0
Router(config-if)#ip access-group 101 in

C. Router(config)#access-list 101 deny tcp 192.168.23.64 0.0.0.63 192.168.23.128 0.0.0.63 eq ftp
Router(config)#access-list 101 permit ip any any
Router(config)#interface fa0/0
Router(config-if)#access-list 101 out

D. Router(config)#access-list 101 deny tcp 192.168.23.64 0.0.0.255 192.168.23.128 0.0.0.255 eq ftp
Router(config)#access-list 101 permit ip any any
Router(config)#interface fa0/1
Router(config-if)#ip access-group 101 in

E. Router(config)#access-list 101 deny tcp 192.168.23.128 0.0.0.63 192.168.23.64 0.0.0.63 eq ftp
Router(config)#access-list 101 permit ip any any
Router(config)#interface fa0/1
Router(config-if)#ip access-group 101 in

F. Router(config)#access-list 101 deny tcp 192.168.23.128 0.0.0.255 192.168.23.128 0.0.0.255 eq ftp
Router(config)#access-list 101 permit ip any any
Router(config)#interface fa0/1
Router(config-if)#ip access-group 101 out

Answer: A
Explanation:
Only choice A specifies the correct wildcard mask and direction. If we apply the access list to interface FA0/0, we need to specify incoming FTP traffic from the 192.168.23.64/26 network to the 192.168.23.128/26 network.
Incorrect Answers:
B, D, F. The wildcard mask for a /26 network is 0.0.0.63, not 0.0.0.255.

C. This access list statement is correct, but when it is applied to the FA0/0 interface it needs to be in the incoming direction.
E. This access list needs to be applied to interface FA0/0, not FA0/1. Alternatively, it could have been applied to interface FA0/1, but in the outbound direction, not the inbound direction.

QUESTION NO: 13
The network topology for a TestKing location is shown below:

Refer to the graphic. It has been decided that Workstation 1 should be denied access to Server1. Which of the following commands are required to prevent only Workstation 1 from accessing Server1 while allowing all other traffic to flow normally? (Choose two)

A. RouterTK1(config)# interface fa0/0
RouterTK1(config-if)# ip access-group 101 out
B. RouterTK1(config)# interface fa0/0
RouterTK1(config-if)# ip access-group 101 in
C. RouterTK1(config)# access-list 101 deny ip host 172.16.161.150 host 172.16.162.163
RouterTK1(config)# access-list 101 permit ip any any
D. RouterTK1(config)# access-list 101 deny ip 172.16.161.150 0.0.0.255 172.16.162.163 0.0.0.0
RouterTK1(config)# access-list 101 permit ip any any

Answer: B, C
Explanation:
To block communication between Workstation A and Server 1, we have to configure Extended Access List.

To define an extended IP access list, use the extended version of the access-list command in global configuration mode. To remove the access lists, use the no form of this command.

access-list access-list-number [dynamic dynamic-name [timeout minutes]] {deny | permit} protocol source source-wildcard destination destination-wildcard

Source Address will be of the Workstation A i.e. 172.16.161.150 and destination address will be of the Server 1 i.e. 172.16.162.163.

The access list will be placed on the FA0/0 of Router TK1.

QUESTION NO: 14
Which wild card mask will enable a network administrator to permit access to the Internet for only hosts that are assigned an address in the range 192.168.8.0 through 192.168.15.255?

A. 0.0.0.0
B. 0.0.0.255
C. 0.0.255.255
D. 0.0.7.255
E. 0.0.3.255
F. None of the above

Answer: D
Explanation:
Wildcard mask summarization example:
This list describes how to summarize a range of networks into a single network for ACL optimization. Consider these networks.
192.168.32.0/24
192.168.33.0/24
192.168.34.0/24
192.168.35.0/24
192.168.36.0/24
192.168.37.0/24
192.168.38.0/24
192.168.39.0/24
The first two octets and the last octet are the same for each network. This table is an explanation of how to summarize these into a single network.

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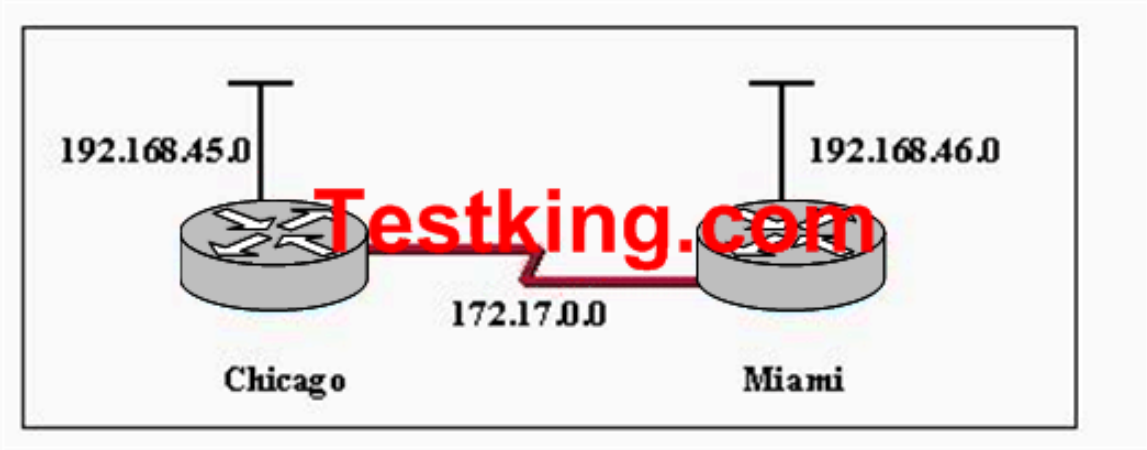
The third octet for the above networks can be written as seen in this table, according to the octet bit position and address value for each bit.

Decimal	128	64	32	16	8	4	2	1
32	0	0	1	0	0	0	0	0
33	0	0	1	0	0	0	0	1
34	0	0	1	0	0	0	1	0
35	0	0	1	0	0	0	1	1
36	0	0	1	0	0	1	0	0
37	0	0	1	0	0	1	0	1
38	0	0	1	0	0	1	1	0
39	0	0	1	0	0	1	1	1
	M	M	M	M	M	D	D	D

Since the first five bits match, the above eight networks can be summarized into one network (192.168.32.0/21 or 192.168.32.0 255.255.248.0). All eight possible combinations of the three low-order bits are relevant for the network ranges in question. This command defines an ACL that permits this network. If you subtract 255.255.248.0 (normal mask) from 255.255.255.255, it yields 0.0.7.255.
access-list acl_permit permit ip 192.168.32.0 0.0.7.255
Reference:
http://www.cisco.com/en/US/products/sw/secursw/ps1018/products_tech_note09186a00800a5b9a.shtml#t

QUESTION NO: 15
Two TestKing routers are connected as shown below:

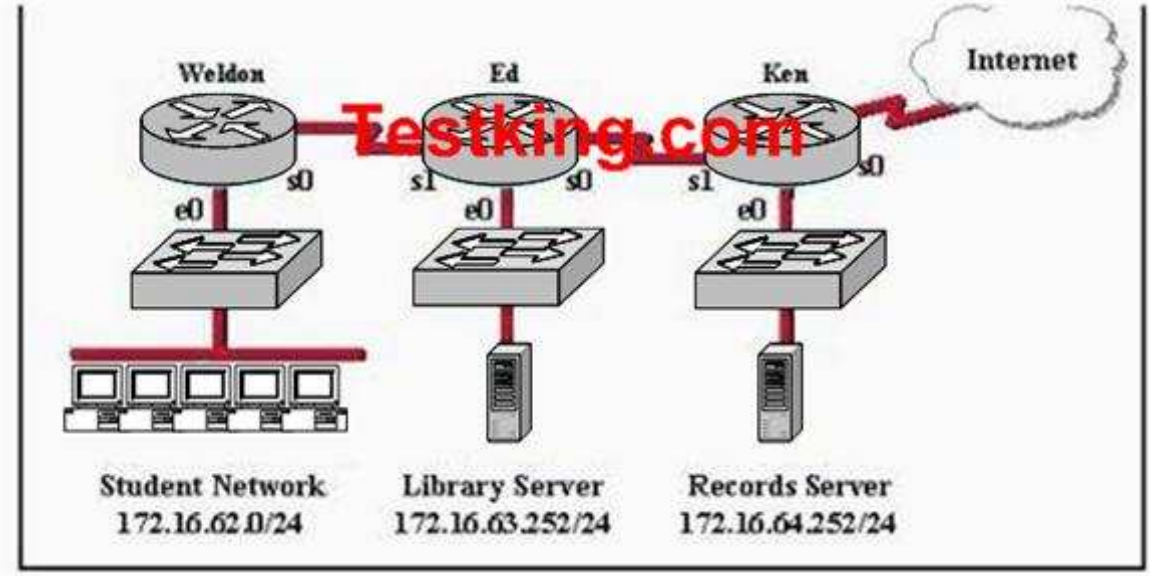


A network administrator in Miami has been instructed to prevent all traffic originating on the Chicago LAN from entering the Miami router. Which statement would accomplish this filtering?

A. access-list 101 deny ip 192.168.45.0 0.0.0.255 any
B. access-list 101 deny ip 192.168.45.0 0.0.0.0 any
C. access-list 101 deny ip 192.168.46.0 0.0.0.255 192.168.45.0 0.0.0.255
D. access-list 101 deny ip 192.168.46.0 0.0.0.255 any

Answer: A
Explanation:
Using access-list we can allow or deny the packets from different hosts or networks.
There are two types of access-list standard and extended access list.
Standard. Standard Access List can allow or deny the request only on the basis of source address. Extended Access list can allow or deny on the basis of source, destination, protocol, port etc.
Syntax of standard Access List:
access-list ACL number permit | deny protocol source address netmask service

QUESTION NO: 16
The TestKing network is shown in the following exhibit:



Refer to the graphic. A named access list called records_block has been written to prevent student and Internet access to the records server. All other users within the enterprise should have access to this server. The list was applied to the e0 interface of the Ken router in the outbound direction. Which of the following conditions should the access list contain to meet these requirements? (Choose two.)

A. deny 172.16.64.252 0.0.0.0 172.16.62.0 0.0.0.255
B. deny 172.16.62.0 0.0.0.255 172.16.64.252 0.0.0.0
C. deny 172.16.64.252 0.0.0.0 any
D. permit 172.16.64.252 0.0.0.0 172.16.0.0 0.0.255.255
E. permit 172.16.0.0 0.0.255.255 172.16.64.252 0.0.0.0
F. permit any any

Answer: B, E
Explanation:
When you create the named access list, you can start your policy from permit or deny. As per the question, traffic from the internet access and student networks need to be blocked, with the student network lies on 172.16.62.0/24 network.

The "deny 172.16.62.0 0.0.0.255 172.16.64.0 0.0.0.255" command will deny access from the student network accessing the Record Server. If you don't permit to any other network then at last explicit deny to all.
The "permit 172.16.0.0 0.0.255.255 172.16.64.252 0.0.0.0" allows all other hosts from the 172.16 network to access the Record Server. The implicit deny all will then block Internet users from accessing the records server.

QUESTION NO: 17
You are securing a network for TestKing and want to apply an ACL (access control list) to an interface of a router. Which one of the following commands would you use?

A. permit access-list 101 out
B. ip access-group 101 out
C. apply access-list 101 out
D. access-class 101 out
E. ip access-list e0 out
F. None of the above

Answer: B
Explanation:
To enable an ACL on an interface and define the direction of packets to which the ACL is applied, the **`ip access-group`** command is used. In this example, the access list is applied to packets going out of the interface. Packets coming in on the interface are not checked against access list 101.

QUESTION NO: 18
The following access list below was applied outbound on the E0 interface connected to the 192.169.1.8/29 LAN:

```
access-list 135 deny tcp 192.169.1.8 0.0.0.7 eq 20 any
access-list 135 deny tcp 192.169.1.8 0.0.0.7 eq 21 any
```

How will the above access lists affect traffic?

A. FTP traffic from 192.169.1.22 will be denied.
B. No traffic, except for FTP traffic will be allowed to exit E0.

C. FTP traffic from 192.169.1.9 to any host will be denied.
D. All traffic exiting E0 will be denied.
E. All FTP traffic to network 192.169.1.9/29 will be denied.

Answer: D
Explanation:
When an access list is created, an implicit deny all entry is created at the end. Therefore, each access list created needs to have at least one permit statement, otherwise it will have the effect of prohibiting all traffic. If the intent in this example was to block only certain hosts from being able to FTP, then the following line should have been included at the end of the access list:

Router(config)#access-list 135 permit ip any any

QUESTION NO: 19
Study the following network diagram displaying the Testking network:

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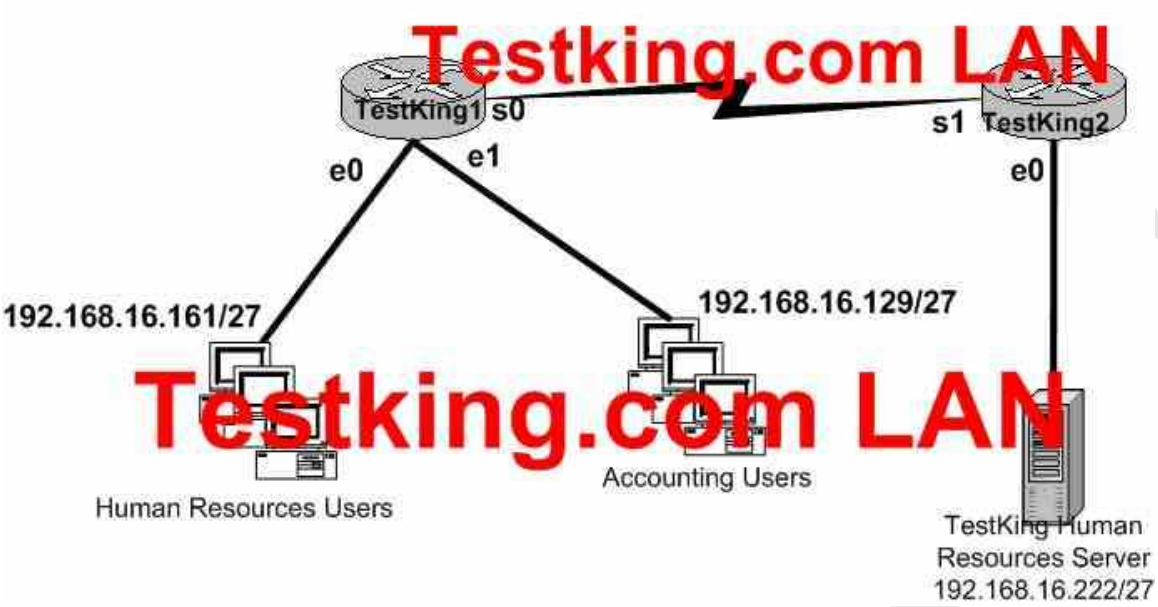


With the goal of preventing the accounting department from gaining access to the HR server, the following access list is created:

```
access-list 19 deny 192.168.16.128 0.0.0.31
access-list 19 permit any
```

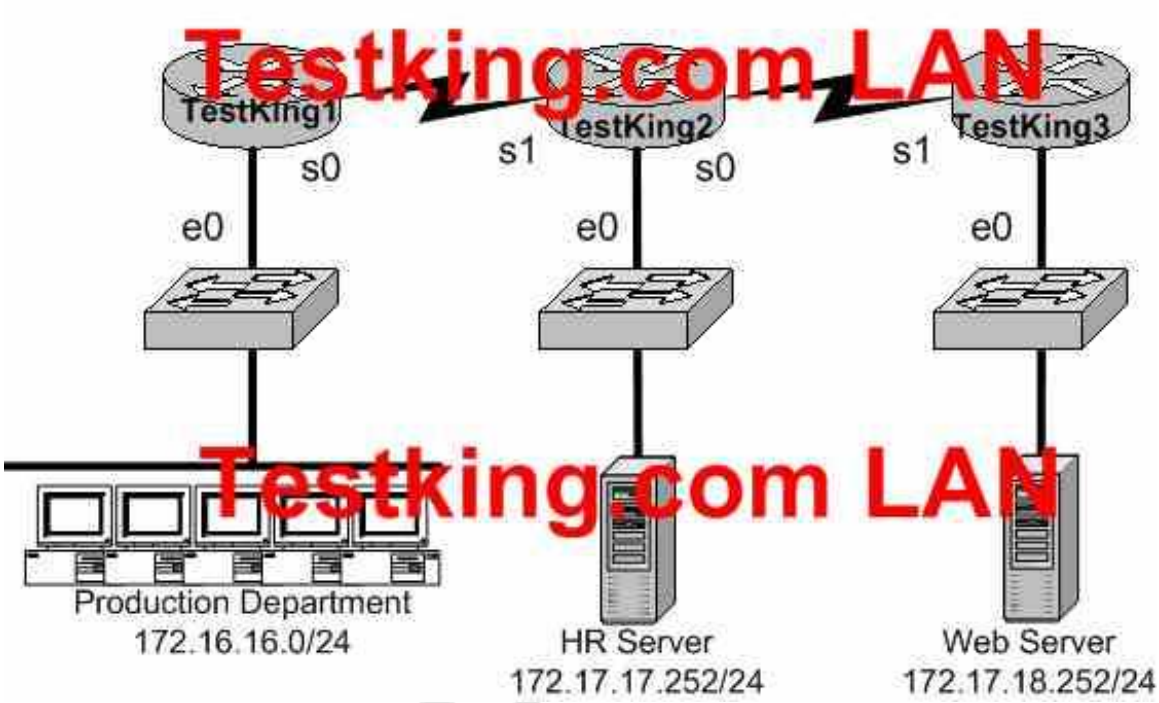
All other traffic is to be permitted through the network. On which interface and in what direction should the access list be applied?

A. TestKing1 S0, out.
B. TestKing1 E1, in.
C. TestKing1 E1, out.
D. TestKing2 S1, in.

E. TestKing2 E0, out.
F. TestKing2 E0, in.

Answer: E
Explanation:
Since this is a standard access list it should be placed near the destination. Standard access lists only match against the source IP address, so placing this access list anywhere else will prevent traffic from the Accounting department to other areas of the network.

QUESTION NO: 20
The Testking network is displayed below:



You want to apply an access list to the e0 interface on the TestKing1 router, with the goal of halting HTTPS traffic from the Production Department from reaching the HR server via the TestKing2 router. Which of the following access lists would you use?

A. Permit ip any any
Deny tcp 172.16.16.0 0.0.0.255 172.17.17.252 0.0.0.0 eq 443
B. Permit ip any any
Deny tcp 172.17.17.252 0.0.0.0 172.16.16.0 0.0.0.255 eq 443
C. Deny tcp 172.17.17.252 0.0.0.0 172.16.16.0 0.0.0.255 eq 443
Permit ip any any
D. Deny tcp 172.16.16.0 0.0.0.255 172.17.17.252 0.0.0.0 eq 443
Permit ip any any

Answer: D
Explanation:
This access problem is very simple; it tells you where to put the access list, all you have to do is to select the right one. You have to deny all HTTP traffic (TCP port 80) from crossing router 1's e0 while, allowing everything else. This is accomplished by Deny tcp 172.16.16.0 0.0.0.255 172.17.17.252 0.0.0.0 eq 443, Permit ip any any.
Incorrect Answers:
Either the order of the statements are reversed. Since all traffic checked against an access list is performed in order from the top down, all traffic will match the first statement and be permitted or the source addresses are incorrect.

QUESTION NO: 21
Two TestKing routers are connected together as shown below:

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```
access-list 10 permit host 172.16.1.5
access-list 10 deny 172.16.1.0 0.0.0.255
access-list 10 permit any
```

The access list shown should deny all hosts located on network 172.16.1.0, except host 172.16.1.5, from accessing the 172.16.4.0 network. All other networks should be accessible. Which command sequence will correctly apply this access list?

A. TestKing1(config)#interface fa0/0
TestKing1(config-if)#ip access-group 10 in

B. TestKing1(config)#interface s0/0
TestKing1(config-if)#ip access-group 10 out

C. TestKing2(config)#interface fa0/1
TestKing2(config-if)#ip access-group 10 out

D. TestKing2(config)#interface fa0/0
TestKing2(config-if)#ip access-group 10 out

E. TestKing2(config)#interface s0/1
TestKing2(config-if)#ip access-group 10 out

Answer: D
Explanation:

In order to only deny access to the 172.16.4.0 network while permitting all other access as specified in this question, we need to apply this access list to router TestKing2, and it must be placed in the outbound direction of interface fa0/0. Applying this access list to any other interface or any other router would result in making other network unreachable from the 172.16.1.0 network, except of course for 172.16.1.5.

QUESTION NO: 22
A network administrator wants to add a line to an access list that will block only Telnet access by the hosts on subnet 192.168.1.128/28 to the server at 192.168.1.5. What command should be issued to accomplish this task?

A. access-list 101 deny tcp 192.168.1.128 0.0.0.15 192.168.1.5 0.0.0.0 eq 23
access-list 101 permit ip any any
B. access-list 1 deny tcp 192.168.1.128 0.0.0.15 host 192.168.1.5 eq 23
access-list 1 permit ip any any
C. access-list 1 deny tcp 192.168.1.128 0.0.0.255 192.168.1.5 0.0.0.0 eq 21
access-list 1 permit ip any any
D. access-list 101 deny tcp 192.168.1.128 0.0.0.240 192.168.1.5 0.0.0.0 eq 23
access-list 101 permit ip any any
E. access-list 101 deny ip 192.168.1.128 0.0.0.240 192.158.1.5 0.0.0.0 eq 23
access-list 101 permit ip any any
F. access-list 101 deny ip 192.168.1.128 0.0.0.15 192.168.1.5 0.0.0.0 eq 23
access-list 101 permit ip any any

Answer: A
Explanation:
Only choice specifies the correct TCT port and wildcard mask, and uses a valid access list number.
Incorrect Answers:
B, C. Access list 1 is used for these choices, which is a standard access list. In this example, an extended access list is required. Choice C also specifies port 21, which is used by FTP not Telnet.
D, E: These choices use an incorrect wildcard mask of 0.0.0.240. It should be 0.0.0.15 for a /28 subnet.
F. IP is specified as the protocol, when it should be TCP.

QUESTION NO: 23

You are the network administrator at TestKing. You apply the following access list on the E0 outbound interface connected to the 192.168.1.8/29 LAN:

access-list 21 deny tcp 192.168.1.8 0.0.0.7 eq 20 any
access-list 21 deny tcp 192.168.1.8 0.0.0.7 eq 21 any

What will the effect of this access list be?

A. All traffic will be allowed to out of E0 except FTP traffic.
B. FTP traffic from 192.168.1.22 to any host will be blocked.
C. FTP traffic from 192.168.1.9 to any host will be blocked.
D. All traffic will be prevented from leaving E0.
E. All FTP traffic to network 192.168.1.9/29 from any host will be blocked.

Answer: D
Explanation:
By default access lists contain an implicit deny statement at the end. In this example there is no permit statement, so it will deny all traffic exiting E0 Interface. Any useful access list must contain at least one permit statement, or everything will be denied.

QUESTION NO: 24
You want to configure an ACL to block only TCP traffic using port 5190 on router TK1. Which access list statement will block all traffic on this router with a destination TCP port number of 5190 while not affecting other traffic?

A. access-list 180 deny ip any eq 5190 any
B. access-list 180 deny tcp any any eq 5190
C. access-list 180 deny tcp any eq 5190
D. access-list 180 deny tcp any eq 5190 any
E. access-list 180 deny telnet any any 5190
F. None of the above

Answer: B
Explanation:
Creating an extended ACL:
These lists are created and applied to an interface as either inbound or outbound packet filters. They are implemented in this format:

Access-list [list number] [permit | deny] [protocol] [source address] [source-mask] [destination address] [destination-mask] [operator] [port] [log]

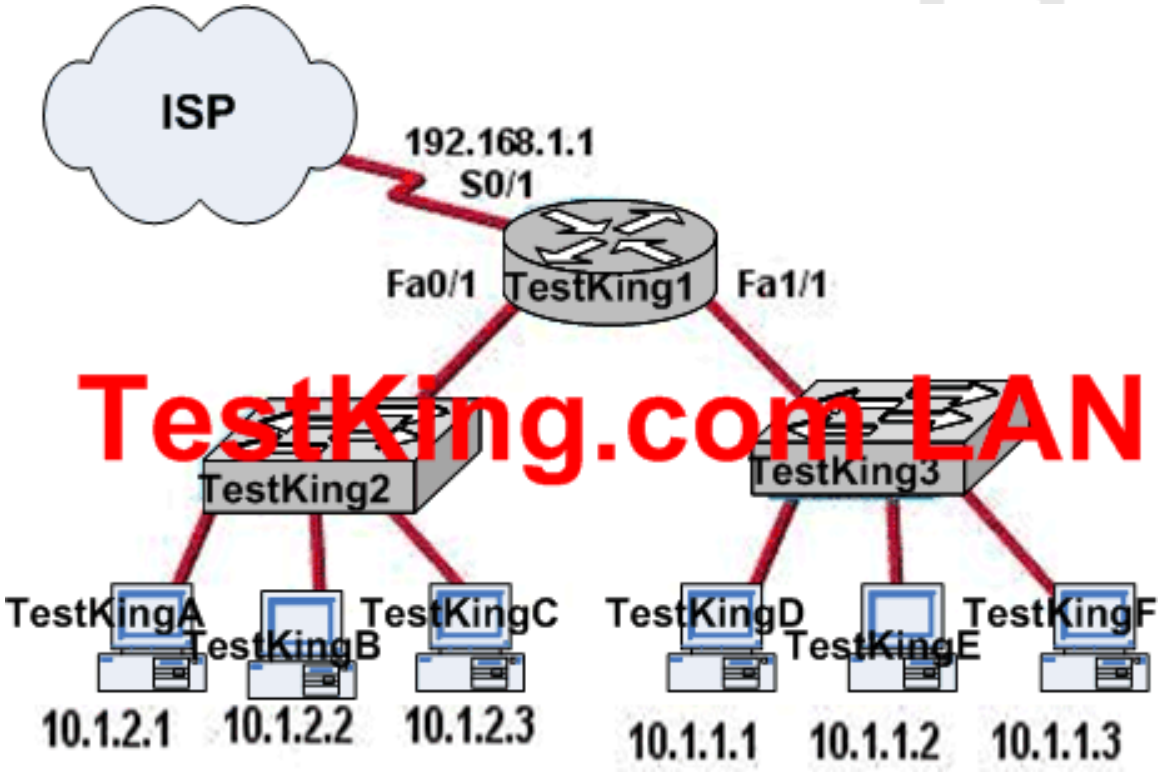
1. List Number-A number between 100 and 199 (Think of it as the name of the list.)
2. Permit | Deny-Whether to permit or deny this packet of information if conditions match
3. Protocol-Type of protocol for this packet (i.e., IP, ICMP, UDP, TCP, or protocol number)
4. Source Address-Number of the network or host that the packet is from (Use the dotted-decimal format 192.168.1.12 or use the keyword ANY as an abbreviation for an address of 0.0.0.0 255.255.255.255 or use HOST and the dotted-decimal address.)
5. Source Mask-The network mask to use with the source address (Cisco masks are a little different, 0 = octet must match exactly; 255 = octet is not significant or doesn't matter.)
6. Destination Address-The address that the packet is going to, or ANY
7. Destination Mask-The network mask to use with the destination address (if you specify one)
8. Operator (optional entry)-This applies to TCP or UDP ports only
   eq=equal
   lt=less than
   gt=greater than
   neq=not equal
   range=a range of ports; you must specify two different port numbers
   est=established connections
9. Port (optional entry)-TCP/UDP destination port number or service
10. Log-Whether to log (if logging is enabled) this entry to the console

A sample inbound ACL would be:

access-list 100 deny ip 10.0.0.0 0.255.255.255 any log
access-list 100 deny ip 172.16.0.0 0.15.255.255 any log
access-list 100 deny ip 192.168.0.0 0.0.255.255 any log
access-list 100 deny ip any host 127.0.0.1 log
access-list 100 permit ip any [your network IP address] [your network mask] est
access-list 100 deny ip [your network IP address] [your network mask] any log
access-list 100 deny tcp any any eq 22222
access-list 100 deny tcp any any range 60000 60020 log
access-list 100 deny udp any any eq snmp log
access-list 100 permit ip any any
Reference: http://articles.techrepublic.com.com/5100-1035_11-1058307.html

Section 3: Configure and apply an ACLs to limit telnet and SSH access to the router using (including: SDM/CLI) (9 questions)

QUESTION NO: 1
The TestKing network topology exhibit is shown below:



TestKing.com LAN

Configuration exhibit:

```
TestKing1(config)# access-list 2 permit 10.1.1.0 0.0.0.255
TestKing1(config)# line vty 0 4
TestKing1(config-line)# access-class 2 in
```

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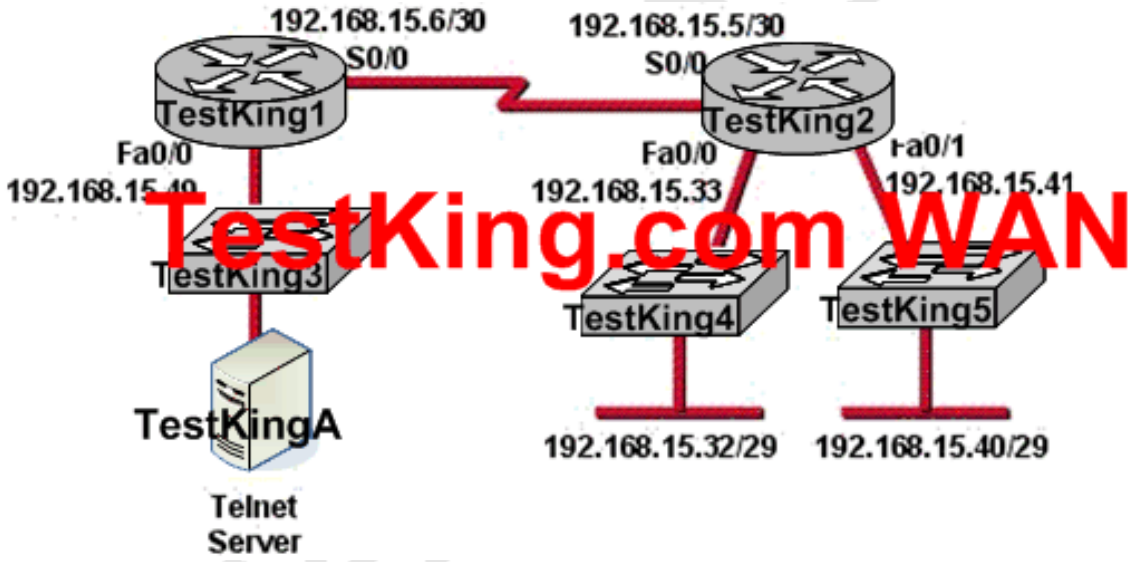
Based on the information shown above, why would the TestKing network administrator configure Router TestKing1 as shown above?

A. To prevent students connected to TestKing2 from accessing the command prompt of Router TestKing1
B. To give administrators access to the internet
C. To prevent students from accessing the admin network
D. To prevent students from accessing the internet
E. To give students access to the internet
F. To prevent administrators from accessing the console of Router TestKing1
G. None of the above

Answer: A

QUESTION NO: 2
Part of the TestKing network is shown below:



In this TestKing network segment, the following ACL was configured on the S0/0 interface of router TestKing2 in the outbound direction:

Access-list 101 deny tcp 192.168.15.32 0.0.0.15 any eq telnet
Access-list 101 permit ip any any

Based on this information which two packets, if routed to the interface, will be denied? (Choose two)

A. Source IP address: 192.168.15.5; destination port: 21
B. Source IP Address: 192.168.15.37 destination port: 21
C. Source IP Address: 192.168.15.41 destination port: 21
D. Source IP Address: 192.168.15.36 destination port: 23
E. Source IP Address: 192.168.15.46; destination port: 23
F. Source IP Address: 192.168.15.49 destination port 23

Answer: D, E

QUESTION NO: 3
You want to control all telnet access going through router TK1. Which one of the access control list statements below will deny all telnet connections to subnet 10.10.1.0/24?

A. access-list 15 deny telnet any 10.10.1.0 0.0.0.255 eq 23
B. access-list 115 deny udp any 10.10.1.0 eq telnet
C. access-list 15 deny tcp 10.10.1.0 255.255.255.0 eq telnet
D. access-list 115 deny tcp any 10.10.1.0 0.0.0.255 eq 23
E. access-list 15 deny udp any 10.10.1.0 255.255.255.0 eq 23
F. None of the above

Answer: D
Explanation:
Telnet uses port TCP port 23. Since we are using source and destination IP address information, an extended access list is required. Extended access lists are access lists in the 100-199 range.
Incorrect Answers:
A, C, E. These access lists are numbered 15. Standard access lists are numbered 1-99, and in this case an extended access lists is required.
B. This access list specifies UDP port 23, and TCP port 23 is the port used by telnet.

QUESTION NO: 4
You wish to limit telnet access into your TestKing router to only a single host. In order to accomplish this, access list 1 has been written to allow host 172.16.1.224 access to the router vty lines. What command would assign this access- list to the Virtual Terminal Lines?

A. TK1(config-line)# ip access-group 1 in
B. TK1(config-line)# access-class 1 in
C. TK1(config-line)# ip access-list 1 in
D. TK1(config-line)# access-line 1 in
E. None of the above

Answer: B
Explanation:
To restrict incoming and outgoing connections between a particular vty (into a Cisco device) and the addresses in an access list, use the access-class command in line configuration mode.
Example:
The following example defines an access list that permits only the host 172.16.1.224 to connect to the virtual terminal ports on the router, as described in this question:

access-list 1 permit 172.16.1.224 0.0.0.0
line 1 5
access-class 1 in

QUESTION NO: 5
The TestKing LAN is depicted below:

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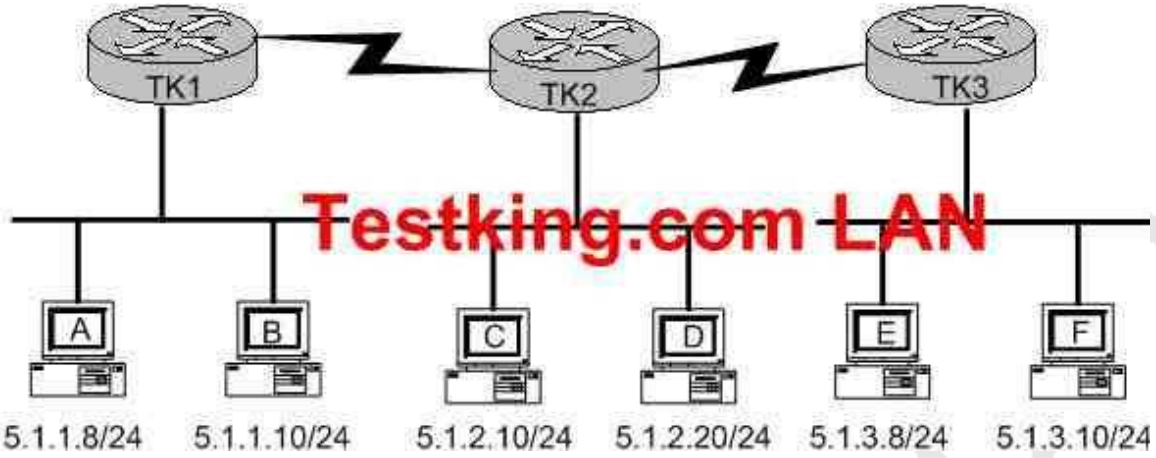

You're the systems administrator at Testing, and you create the following access control lists.

access-list 101 deny tcp 5.1.1.10 0.0.0.0 5.1.3.0 0.0.0.255 eq telnet
access-list 101 permit any any

You then enter the command "ip access-group 101 in" to apply access control list 101 to router TK1s e0 interface.

Which of the following Telnet sessions will be blocked as a result of your access lists? (Select all that apply)

A. Telnet sessions from host A to host 5.1.1.10
B. Telnet sessions from host A to host 5.1.3.10
C. Telnet sessions from host B to host 5.1.2.10
D. Telnet sessions from host B to host 5.1.3.8
E. Telnet sessions from host C to host 5.1.3.10
F. Telnet sessions from host F to host 5.1.1.10

Answer: D, F
Explanation:

All the telnet sessions from host B to network 5.1.3.0/24 will be denied. In addition, all telnet traffic to host B from the 5.1.3.0/24 network will not work, because the return telnet traffic will be denied.

QUESTION NO: 6
Which of the following commands would successfully implement an access list on a routers virtual terminal line? (Select only one answer choice)

A. RouterTK(config-line)# access-class 10 in
B. RouterTK(config-if)# ip access-class 23 out
C. RouterTK(config-line)# access-list 150 in
D. RouterTK(config-if)# ip access-list 128 out
E. RouterTK(config-line)# access-group 15 out
F. RouterTK(config-if)# ip access-group 110 in

Answer: A
Explanation:
To configure VTY you must be in the config-line mode. Virtual terminal sessions use VTY lines 0-4, and VTY access lists use the access-class command.
Incorrect Answers:
B. This is placed in the wrong configuration mode
C, D, E, F. The correct syntax for VTY lines is the access-class command, not the access-group or access-list commands.

QUESTION NO: 7
The following access control list needs to be applied to one of the routers shown in the graphic:

access-list 101 permit tcp 192.168.1.16 0.0.0.15 192.168.2.16 0.0.0.15 eq 23

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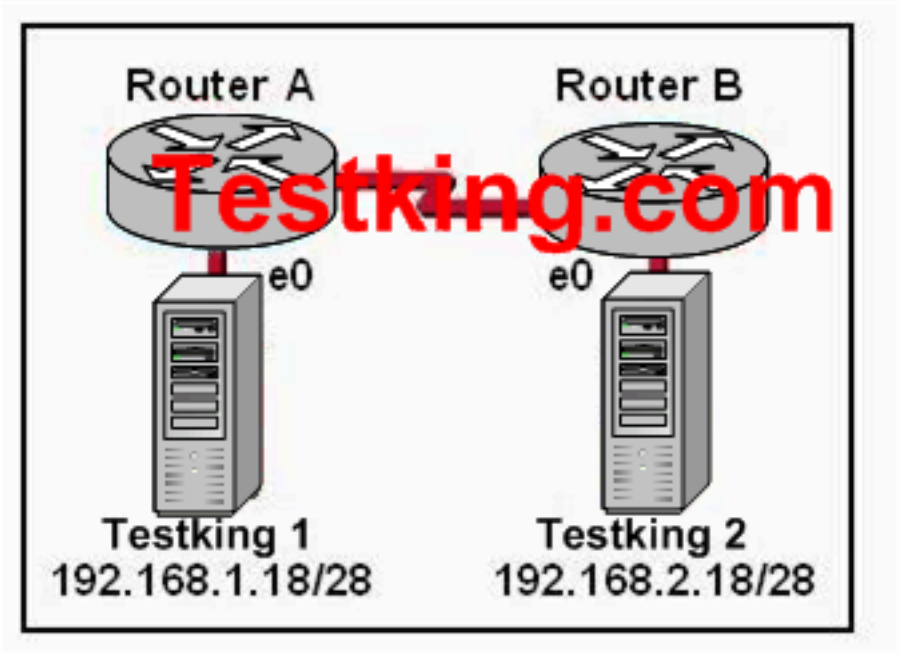

What can be concluded about this ACL? (Choose two.)

A. Telnet traffic from 192.168.1.16 0.0.0.15 to 192.168.2.16 0.0.0.15 is allowed.
B. SMTP traffic from 192.168.2.16 0.0.0.15 to 192.168.1.16 0.0.0.15 is allowed.
C. The ACL is configured to allow traffic from one specific host to another.
D. When the ACL is applied, Testking 1 will be able to ping Testking 2.
E. The ACL should be applied inbound to the e0 interface of Router A.
F. The ACL should be applied outbound to the e0 interface of Router A.

Answer: A, E
Explanation:
The given extended ACL allow the telnet traffic from 192.168.1.16 0.0.0.15 to 192.168.2.16 0.0.0.15. Telnet uses TCP port 23. With access lists, the first network specified is the source of the traffic and the second is the destination, so since this access list says to allow telnet traffic from the Tessking1 network to the Testking2 network, it should be placed on the inbound interface of E0.

QUESTION NO: 8

Unauthorized users have used Telnet to gain access to TestKing router. The network administrator wants to configure and apply an access list to allow Telnet access to the router, but only from the network administrator's computer. Which group of commands would be the best choice to allow only the IP address 172.16.3.3 to have Telnet access to the router?

A. access-list 101 permit tcp any host 172.16.3.3 eq telnet
 access-list 101 permit ip any any
 interface s0/0
 ip access-group 101 in
B. access-list 3 permit host 172.16.3.3
 line vty 0 4
 ip access-group 3 in
C. access-list 101 permit tcp any host 172.16.3.3 eq telnet
 interface s0/0ip access-group 101 in
D. access-list 3 permit host 172.16.3.3
 line vty 0 4
 access-class 3 in

Answer: D
Explanation:
To restrict incoming and outgoing connections between a particular vty (into a Cisco device) and the addresses in an access list, use the access-class command in line configuration mode.
Example:
The following example defines an access list that permits only hosts on network 192.89.55.0 to connect to the virtual terminal ports on the router:
access-list 12 permit 192.89.55.0 0.0.0.255
line 1 5
access-class 12 in
Reference:
http://www.cisco.com/en/US/products/sw/iosswrel/ps1835/products_command_reference_chapter09186a0

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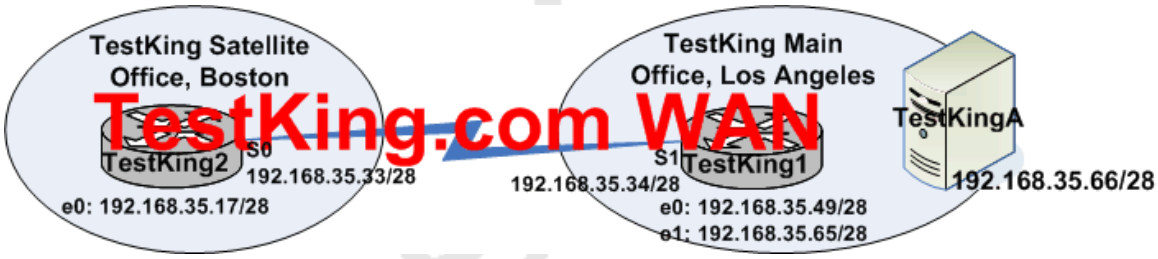
Section 4: Verify and monitor ACLs in a network environment (9 questions)

QUESTION NO: 1
An inbound access list has been configured on a TestKing router. This inbound access list has been applied to the serial interface to deny packet entry for TCP and UDP ports 21, 23 and 25. All other traffic types will be allowed. What types of packet will be permitted by this ACL? (Choose three)

A. HTTP
B. HTTPS
C. FTP
D. Telnet
E. DNS
F. SMTP

Answer: A, B, E

QUESTION NO: 2 DRAG DROP
Two TestKing offices are displayed below:



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You work as a network technician at TestKing.com. Study the exhibit carefully. TestKing.com has a main office in Los Angeles and a satellite office in Boston. The offices are connected through two Cisco routers. The Boston satellite office is connected through the TestKing2 Router s0 interface to the Los Angeles office TestKing1 router s1 interface. TestKing1 has two local area networks. Boston users receive Internet access through the TestKing1 router.

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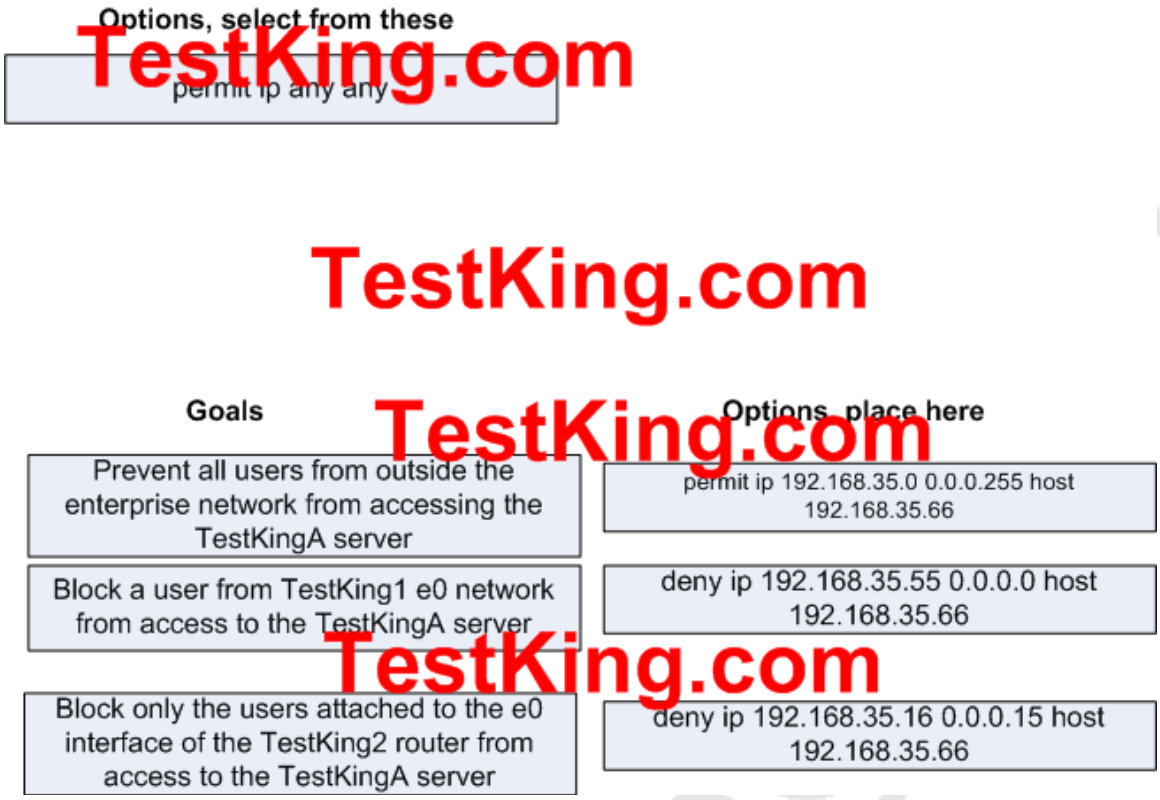
Answer:



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QUESTION NO: 3
Observe the following access list configuration:

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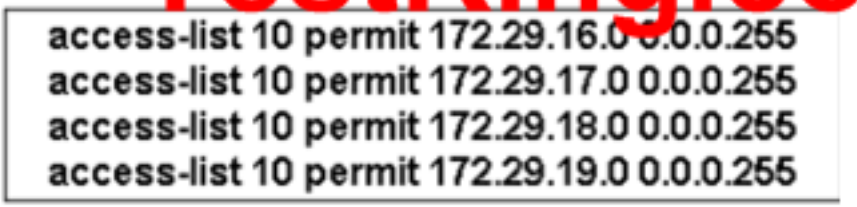

An access list was configured on TK1 with the four statements shown in the graphic above. Which single access list statement will combine all four of these statements into a single statement that will have exactly the same effect?

A. access-list 10 permit 172.29.16.0 0.0.0.255
B. access-list 10 permit 172.29.16.0 0.0.1.255
C. access-list 10 permit 172.29.16.0 0.0.3.255
D. access-list 10 permit 172.29.16.0 0.0.15.255
E. access-list 10 permit 172.29.0.0 0.0.255.255
F. None of the above

Answer: C
Explanation:
172.29.16.0 0.0.3.255 is an aggregate address for those 4 networks. If you would write all these addresses in binary form and will mark the equal part, than you will see that it is 172.29.16.0 0.0.3.255 is the correct wildcard mask as it will aggregate these four contiguous ACL statements.

QUESTION NO: 4 DRAG DROP
You work as a network technician at TestKing.com. You are configuring the TestKing.com office. In particular the host TestKingC, with the IP address 192.168.125.34/27, needs to be configured so that it cannot access hosts outside its own subnet.
You decide to use the following command:
access-list 100 deny *protocol* *address* *mask* any

You are required to fill in the *protocol*, *address*, and *mask* in this command using the choices below:

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TestKing.com
TestKing.com
TestKing.com

Answer:
Explanation:

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QUESTION NO: 5
On your newly installed router, you apply the access list illustrated below to interface Ethernet 0 on a TestKing router. The interface is connected to the 192.168.1.8/29 LAN.

```
access-list 123 deny tcp 192.168.166.18 0.0.0.7 eq 20 any
access-list 123 deny tcp 192.168.166.18 0.0.0.7 eq 21 any
```

How will the above access lists affect traffic?

A. All traffic will be allowed to exit E0 except FTP traffic.
B. FTP traffic from 192.168.166.19 to any host will be denied.
C. FTP traffic from 192.168.166.22 to any host will be denied.
D. All traffic exiting E0 will be denied.
E. All FTP traffic to network 192.168.166.18/29 from any host will be denied.
F. None of the above

Answer: D
Explanation:
By default every access list contains an implicit deny statement at the end. Because of this, only an access list that contains at least one permit statement will be useful. In this example there is no permit statement, so it will deny all traffic exiting E0 Interface.
Incorrect Answers:
A. It will deny everything, including FTP and telnet traffic.
B, C, E. It will deny all traffic in addition to the condition mentioned in these answers, because there is no permit statement at the end.

QUESTION NO: 6
On a newly installed TestKing router, the following access list is added to serial interface for incoming traffic:

Access-list 101 permit tcp any 10.18.10.0 0.0.0.255 eq 23

What is the effect of the "any" keyword in the above access list?

A. check any of the bits in the source address
B. permit any wildcard mask for the address
C. accept any source address
D. check any bit in the destination address
E. permit 255.255.255.255 0.0.0.0
F. accept any destination
G. None of the above

Answer: C
Explanation:

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The "any" in this list is the source address to filter. If it is set to any or "0.0.0.0 255.255.255.255", then any source address will be filtered. In the example above, the access list is stating that any TCP traffic from any source going to the 10.18.10.0/24 network will be allowed.

QUESTION NO: 7
Which one of the following commands will display the placement and direction of an IP access control list on the interfaces of a router?

A. show interface list
B. show ip route
C. show ip interface
D. show ip interface brief
E. show interface
F. None of the above

Answer: C
Explanation:
The command "show ip interface" will include a reference to the access lists enabled on the interface.

QUESTION NO: 8
You are a technician at TestKing. Your assistant applied an IP access control list to Router TK1. You want to check the placement and direction of the access control list.

Which command should you use?

A. show access-list
B. show ip access-list
C. show ip interface
D. show interface
E. show interface list
F. None of the above

Answer: C

Explanation:
The show ip interface [name] command can be used to see if the access-list is on the interface. Output will vary depending on how the access-list command was applied but can include:
* Outgoing access list is not set
* Inbound access list is 101

* Outgoing access list is not set
* Inbound access list is 101, default is not set

Incorrect Answers:
A, B. This would simply show you the contents of the ACL, as well as the counters assuming the "log" keyword was configured on the access list. Example:
Show access list 101 or show IP access list 101

```
* Extended IP access list 101
* deny tcp any any (1649 matches)
* deny udp any any (35 matches)
* deny icmp any any (36 matches)
```

D. This will display the statistics pertaining to the interface, but not any configured access lists that are applied.

QUESTION NO: 9
Which of the following statements regarding the use of multiple access lists are valid when configuring a single interface on a Cisco router?

A. Application of up to three access lists per protocol to a single interface.
B. No more than two access lists per interface.
C. One access list may be configured per direction for each Layer 3 protocol configured on an interface.
D. The maximum number allowed varies due to RAM availability in the router.
E. An infinite number of access lists that can be applied to an interface, from most specific to most general.
F. Cisco IOS allows only one access list to an interface.
G. None of the above

Answer: C
Explanation:

For each interface, one access list for each protocol (IP, IPX, etc) can be applied in the inbound direction, and one for the outbound direction.
Incorrect Answers:
B. It is true that no more than two access lists can be applied per interface (inbound and outbound). However, this applies per layer 3 protocol, so it is possible to configure more than 2 access lists per interface.

Section 5: Troubleshoot ACL issues (5 questions)

QUESTION NO: 1
The following configuration line was added to router TK1:

Access-list 101 permit ip 10.25.30.0 0.0.0.255 any

What is the effect of this access list configuration?

A. It will permit all packets matching the host bits in the source address to all destinations
B. It will permit all packets to destinations matching the first three octets in the destination address
C. It will permit all packets from the third subnet of the network address to all destinations
D. It will permit all packets matching the first three octets of the source address to all destinations
E. It will permit all packets matching the last octet of the destination address and accept all source addresses
F. None of the above

Answer: D

QUESTION NO: 2
The TestKing network is shown below:

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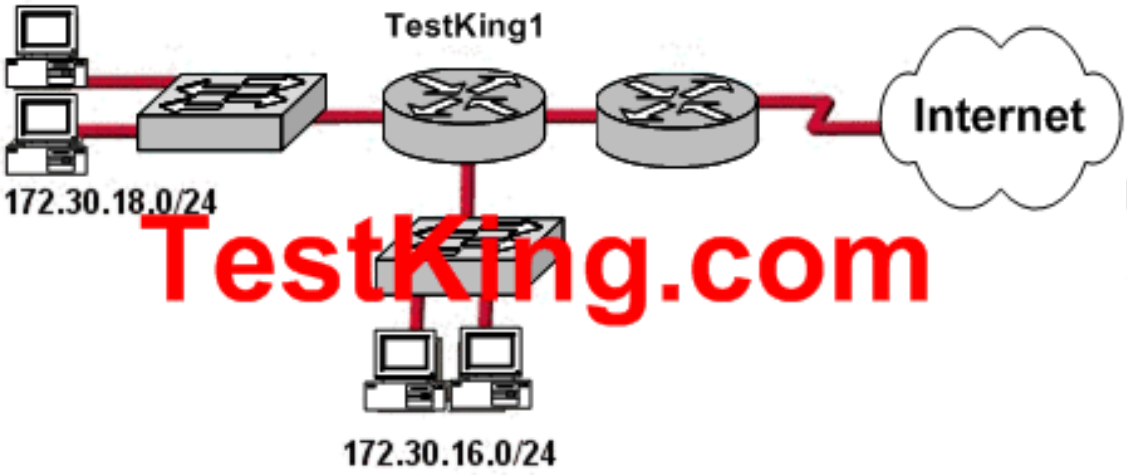


The TK network administrator needs to troubleshoot an ACL issue. He would like to permit only hosts on the 172.30.16.0/24 network to access the Internet. Which wild card mask and address combination will only match addresses on this network?

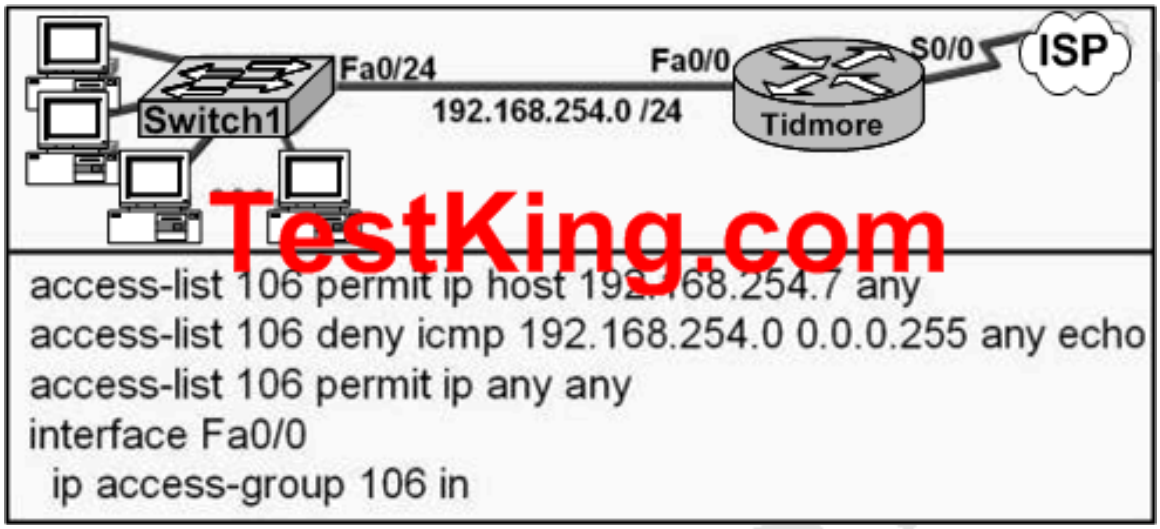
A. 172.30.0.0 0.0.0.0
B. 172.30.16.0 0.0.0.255
C. 172.30.0.0 0.0.15.255
D. 172.30.16.0 0.0.31.255
E. 172.30.16.0 0.0.255.255

Answer: B
Explanation:
According to question, only the hosts from 172.30.16.30/24 network allow to access the Internet, for that we should use the wildcard masking. 172.168.16.0 0.0.0.255 where 0 means exact and 255 means 1-255 range.
For any particular host: 192.168.0.1 0.0.0.0
For Range: 192.168.0.1 0.0.0.3 means 1-4 total 4 hosts.

QUESTION NO: 3
In the TestKing network shown below, a network technician enters the following line into the router:

Tidmore1(config)# access-list 106 deny tcp 192.168.254.0 0.0.0.255 any eq www.

What is the effect of this configuration, given that the router was already configured as shown below?



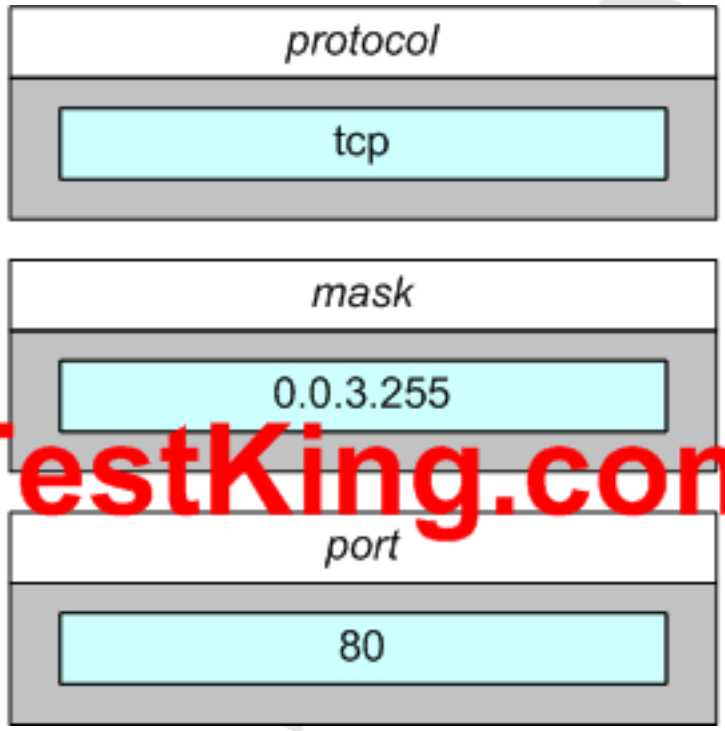
A. Web pages from the Internet cannot be accessed by hosts in the 192.168.254.0 LAN.
B. No hosts in the 192.168.254.0 LAN except 192.168.254.7 can access web pages from the Internet.
C. The change has no effect on the packets being filtered.
D. All traffic from the 192.168.254.0 LAN to the Internet is permitted.

Answer: C
Explanation:
Traffic that comes into the router is compared to ACL entries based on the order that the entries occur in the router. New statements are added to the end of the list. The router continues to look until it has a match. If no matches are found when the router reaches the end of the list, the traffic is denied. For this reason, you should have the frequently hit entries at the top of the list. There is an "implied deny" for traffic that is not permitted. A single-entry ACL with only one "deny" entry has the effect of denying all traffic. You must have at least one "permit" statement in an ACL or all traffic is blocked. In this example, since the statement will be added to the end of the access list, and since there is already an entry that permits all IP traffic, the www traffic will be allowed, all traffic will never reach this access list entry.

QUESTION NO: 4
For security reasons, the network administrator needs to prevent pings into the corporate networks from hosts outside the internetwork. Which protocol should be blocked with access control lists?

A. UDP
B. ICMP
C. IP
D. TCP
E. None of the above

Answer: B
Explanation:
ICMP is used for error and control messages within the IP world and is very much integrated with IP. Ping is a computer network tool used to test whether a particular host is reachable across an IP network. Ping works by sending ICMP "echo request" packets to the target host and listening for ICMP "echo response" replies.



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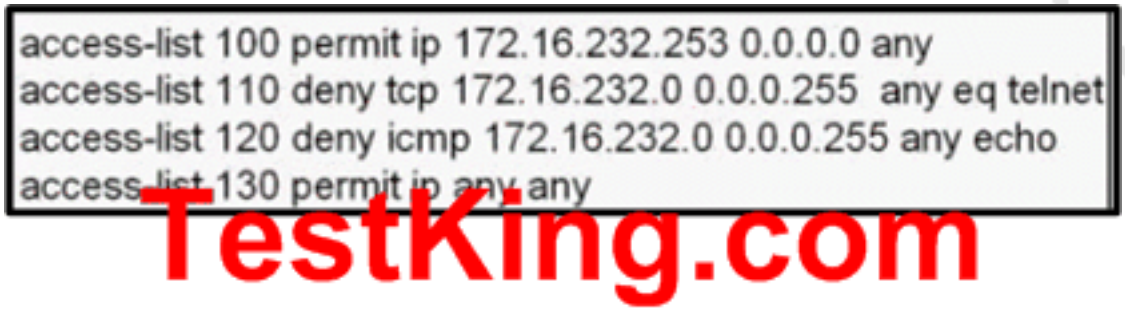
QUESTION NO: 5
A TestKing network associate creates the configuration shown in the exhibit below:

Exhibit:



What will be the results of this configuration?

A. The configuration creates an access list that allows all the hosts in the 172.16.232.0/24 subnet to use Telnet but not to access web pages.
B. The configuration creates an access list that allow all traffic from the host 172.16.232.253 except Telnet and ping traffic.
C. The fourth line of the configuration creates an access list that allows only traffic from the host172.16.232.253 to anywhere in the network.
D. The configuration creates four access lists.

Answer: D
Explanation:
With all access list entries, the order of entries is important. Normally, when a packet is evaluated against entries in an access list, the entries are evaluated in sequential order, and when a match occurs, no more entries are evaluated. However, this applies to access lists with the same number, but has multiple lines. When a different number is specified for each line, a different, separate, access list is actually created as is the case here.

Section 6: Explain the basic operation of NAT (4 questions)

QUESTION NO: 1
You need to configure NAT on a TestKing router that is connected to the Internet. To do so, you must determine what the Inside Global IP addresses will be. What does the "Inside Global" address represent in the configuration of NAT?

A. The summarized address for all of the internal submitted addresses
B. A registered address that represents that represents an inside host to an outside network
C. A globally unique, private IP address assigned to a host on the inside network
D. The MAC address of the router used by inside hosts to connect to the Internet
E. None of the above

Answer: B

QUESTION NO: 2
Which one of the following varieties of NAT utilizes different ports to map multiple IP addresses to a single globally registered IP address?

A. Static NAT
B. Port loading
C. NAT Overloading
D. Dynamic NAT
E. Overlapping
F. None of the above

Answer: C
Explanation:
Port address translation, or NAT overloading, uses transport layer port information to dynamically create NAT entries. This is also known as one to many network address translation.
Incorrect Answers:
A. Static NAT is known as one to one NAT, and is used to map a single IP address to a single registered IP address. It is often used for servers that need to be accessed via the Internet.
B, D: This is the incorrect term, and is not used.

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QUESTION NO: 3
Part of the TestKing network is shown below:

The TestKing network administrator would like to implement NAT in the TestKing network segment shown in the graphic to allow inside hosts to use a private addressing scheme. In this network segment, where should NAT be configured?

A. All routers
B. All routers and switches
C. TestKing1 router
D. TestKing2 router
E. TestKing3 router
F. None of the above

Answer: C
Explanation:
Network Address Translation (NAT) can be used to hide the private IP addressing scheme of the entire network from the Internet. To do this, NAT needs to only be configured on the router that resides between the Internet and the rest of the private internal network. In this case, it needs to only be implemented on the Corporate router.

QUESTION NO: 4
In any NAT (network address translation) configuration, what is the Inside Global IP address?

A. The summarized address for all internal subnetted addresses.
B. A private IP address assigned to a host on the inside network.
C. A registered address that represents an inside host to an outside network.
D. A unique IP address used on an internal network
E. Non of the above

Answer: C
Explanation:
With NAT, Cisco defines 4 different types of addresses as follows:
* **Inside local address** - The IP address assigned to a host on the inside network. This is the address configured as a parameter of the computer's OS or received via dynamic address allocation protocols such as DHCP. The address is likely not a legitimate IP address assigned by the Network Information Center (NIC) or service provider.
* **Inside global address** - A legitimate IP address assigned by the NIC or service provider that represents one or more inside local IP addresses to the outside world.
* **Outside local address** - The IP address of an outside host as it appears to the inside network. Not necessarily a legitimate address, it is allocated from an address space routable on the inside.
* **Outside global address** - The IP address assigned to a host on the outside network by the host's owner. The address is allocated from a globally routable address or network space.
The above definitions still leave a lot to be interpreted. For this example, this document redefines these terms by first defining "local address" and "global address." Keep in mind that the terms "inside" and "outside" are NAT definitions. Interfaces on a NAT router are defined as "inside" or "outside" with the NAT configuration commands, ip nat inside and ip nat outside. Networks to which these interfaces connect can then be thought of as "inside" networks or "outside" networks, respectively.
* **Local address** - A local address is any address that appears on the "inside" portion of the network.
* **Global address** - A global address is any address that appears on the "outside" portion of the network.

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Section 7: Configure NAT for given network requirements using (including: CLI/SDM) (7 questions)

QUESTION NO: 1 SIMULATION
Network topology exhibit:

You work as a network technician at TestKing.com. Study the exhibit carefully. You are required to perform configurations to enable internet access. The TestKing ISP has given you six public IP addresses in the 198.18.227.25 198.18.227.30 range. TestKing.com has 30 clients that needs to have simultaneous internet access. These local hosts use private IP addresses in the 192.168.107.33 - 192.168.107.62 range.

You need to configure Router TestKing1 using the TestKingA console.
You have already made basic router configuration. You have also configured the appropriate NAT interfaces; NAT inside and NAT outside respectively.

Now you are required to finish the configuration of TestKing1.

Answer:
Explanation:
Testking1#config t
Testking1(Config)#access-list 1 permit 192.168.107.33 0.0.0.30

```
Testking1(Config)#access-list 1 deny any
Testking1(Config)#interface fa0/0
Testking1(Config-if)#ip nat inside
Testking1(Config-if)#exit
Testking1(Config)#interface s0/0
Testking1(Config-if)#ip nat outside
Testking1(Config-if)#exit
Testking1(Config)#ip nat pool test_nat 198.18.227.25 198.18.227.30 prefix-length 24
Testking1(Config)#ip nat inside source list 1 pool test_nat override
```

Verify using:
Testking1#show ip nat translations

QUESTION NO: 2
TestKing has 25 computers and decides to connect the network to the Internet. TestKing would like for all of the computers to have access to the Internet at the same time, but TestKing only has four usable publicly routable IP addresses. What should be configured on the router so that all computers can connect to the Internet simultaneously?

A. Static NAT
B. Global NAT
C. Dynamic NAT
D. Static NAT with ACLs
E. Dynamic NAT with overload

Answer: E
Explanation:
NAT overload, also called many to one NAT or Port Address Translation (PAT) allows for many IP hosts to share a single IP address when connecting to the outside. In this case, the use of dynamic NAT with overloading will allow for the 25 hosts to use an IP address from the NAT pool, which will contain the 4 public IP addresses.

QUESTION NO: 3
A TestKing router has been configured with the following command:

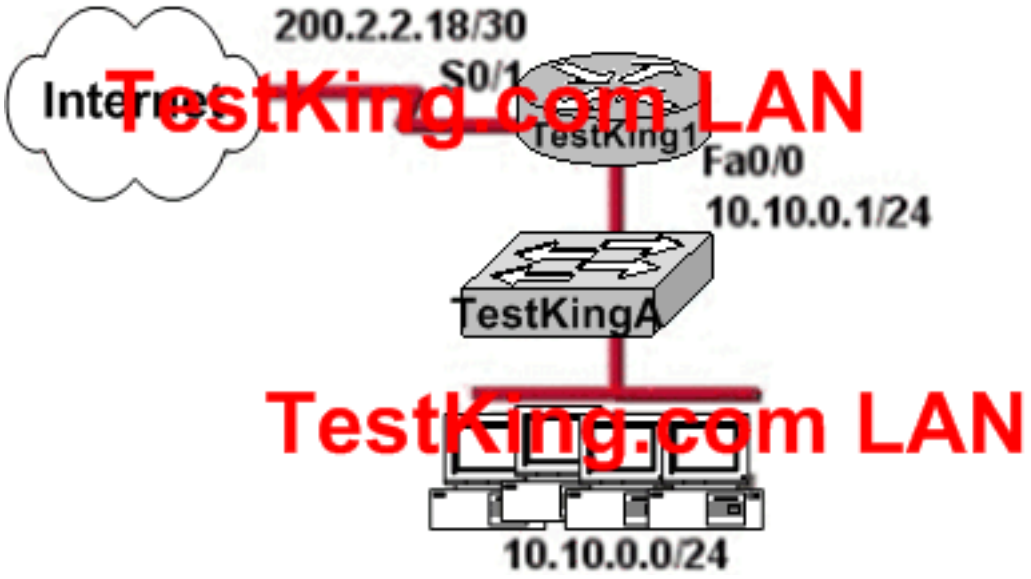
IP nat pool nat-test 192.168.6.10 192.168.6.20 netmask 255.255.255.0

This is an example of what type of NAT?

A. Static NAT
B. Dynamic NAT
C. Dynamic NAT with overload
D. Port Address Translation
E. None of the above

Answer: B
Explanation:
The configuration statement in this example is used to define a pool of IP addresses to be used for dynamic NAT translations.
Incorrect Answers:
A. Static NAT is used for 1 to 1 translation entries, using the "static" configuration keyword. In this example a range of addresses are being defined for the use in a pool.
C, D. With NAT overload, also known as Port Address Translation (PAT), the keyword "overload" is added at the end of the configuration statement.

QUESTION NO: 4
The TestKing network is displayed below:



TestKing.com LAN
TestKing.com LAN

TestKing.com wants to use NAT in network displayed in the exhibit.
Which commands will apply the NAT configuration to the proper interfaces? Select two.

A. TestKing1(config)# interface serial0/1
TestKing1(config-if)# ip nat inside

B. TestKing1(config)# interface serial0/1
TestKing1(config-if)# ip nat outside

C. TestKing1(config)# interface fastethernet0/0
TestKing1(config-if)# ip nat inside

D. TestKing1(config)# interface fastethernet0/0
TestKing1(config-if)# ip nat outside

E. TestKing1(config)# interface serial0/1
TestKing1(config-if)# ip nat outside source pool 200.2.2.18 255.255.255.252

F. TestKing1(config)# interface serial0/1
TestKing1(config-if)# ip nat inside source 10.10.0.0 255.255.255.0

Answer: B, C
Explanation:
After creating the static NAT entries, the router needs to know which interfaces are "inside" and which are "outside." The ip nat inside and ip nat outside interface sub-commands identify each interface appropriately.
Reference: Cisco CCNA ICND, p.271

QUESTION NO: 5
Refer to the topology and partial configuration output shown in the graphic below:

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The ip subnet-zero configuration command is also in effect on router TK1. After this router performs network address translation, which address is a valid "inside global address"?

A. 10.10.0.1
B. 10.10.0.17
C. 200.2.2.17
D. 200.2.2.18
E. 199.99.9.33
F. 199.99.9.47

Answer: F
Explanation:
Regarding NAT operation, Cisco defines these terms as follows:
1. Inside local address - The IP address assigned to a host on the inside network. This is the address configured as a parameter of the computer's OS or received via dynamic address allocation protocols such as DHCP. The address is likely not a legitimate IP address assigned by the Network Information Center (NIC) or service provider.
2.

Inside global address - A legitimate IP address assigned by the NIC or service provider that represents one or more inside local IP addresses to the outside world. In this case, the NAT pool is used to distribute the Inside Global IP addresses.

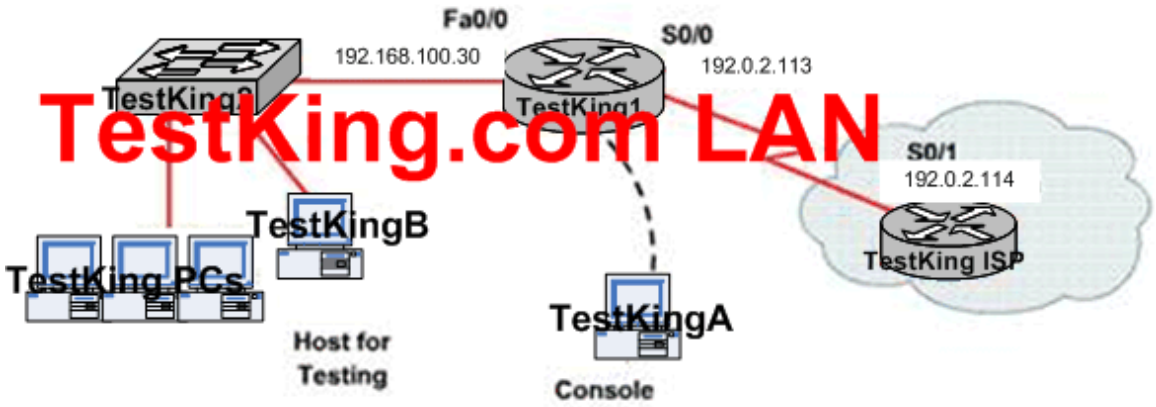
3. Outside local address - The IP address of an outside host as it appears to the inside network. Not necessarily a legitimate address, it is allocated from an address space routable on the inside.
4. Outside global address - The IP address assigned to a host on the outside network by the host's owner. The address is allocated from a globally routable address or network space.

Reference:

http://www.cisco.com/en/US/tech/tk648/tk361/technologies_tech_note09186a0080094837.shtml

QUESTION NO: 6 SIMULATION

Network topology exhibit:



You work as a network technician at TestKing.com. Study the exhibit carefully. You are required to perform configurations to enable internet access. The TestKing ISP has given you six public IP addresses in the 198.18.184.105 198.18.184.110/29 range. TestKing.com has 14 clients that needs to have simultaneous internet access. These local hosts use private IP addresses in the 192.168.100.17 - 192.168.100.30/28 range.

You need to configure Router TestKing1 using the TestKingA console.
You have already made basic router configuration. You have also configured the appropriate NAT interfaces; NAT inside and NAT outside respectively.

Now you are required to finish the configuration of TestKing1.

Answer:
Explanation:

```
interface FastEthernet0/0
 no ip address
 no ip directed-broadcast
 ip nat inside

!
interface Serial0/0
 no ip address
 no ip directed-broadcast
 ip nat outside
!
interface FastEthernet0/1
 no ip address
 no ip directed-broadcast
 shutdown
!
interface Serial0/1
 no ip address
 no ip directed-broadcast
 shutdown
!
!
ip nat pool nat_test 198.18.184.105 198.18.184.110 netmask 255.255.255.248
ip nat inside source list 1 pool nat_test overload
ip classless
no ip http server
!
!
access-list 1 permit 192.168.100.16 0.0.0.15
```

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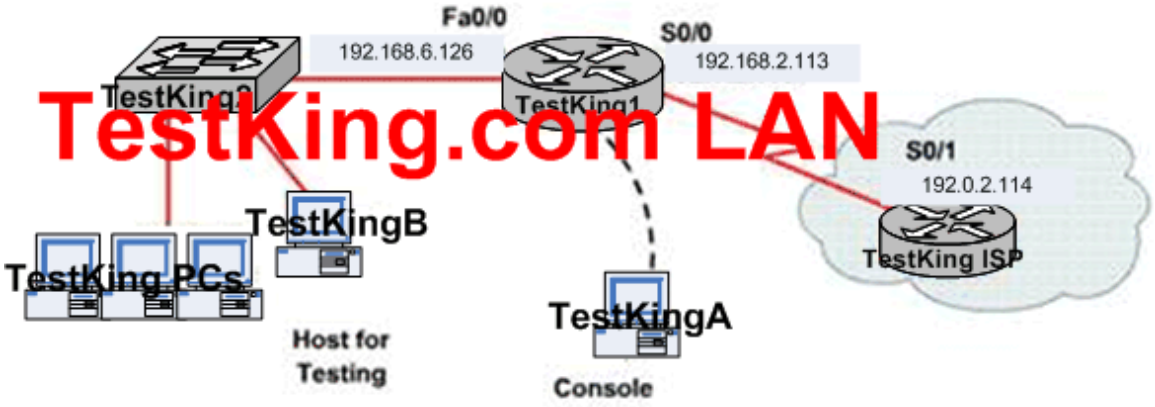
QUESTION NO: 7 SIMULATION
Network topology exhibit:



You work as a network technician at TestKing.com. Study the exhibit carefully. You are required to perform configurations to enable internet access. The TestKing ISP has given you six public IP addresses in the 198.18.32.65 198.18.32.70/29 range. TestKing.com has 62 clients that needs to have simultaneous internet access. These local hosts use private IP addresses in the 192.168.6.65 - 192.168.6.126/26 range.

You need to configure Router TestKing1 using the TestKingA console.
You have already made basic router configuration. You have also configured the appropriate NAT interfaces; NAT inside and NAT outside respectively.

Now you are required to finish the configuration of TestKing1.

Answer:
Explanation:
Testking1:
Testking1#Config t
Testking1(Config)#interface fa0/0
Testking1(Config-if)#ip nat inside
Testking1(Config)#interface S0/0

```
Testking1(Config-if)#ip nat outside
Testking1(Config-if)#exit
Testking1(Config)#access-list 1 permit 192.168.6.65 0.0.0.62
Testking1(Config)#access-list 1 deny any
Testking1(Config)#ip nat pool nat_test 198.18.32.65 198.18.32.70 prefix-length 29
Testking1(Config)#ip nat inside source list 1 pool nat_test overload
```

Section 8: Troubleshoot NAT issues (9 questions)

QUESTION NO: 1
You need to review the NAT configuration of a TestKing router. What is the function of the Cisco IOS command "ip nat inside source static 10.99.199.9 172.137.16.9" that us being used in this router?

A. It creates a global address pool for all outside NAT transactions
B. It creates dynamic source translations for all inside local PAT transactions
C. It establishes a dynamic address pool for an inside static address
D. It creates a one-to-one mapping between an inside local address and an inside global address
E. It maps one inside source address to a range of outside global addresses
F. None of the above

Answer: D

QUESTION NO: 2
The TestKing WAN is depicted below:

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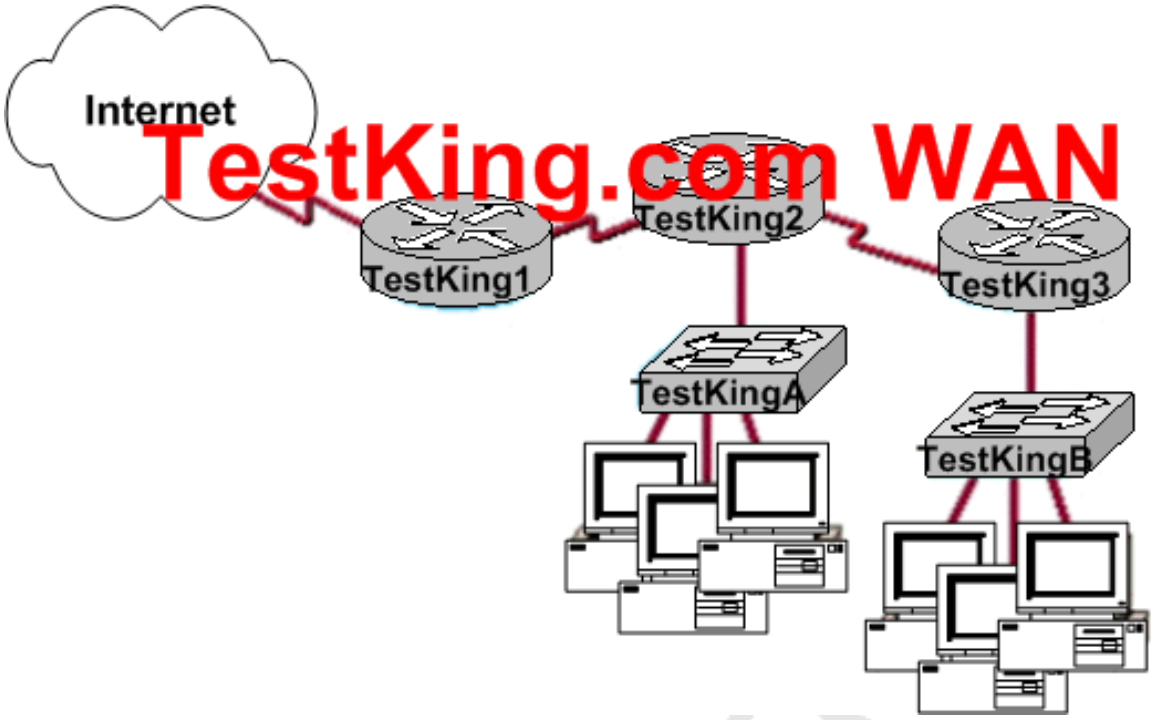

As a network technician at TestKing.com you would like to implement NAT in the network shown in the exhibit. You would like to allow inside hosts to use a private addressing scheme. Where should NAT be configured?

A. TestKing1 router
B. TestKing2 router
C. TestKing3 router
D. All routers
E. All routers and switches
F. None of the above

Answer: A
Explanation:
NAT should always be configured on the border device. It can be a either a border router or a PIX firewall connecting to the Internet.

QUESTION NO: 3
The administrator of the TestKing network needs to ensure that a web server in their network is accessible from the Internet. Since the network uses private addressing, this requires an IP-to-registered-address mapping. The following command is entered on the router:

TestKing1(config)# ip nat inside source static 192.168.2.1 198.18.1.254

After unsuccessful results from a ping to the Internet, the administrator issues the show ip nat translations command and the output is blank. What could be the problem with the NAT configuration for this mapping?

A. The keyword overload is missing from the command.
B. The administrator needs to define a NAT pool first.
C. An access list must be defined to create static NAT translations.
D. The interfaces need to be configured for NAT.

Answer: D
Explanation:
After configuring the static NAT administrator should configure the NAT on interface in order to define which interfaces are on the outside and which are on the inside:
Example:
interface s0
ip nat outside àBecause s0 interface is connected to ISP
interface e0
ip nat inside à Because e0 interface is connected to Local LAN.
Incorrect Answers:
A, B, C: These are all tasks that need to be configured when performing many to one NAT, also known as Port Address Translation (PAT). In this example, we are specifying a static 1-1 NAT entry.

QUESTION NO: 4
Part of the TestKing network is shown below:

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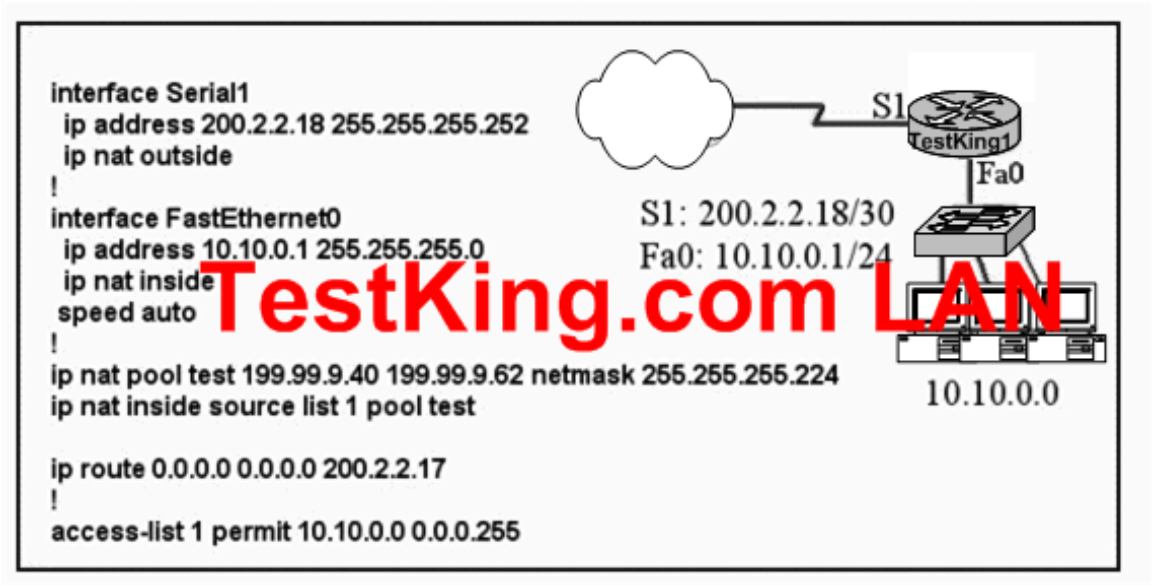
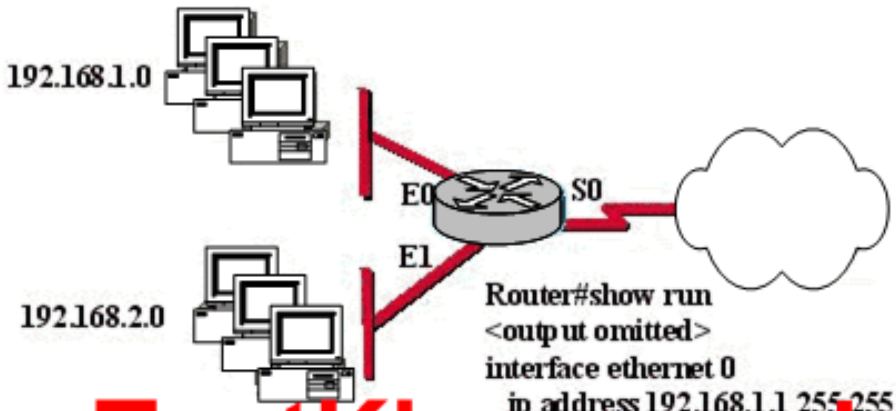


Refer to the topology and router configuration shown in the graphic above. A host on the TestKing LAN is accessing an FTP server across the Internet. Which of the following addresses could appear as a source address for the packets forwarded by the router to the destination server?

A. 10.10.0.1
B. 10.10.0.2
C. 199.99.9.3
D. 199.99.9.57
E. 200.2.2.17
F. 200.2.2.18
G. None of the above

Answer: D
Explanation:
Using NAT we can translate the Source or Destination Address. In our example all source address from the 10.10.00 0.0.0.255 network will be translated to an IP address form the 199.99.9.40-62 pool, making only choice D correct.

QUESTION NO: 5
Part of the configuration of a TestKing router is shown below:




```
Router#show run
<output omitted>
interface ethernet 0
  ip address 192.168.1.1 255.255.255.0
!
interface ethernet 1
  ip address 192.168.2.1 255.255.255.0
!
interface serial 0
  ip address 192.168.3.1 255.255.255.0
!
ip nat inside source list 1 interface serial 0 overload
!
access-list 1 permit 192.168.1.0 0.0.0.255
access-list 1 permit 192.168.2.0 0.0.0.255
```

TestKing.com LAN

The TestKing network administrator has configured NAT as shown above. Clients still cannot access the Internet. What should the network administrator do to resolve this problem?

A. Configure an IP NAT address pool.
B. Properly configure the ACL.
C. Apply the "ip nat" command to the S0 interface.
D. Configure the "ip nat inside" and "ip nat outside" commands on the appropriate interfaces.

E. None of the above

Answer: D
Explanation:
The "ip nat inside" and "ip nat outside" commands must be used from interface configuration mode to tell the router which interface is performing which role in the NAT process. The following commands show how to configure our example router:

TK1(config)#interface ethernet0TK1(config-if)#ip nat insideTK1(config-if)#exitTK1(config)#interface serial0TK1(config-if)#ip nat outsideTK1(config-if)#exitTK1(config)#

QUESTION NO: 6
The TestKing WAN is shown in the diagram below:

```
TestKing1 (config)# ip nat pool c-pool 66.179.148.33 66.179.148.34
    netmask 255.255.255.248
TestKing1 (config)# Access-list 1 permit 192.168.9.0 0.0.0.7
TestKing1 (config)# ip nat inside source list 1 pool c-pool overload
TestKing1 (config)# interface fastethernet 0/0
TestKing1 (config-if)# ip nat inside
TestKing1 (config)# interface serial 0/0
TestKing1 (config-if)# ip nat outside
```

Study the Exhibit carefully and sequence of configuration commands shown in the graphic. The network at TestKing1 has just been configured for NAT as shown. Initial tests indicate that the network is functioning properly.
However, several users report that they cannot access the Internet. What is the problem?

A. The NAT pool does not have enough IP addresses.
B. The access list is not permitting all of the LAN host addresses to be translated.
C. The NAT inside and NAT outside interfaces are reversed.
D. The link between the TestKing routers and the TestKing2 ISP
E. None of the above

Answer: B
Explanation:
The source of the IP address hosts that should be translated is specified in access list 1, which only specifies 192.168.9.0 0.0.0.7. This will only translate host 192.168.9.1-192.168.9.7. The correct syntax should have been:

access-list 1 permit 192.168.9.0 0.0.0.255

QUESTION NO: 7
The TestKing network is shown below:

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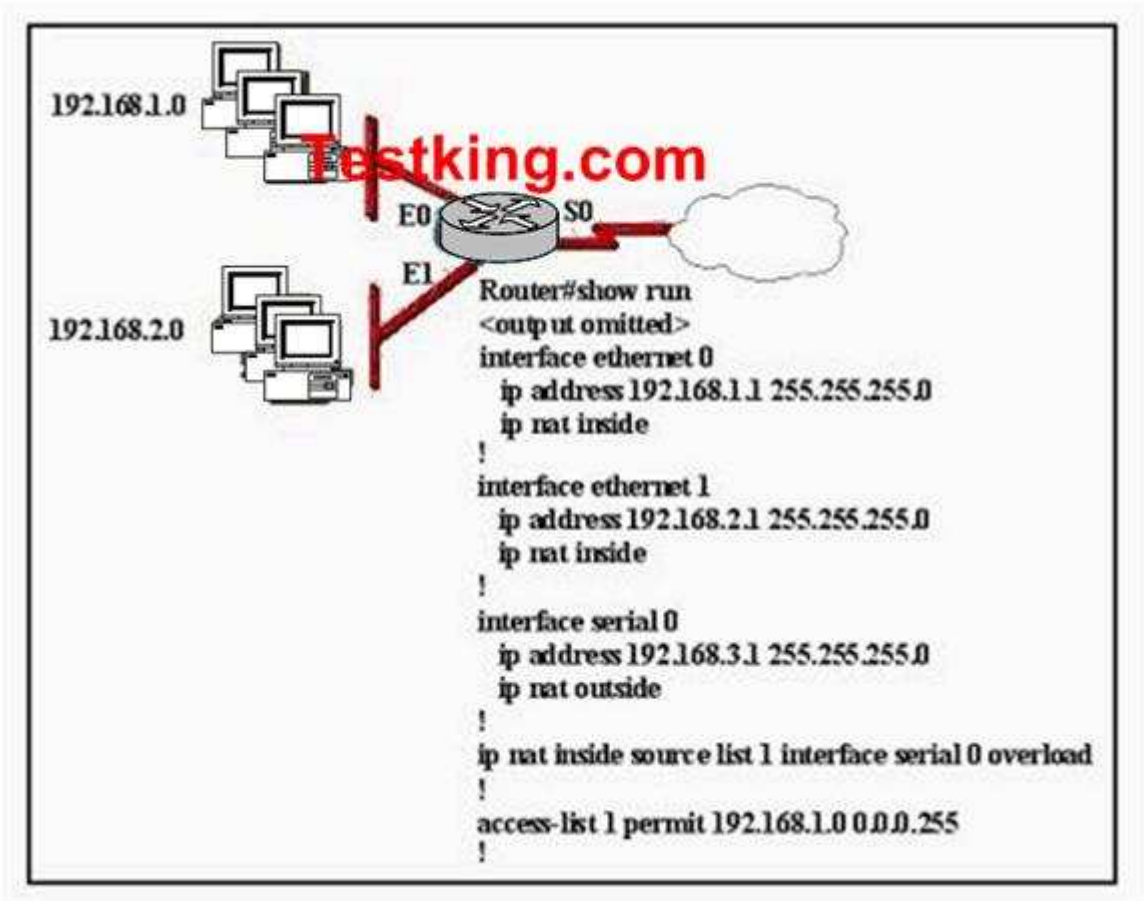
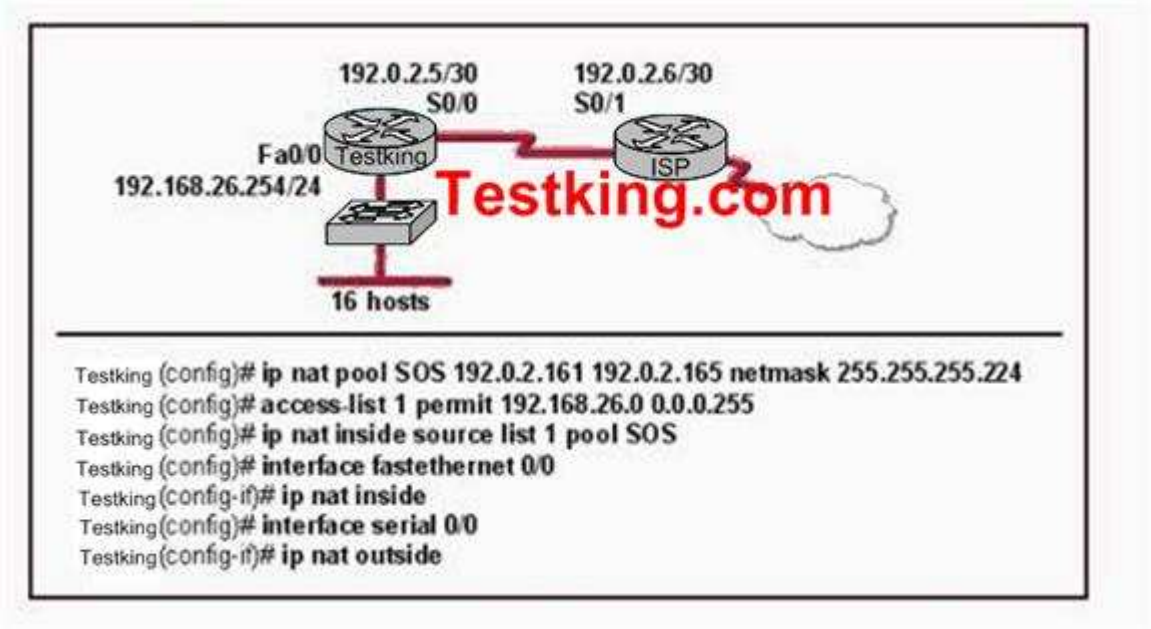


The network administrator has configured NAT as shown in the graphic. Some clients can access the Internet while others cannot. What should the network administrator do to resolve this problem?

A. Configure an IP NAT pool.
B. Properly configure the ACL.
C. Apply the ACL to the S0 interface.
D. Configure another interface with the ip nat outside command.
E. None of the above.

Answer: B
Explanation:
In the exhibit the ACL is only configured for the 192.168.1.0/24 network. In order to make Internet access available to all clients of both networks the access list 1 needs to include both 192.168.1.0/24 and 192.168.2.0/0.

QUESTION NO: 8
The TestKing network is shown below:



The network at the Testking has just been configured for NAT as shown. Initial tests indicate that everything is functioning as intended. However, it is found that a number of hosts cannot access the Internet. What is the problem?

A. The access list is not correct.
B. There are not enough IP addresses available in the NAT address pool.
C. The wrong interface has been configured with the ip nat inside command.
D. The IP address of the Fa0/0 interface is not usable.

E. The S0/1 interface of the ISP router is in the wrong subnet.

Answer: B
Explanation:
According to the configuration shown above, the NAT pool only specifies 5 IP addresses (192.0.2.161-165) while there are 16 hosts on the network that need to be translated. This explains why everything functions well for the first hosts, but not for the rest. To fix this issue, more IP addresses need to be specified in the NAT pool named SOS, or alternatively the "overload" keyword could be used to specify many to one address translation, or PAT.
Several internal addresses can be NATed to only one or a few external addresses by using a feature called Port Address Translation (PAT) which is also referred to as "overload", a subset of NAT functionality.
PAT uses unique source port numbers on the Inside Global IP address to distinguish between translations. Because the port number is encoded in 16 bits, the total number could theoretically be as high as 65,536 per IP address. PAT will attempt to preserve the original source port, if this source port is already allocated PAT will attempt to find the first available port number starting from the beginning ofthe appropriate port group 0-5111, 512-1023 or 1024-65535. If there is still no port available from the appropriate group and more than one IP address is configured, PAT will move to the next IP address and try to allocate the original source port again. This continues until it runs out of available ports and IP addresses.
Alternatively, we could have configured port address translation, or NAT overload, to provide Internet access to the given number of hosts.

QUESTION NO: 9
The TestKing network is shown in the diagram below:

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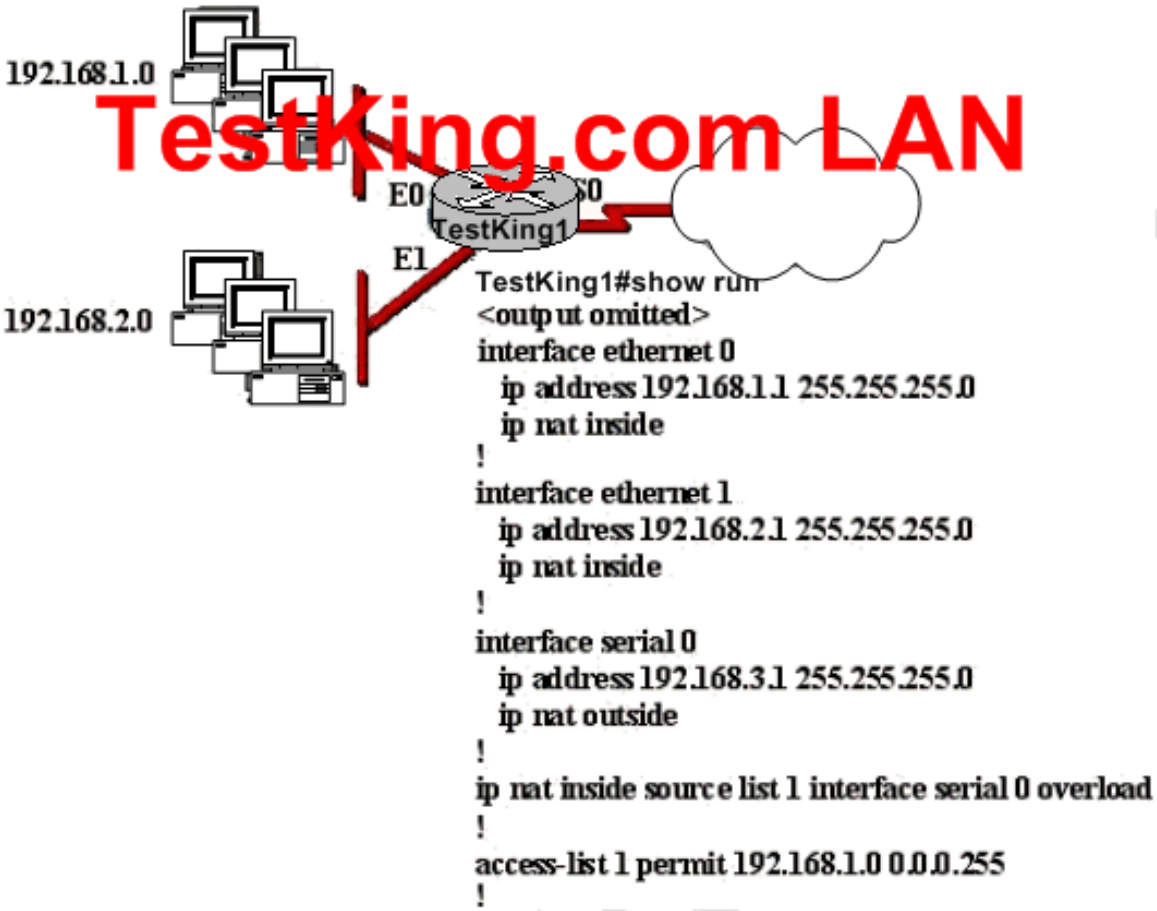

The network administrator has configured NAT as shown in the exhibit. Some clients can access the Internet while others cannot.
What should the network administrator do to resolve this problem?

A. Configure an IP NAT pool.
B. Properly configure the ACL.
C. Apply the ACL to the S0 interface.
D. Configure another interface with the ip nat outside command.
E. Configure the ip nat inside and ip nat outside commands

Answer: B

Explanation:
"Some clients can access the Internet while others cannot." this is a huge hint that tell us either:
1. ACL is blocking some people
2. You are not using overload when you should
3. That you are using 2 inside subnets like in this example & 1 of those does not have the IP NAT INSIDE statement against it.

In this example, the access list specified is only allowing users on the 192.168.1.0/24 subnet should be translated, so all of the users on E1 (192.168.2.X/24 subnet) will not get translated, and will therefore not be able to reach the Internet.

Topic 8, IMPLEMENT AND VERIFY WAN LINKS (60 questions)

Section 1: Describe different methods for connecting to a WAN (4 questions)

QUESTION NO: 1
Of the following choices below, only three could be used as WAN encapsulation methods, as opposed to LAN encapsulation. Which three are they? (Choose three)

A. FDDI
B. HDLC
C. Frame Relay
D. PPP
E. Token Ring
F. Ethernet
G. VTP

Answer: B, C, D

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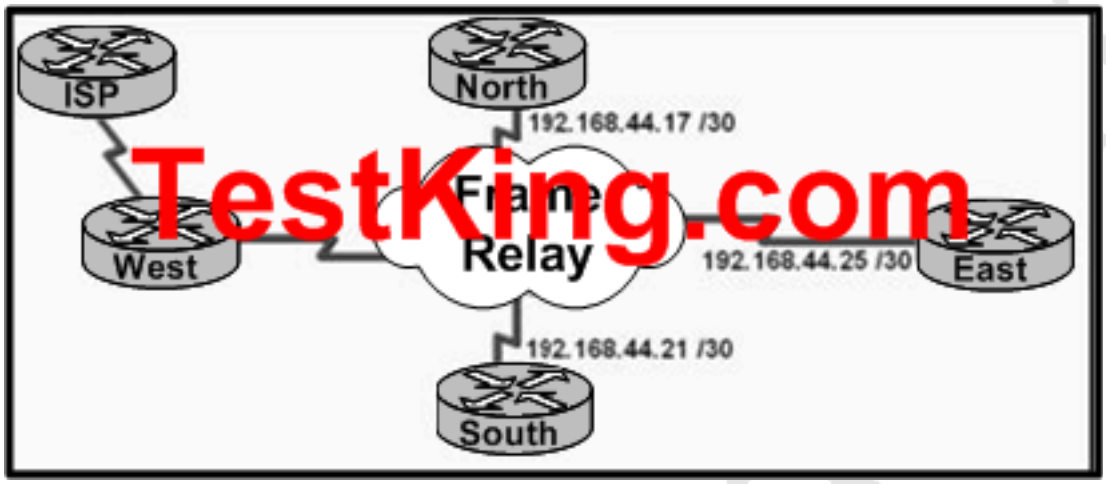
QUESTION NO: 2
In the TestKing network shown below, an associate has the task of planning a Frame Relay implementation to replace the existing WAN infrastructure.



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The addresses for the North, East, and South branch offices have been assigned as shown in the diagram. Which type of topology should be implemented in this network?

A. Extended star
B. Ring
C. Hub and spoke
D. Bus
E. Full mesh

Answer: C
Explanation:
In a Fully meshed environment, every router has a PVC defined to every other router and in a Non-fully meshed environment (or Hub and Spoke) PVCs are only defined between routers that need to communicate. In this example, a /30 IP subnet mask is used at each remote location. This mask allows for only two hosts on the network, which will used for the local router's frame relay interface, and the hub router's interface. In this example, all site to site (spoke) traffic will need to traverse through the main (hub) location.

QUESTION NO: 3
What can the TestKing network administrator utilize by using PPP (Point to Point Protocol) as the Layer 2 encapsulation? (Choose three)

A. Compression
B. QOS
C. Sliding windows
D. VLAN support
E. Authentication
F. Multilink support

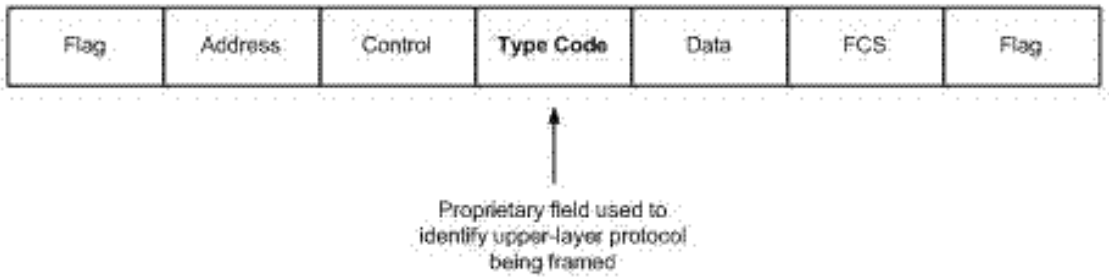
Answer: A, E, F

QUESTION NO: 4
You need to establish a point to point circuit between a Cisco router and a Juniper router on the TestKing network. You are having difficulty in establishing this serial link between a Cisco router and another vendor. Both routers are configured for HDLC encapsulation. Which statements are true regarding this configuration? (Choose two)

A. HDLC requires a clock rate to be configured on the routers at both ends of the serial link.
B. The Cisco HDLC frame uses a proprietary "Type" field that may not be compatible with equipment of other vendors.
C. PPP encapsulation is recommended for serial links between equipment from multiple vendors.
D. Usernames must be configured at both ends of the HDLC serial link
E. There is a mismatch in the HDLC authentication password configurations.
F. The HDLC vendor type must be enabled on the Cisco router.

Answer: B, C
Explanation:
The High Level Data Link Control protocol (HDLC) is the default encapsulation used on the synchronous serial interfaces of a Cisco router.

HDLC is a Data Link layer protocol used to encapsulate and transmit packets over point-to-point links. It handles the transfer of data in full duplex, as well as link management functions. As an OSI standard, many vendors implement the HDLC protocol in their equipment. Unfortunately, these implementations are usually not interoperable. The reason is that when the HDLC frame format was defined, it did not include a field to identify the Network layer protocol that it was framing. As such, the OSI version of HDLC assumes that any link using HDLC is running only a single Network layer protocol like IP. Of course, many networks run IP, IPX, and other Layer 3 protocols simultaneously. This has led vendors (including Cisco) to implement HDLC using a proprietary frame format that includes a type code field, thus allowing the Network layer protocol within a frame to be properly identified.
The Cisco HDLC frame is illustrated in the figure below.



Because of the proprietary nature of vendor HDLC implementations, you should only use HDLC framing on point-to-point links when the router at each end of a link is from the same vendor. In cases where you want to connect equipment from different vendors over a leased line, the Point-to-Point Protocol (PPP) should be used. Always remember that the router on both sides of a point-to-point link must be using the same data framing method in order to communicate.
Reference: http://www.2000trainers.com/cisco-ccna-11/ccna-hdlc/

Section 2: Configure and verify a basic WAN serial connection (13 questions)

QUESTION NO: 1
The TestKing WAN connection is shown below:

Based on this diagram, which two devices can be used to complete the connection between the WAN router at the customer site and the service provider? (Choose two.)

A. CSU/DSU
B. modem
C. WAN switch
D. ATM switch
E. Frame Relay switch
F. ISDN TA

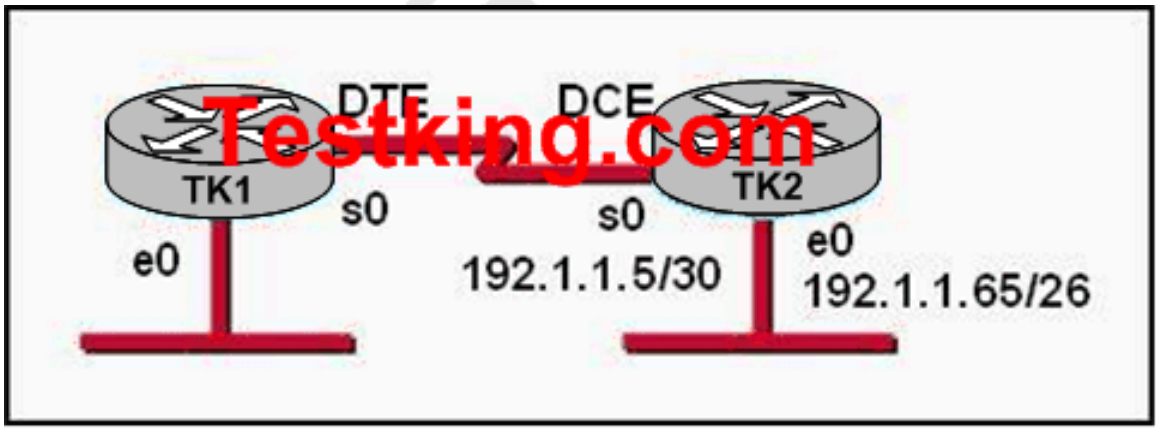
Answer: A, B
Explanation:
DTE is an abbreviation for Data Terminal Equipment, and refers to an end instrument that converts user information into signals for transmission, or reconverts the received signals into user information. A DTE device communicates with the Data Circuit-terminating Equipment (DCE), such as a modem or CSU/DSU.
A DTE is the functional unit of a data station that serves as a data source or a data sink and provides for the data communication control function to be performed in accordance with link protocol.
The data terminal equipment (DTE) may be a single piece of equipment or an interconnected subsystem of multiple pieces of equipment that perform all the required functions necessary to permit users to communicate. A user interacts with the DTE (e.g. through a Human-Machine Interface), or the DTE may be the user.
Usually, the DTE device is the terminal (or a computer emulating a terminal), and the DCE is a modem.
A CSU/DSU (Channel Service Unit/Data Service Unit) is a hardware device about the size of an external modem that converts a digital data frame from the communications technology used on a local area network (LAN) into a frame appropriate to a wide-area network (WAN) and vice versa. The DSU provides an interface to the data terminal equipment (DTE) using a standard (EIA/CCITT) interface. It also provides testing capabilities.

QUESTION NO: 2
You are configuring the serial interface of your Cisco router; which of the following are valid encapsulation types you can use? (Select all that apply)

A. Token Ring
B. Ethernet
C. HDLC
D. PPP
E. Frame Relay
F. CHAP

Answer: C, D, E
Explanation:
HDLC, Frame Relay, and PPP are the most common encapsulation types set for serial interfaces in a Cisco router. HDLC is often used in point to point circuits with Cisco routers on each end. HDLC is Cisco proprietary and offers an alternative to PPP.
Incorrect Answers:
A, B. Token Ring and Ethernet aren't encapsulation types used on serial interfaces; they are types of LAN networks.
F. CHAP is the Challenge Authentication Protocol. It is used for authentication on PPP links.

QUESTION NO: 3
Two TestKing routers are connected as shown in the diagram below:



Which series of commands will configure router TK1 for LAN-to-LAN communication with router TK2? The enterprise network address is 192.1.1.0/24 and the routing protocol in use is RIPv2. (Choose three)

A. TK1(config)# interface ethernet 0
TK1(config-if)# ip address 192.1.1.129 255.255.255.192
TK1(config-if)# no shutdown
B. TK1(config)# interface ethernet 0
TK1(config-if)# ip address 192.1.1.97 255.255.255.192
TK1(config-if)# no shutdown
C. TK1(config)# interface serial 0
TK1(config-if)# ip address 192.1.1.4 255.255.255.252
TK1(config-if)# clock rate 56000
D. TK1(config)# interface serial 0
TK1(config-if)# ip address 192.1.1.6 255.255.255.252
TK1(config-if)# no shutdown
E. TK1(config)# router rip
TK1(config-router)# network 192.1.1.4
TK1(config-router)# network 192.1.1.128
F. TK1(config)# router rip
TK1(config-router)# version 2
TK1(config-router)# network 192.1.1.0

Answer: A, D, F
Explanation:
To establish connectivity on router TK1 the first step is to configure the interfaces with the correct IP address and enable them with the "no shutdown" command as shown in answer choices A and D. The final step is to enable the RIP routing process. Since this network uses VLSM, RIP version 2 will be required to establish connectivity. RIP version 1 is the default RIP version, but it does not support VLSM.
Incorrect Answers:
B: The IP address in use here will conflict with the LAN network configured on TK2.
C: the 192.168.1.4/30 address is a network address, not a host address.
E: In this example we are required to use RIP version 2, not 1. In addition, the IP networks shown are not required. Since RIP assumes classful routing, we only need the single 192.168.1.0 network to be added to the routing process.

QUESTION NO: 4

A network administrator needs to configure a serial link between the main office and a remote location. The router at the remote office is a non-Cisco router. How should the network administrator configure the serial interface of the main office router to make the connection?

A. Main(config)# interface serial 0/0
Main(config-if)# ip address 172.16.1.1 255.255.255.255
Main(config-f)# no shut

B. Main(config)# interface serial 0/0
Main(config-if)# ip address 172.16.1.1 255.255.255.255
Main(config-f)# encapsulation ppp
Main(config-if)# no shut

C. Main(config)# interface serial 0/0
Main(config-if)# ip address 172.16.1.1 255.255.255.255
Main(config-f)# encapsulation frame-relay
Main(config-if)# authentication chap
Main(config-if)# no shut

D. Main(config)# interface serial 0/0
Main(config-if)# ip address 172.16.1.1 255.255.255.255
Main(config-f)# encapsulation ietf

Answer: B
Explanation:
The default encapsulation on a serial interface is the Cisco proprietary HDLC. When connecting to routers from another vendor, we will need to use the standards based PPP, which is correctly defined in choice B.
Incorrect Answers:
A: This is not a correct answer because no encapsulation is defined, so the default HDLC will be used, which is a Cisco proprietary protocol.
C: CHAP authentication is only used by PPP, not HDLC.
D: IETF itself is not an encapsulation option on an interface; it is used in frame relay networks, where the encapsulation can be frame relay IETF, but not simply IETF alone.

QUESTION NO: 5
Two TestKing routers are connected as shown below:

TestKing1 configuration exhibit:

```
TestKing1# show interfaces s0
  Serial0 is up, line protocol is up
    Hardware is HD64570
    Internet address is 192.168.10.1/24
    MTU 1500 bytes, BW 1544 Kbit,
     reliability 255/255
    Encapsulation HDLC, loopback not set
    Keepalive set (10 sec)
```

TestKing2 configuration exhibit:

```
TestKing2# show interfaces s1
  Serial1 is up, line protocol is up
    Hardware is HD64570
    Internet address is 192.168.11.2/24
    MTU 1500 bytes, BW 56000 Kbit,
     reliability 255/255
    Encapsulation HDLC, loopback not set
    Keepalive set (10 sec)
```

Two routers named TestKing1 and TestKing2 are connected by their serial interfaces as shown above, but there is no data connectivity between them. The TestKing1 router is known to have a correct configuration. Given the partial configurations shown in the exhibit, what is the problem on the TestKing2 router that is causing the lack of connectivity?

A. The serial line encapsulations are incompatible.
B. The subnet mask is incorrect.
C. The maximum transmission unit (MTU) size is too large.

D. The IP address is incorrect.
E. A loopback is not set.
F. The bandwidth setting is incompatible with the connected interface.
G. None of the above

Answer: D

QUESTION NO: 6
Part of the TestKing network is shown below:

TestKing1 configuration exhibit:

```
TestKing2# show ip interface brief
Interface          IP-Address      OK? Method Status                Protocol
FastEthernet0/0    192.168.2.1     YES manual up                    up
Serial0/0          192.168.1.5     YES manual up                    down
Serial0/1          unassigned      YES manual administratively down down
```

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In this TestKing network segment shown above, hosts in network 192.168.2.0 are unable to reach hosts in network 192.168.3.0. Based on the output from Router TestKing1, what are two possible reasons for the failure? (Choose two)

A. The cable that is connected to S0/0 on Router TestKing1 is faulty.
B. The encapsulation that is configured on S0/0 of Router TestKing2 does not match the encapsulation that is configured on S0/0 of Router TestKing1.

C. The IP address that is configured on S0/0 of Router TestKing2 is not in the correct subnet.
D. Interface S0/0 on Router TestKing1 is not receiving a clock signal from the CSU/DSU.
E. Interface S0/0 on Router TestKing2 is administratively down.
F. Interface S0/0 on Router TestKing1 is configured with an incorrect subnet mask.

Answer: B, D

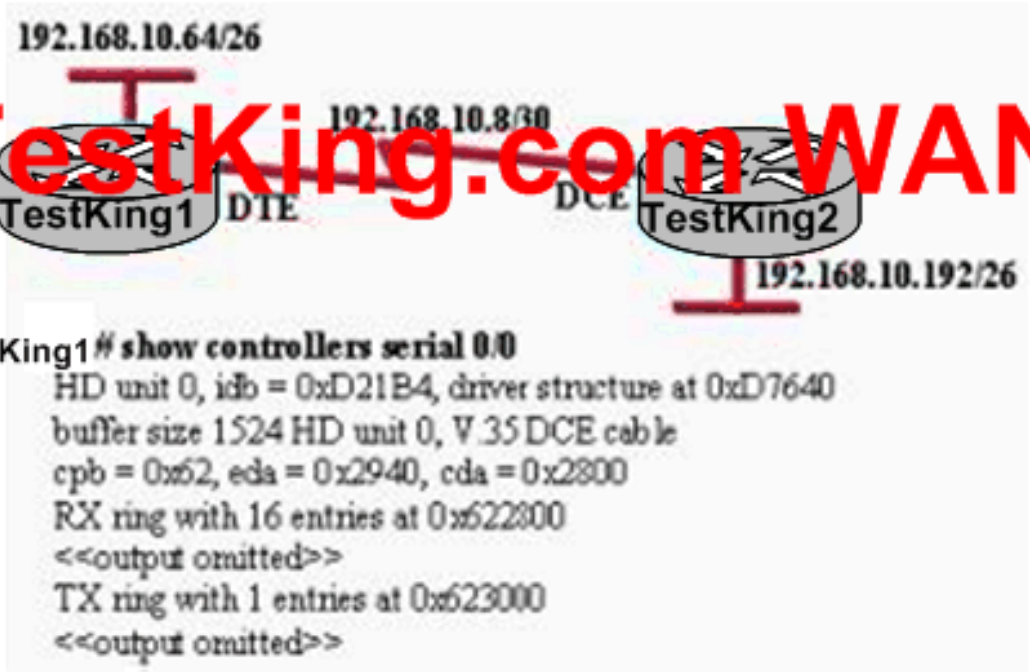
QUESTION NO: 7
The two TestKing Lab routers shown below are interconnected with back-to-back cables between their serial interfaces. How should the serial interface of the TestKing1 router be configured to establish Layer 3 connectivity between the two routers?

A. TestKing1(config)#interface serial 3
TestKing1(config-if)# clock rate 64000
TestKing1(config-if)# no shutdown
B. TestKing1(config)#interface serial 3
TestKing1(config-if)# ip address 192.168.10.3 255.255.255.0
TestKing1(config-if)# clock rate 64000

C. TestKing1(config)#interface serial 3
TestKing1(config-if)# ip address 192.168.10.3 255.255.255.0
TestKing1(config-if)# clock rate 64000
TestKing1(config-if)# no shutdown
D. TestKing1(config)#interface serial 3
TestKing1(config-if)# ip address 192.168.10.3 255.255.255.0
TestKing1(config-if)# no shutdown
E. None of the above

Answer: D
Explanation:
When examining the interface using the show controllers command, the DTE cable is connected so there is no need to specify the clock rate and bandwidth; just specify the IP address and bring up the interface. Only the DCE side of the serial to serial connection is required to specify the clock rate.

QUESTION NO: 8
An administrator cannot connect from TestKing1 to TestKing2. To troubleshoot this problem, the administrator has entered the command shown in the exhibit.



TestKing.com WAN

Based on the output shown, what could be the problem?

A. The serial interface has a full buffer.
B. The serial interface is configured for half duplex.
C. The serial interface has the wrong type of cable attached.
D. The serial interface does not have a cable attached.
E. The serial interface is configured for the wrong frame size.

Answer: C
Explanation:
According to the figure DTE cable should connect to Testking1 on interface but while examining using show controllers serial 0/0 command it showing that a DCE is connected so the wrong type of cable is being used.

QUESTION NO: 9
While logged into a router you manually shut down the serial 0 interface using the "shutdown" interface configuration command. You then issue the "show interface serial 0" command in exec mode. What could you expect the status of the serial 0 interface to be?

A. Serial 0 is up, line protocol is up
B. Serial 0 is up, line protocol is down
C. Serial 0 is down, line protocol is down
D. Serial 0 is down, line protocol is up
E. Serial 0 is administratively down, line protocol is down
F. Serial 0 is administratively down, line protocol is up

Answer: E
Explanation:
To bring down an interface for administrative reasons and, as a side effect, remove the connected router from the routing table, you can use the shutdown interface subcommand. To enable the interface back up, issue the "no shutdown" configuration command.
Incorrect Answers:
A. This is the status of a fully operational interface.
B, C. These are the results of line problems or configuration errors.
D, F. These two interface conditions should never be seen.

QUESTION NO: 10 DRAG DROP
You work as a network administrator at TestKing.com. You are required to configure router TestKing2. In particular, you must set the IP address on a serial interface. Select the appropriate command. Not all commands are used.

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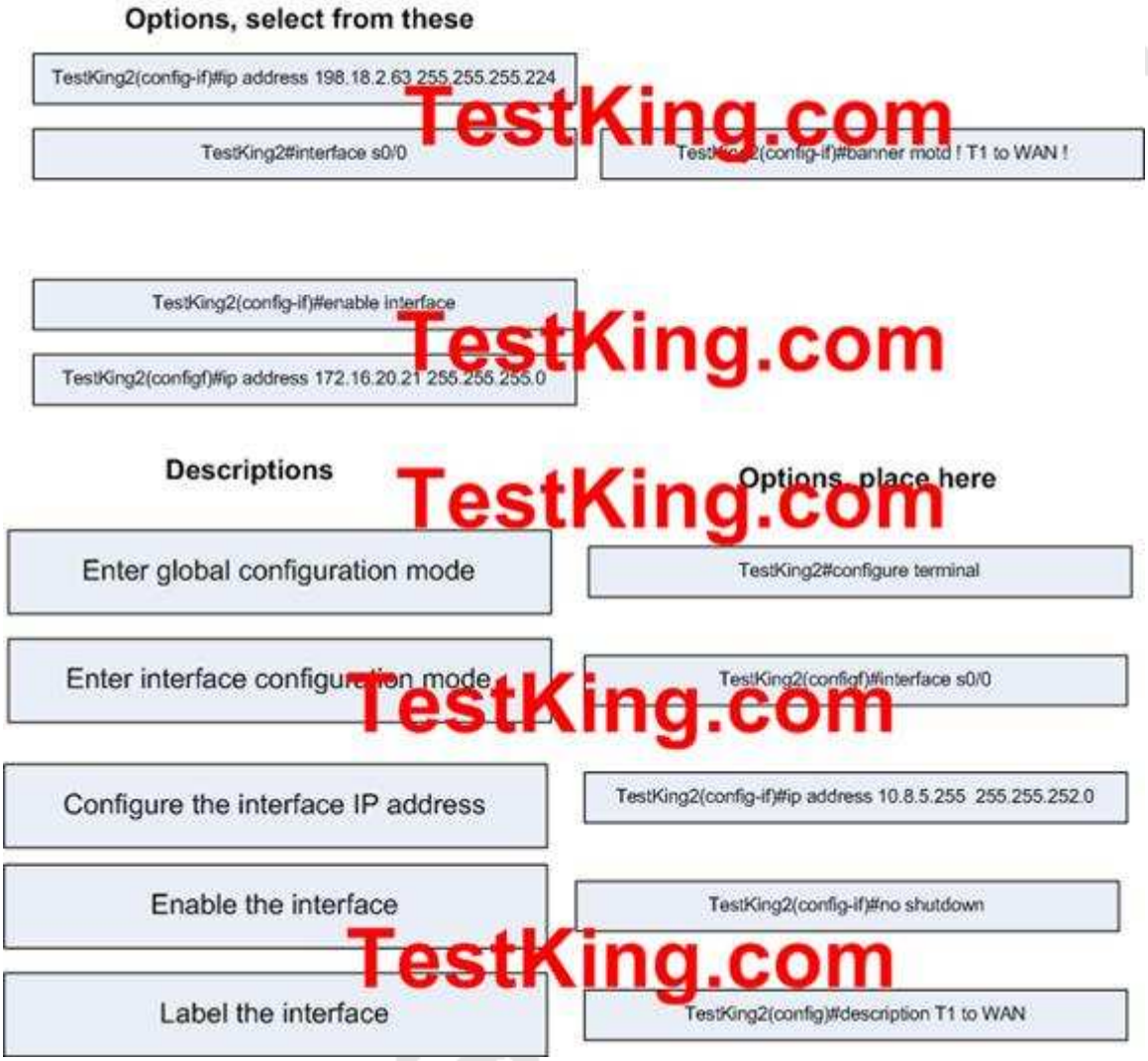
Answer:
Explanation:



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QUESTION NO: 11
Part of the TestKing network is shown below:

TestKing.com WAN

The network administrator is configuring router TestKing2 to connect to a non-Cisco (Juniper) network. Which two commands would be applied to the S0/0 WAN interface, but not to the Fa0/0 LAN interface? (Choose two.)

A. ip address
B. authentication pap
C. encapsulation ppp
D. speed
E. no shutdown

Answer: B, C
Explanation:
Since we are connecting to a non Cisco device, we must use PPP on the serial interface. PAP authentication is an optional parameter that can also used on this interface.
Incorrect Answers:
A, E: Although are indeed configurable on the serial interface, they are also configured on the LAN interface and we are being asked to choose the options that apply to the serial interface only.

D: This is a parameter that can only be set on and Ethernet interface, not on the serial interface.

QUESTION NO: 12
Network topology exhibit:

TestKing1 configuration exhibit:

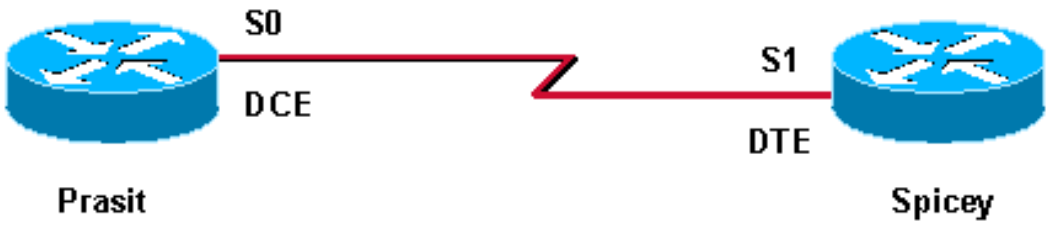
TestKing2 configuration exhibit:

***Note that some output might have been omitted from the configurations exhibits.

The TestKing1 and TestKing2 routers are directly connected through their serial interfaces for purposes of testing. Based on the output shown in the exhibit, what must be done to make the serial line operational?

A. Use the no shutdown command on the TestKing1 router.
B. Change the IP address on the TestKing2 router.
C. Configure the serial 0/0 interface on the TestKing2 router with a clockrate.
D. Start the clock on the TestKing1 router.
E. Replace the broken cable between the two devices.
F. None of the above

Answer: C
Explanation:
Refer to the following example provided by Cisco:



The default serial encapsulation on Cisco routers is Cisco HDLC, so it does not need to be explicitly configured on the router. As a result, the encapsulation type is not displayed in the configuration.
With a back-to-back serial connection, the router connected to the DCE end of the cable provides the clock signal for the serial link. The clockrate command in the interface configuration mode enables the router at the DCE end of the cable (Prasit, in this example) to provide the clock signal for the serial link. Issue the show controllers command to determine which end of the cable is connected to the serial interface.
In this configuration, the DCE end of the cable is connected to Prasit (the clockrate command is issued), and the DTE end is connected to Spicey.
Configurations
This document uses the configurations shown below.

Prasit
interface Serial0 ip address 5.0.2.1 255.255.255.0 clockrate 64000 no cdp enable

Spicey
interface Serial1 ip address 5.0.2.2 255.255.255.0 no cdp enable

Reference:
http://www.cisco.com/en/US/tech/tk713/tk317/technologies_configuration_example09186a00800944ff.sht

QUESTION NO: 13
Network Topology Exhibit:

TestKing1 configuration Exhibit:

```
TestKing#1 show run
Building configuration...
<output omitted>
interface Serial0/0
 ip address 172.16.5.2 255.255.255.252
 no ip proxy-arp
 encapsulation ppp
 mtu 1496
<output omitted>
TestKing#1
```

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TestKing2 configuration Exhibit:

```
TestKing#2 show run
Building configuration...
<output omitted>
interface Serial1/1
 ip address 172.16.5.1 255.255.255.252
 no ip proxy-arp
 mtu 1496
<output omitted>
TestKing#2
```

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You are troubleshooting a connectivity problem on the serial interfaces of these TestKing routers. The output from the "show interface" command on both routers shows that the serial interface is up, line protocol is down. Given the partial output for the show running-config in the exhibit, what is the most likely cause of this problem?

A. The serial cable is bad.
B. The MTU is incorrectly configured.
C. The IP addresses are not in the same subnet.
D. The Layer 2 framing is misconfigured.
E. None of the above.

Answer: D

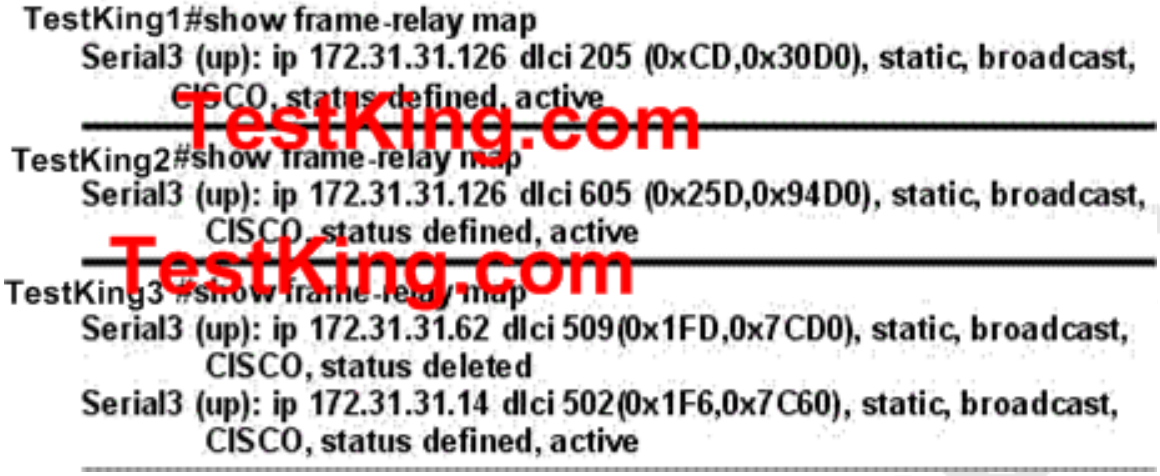
Explanation:
HDLC and PPP are layer 2 protocols. HDLC is actually the default protocol on all Cisco serial interfaces. If you do a show running-config on a Cisco router, your serial interfaces (by default) won't have any encapsulation. This is because they are configured to the default of HDLC. If you do a show interface serial 0/0, you'll see that you are running HDLC. This is the case with router TestKing2, as the default encapsulation is used.
In router TestKing1, we see that the serial interface has been set to use PPP. Since both sides of a point to point circuit must match, the layer 2 framing is the most likely cause of the problem.

Section 3: Configure and verify Frame Relay on Cisco routers (29 questions)

QUESTION NO: 1
Network Topology Exhibit:

TestKing.com WAN

Configuration exhibit:



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You work as a network technician at TestKing.com. Study the exhibits carefully. The Frame-Relay network in the diagram is not functioning properly. Based on the information shown above, what is the cause of the problem?

A. The S3 interface of the TestKing2 router has been configured with the "frame relay encapsulation ietf" command
B. The Frame-relay map statement in the TestKing3 router for the PVC to TestKing2 is not correct
C. The TestKing1 router has the wrong LMI type configured
D. Inverse ARP is providing the wrong PVC information to the TestKing1 Router
E. The IP Address on the serial interface of the TestKing3 router is configured incorrectly
F. None of the above

Answer: B
Explanation:
On serial 3 of TestKing 3 we can see that there are 2 PVC's defined, but only one of them is working and is shown as active. The frame relay map that was used to specify DLCI 509 was incorrect. Incorrect DLCI assignments that are configured in routers normally show up as "deleted" in the frame relay maps.

QUESTION NO: 2
The following output was displayed on a TestKing router:

Based on the information shown above, what is the meaning of the term "dynamic" as displayed in the output of the show frame-relay map command shown?

A. The DLCI 100 will be dynamically changed as required to adapt to changes in the Frame Relay cloud
B. The DLIC 100 was dynamically allocated by the router
C. The mapping between DLCI 100 and the end station IP Address 172.16.3.1 was learned through inverse ARP
D. The Scenario0/0 interface is passing traffic
E. The Serial0/0 interface acquired the IP address 172.16.3.1 from a DHCP server
F. None of the above

Answer: C
Explanation:
Inverse Address Resolution Protocol (Inverse ARP) was developed to provide a mechanism for dynamic DLCI to Layer 3 address maps. Inverse ARP works much the same way Address Resolution Protocol (ARP) works on a LAN. However, with ARP, the device knows the Layer 3 IP address and needs to know the remote data link MAC address. With Inverse ARP, the router knows the Layer 2 address which is the DLCI, but needs to know the remote Layer 3 IP address.
When using dynamic address mapping, Inverse ARP requests a next-hop protocol address for each active PVC. Once the requesting router receives an Inverse ARP response, it updates its DLCI-to-Layer 3 address mapping table. Dynamic address mapping is enabled by default for all protocols enabled on a physical interface. If the Frame Relay environment supports LMI autosensing and Inverse ARP, dynamic address mapping takes place automatically. Therefore, no static address mapping is required.

QUESTION NO: 3

The command "frame-relay map ip 10.121.16.8 102 broadcast" was entered on a TestKing FR router. Which of the following statements is true concerning this command?

A. The command is required for all frame relay configurations
B. The broadcast option allows packets, such as RIP updates to be forwarded across the PVC
C. This command should be executed from the global configure mode
D. 102 is the remote DLCI that will receive the information
E. The IP Address 10.121.16.8 is the local router port used to forward data
F. None of the above

Answer: B
Explanation:
The broadcast keyword is commonly used with the frame-relay map command. The broadcast keyword provides two functions. First, it forwards broadcasts when multicasting is not enabled and secondly, it simplifies the configuration of OSPF for nonbroadcast networks that use Frame Relay.
The broadcast keyword might also be required for routing protocols such as RIP that depend on regular routing table updates. This is especially true when the router at the remote end is waiting for a routing update packet to arrive before adding the route.

QUESTION NO: 4
Many TestKing locations are connected via Frame Relay, and the default network types are being used. By default, a Frame Relay WAN is classified as what type of physical network?

A. Point-To-Point
B. Nonbroadcast multi-access
C. Broadcast Point-To-Multipoint
D. Nonbroadcast multipoint
E. Broadcast multi-access
F. Broadcast multi-access
G. None of the above

Answer: B

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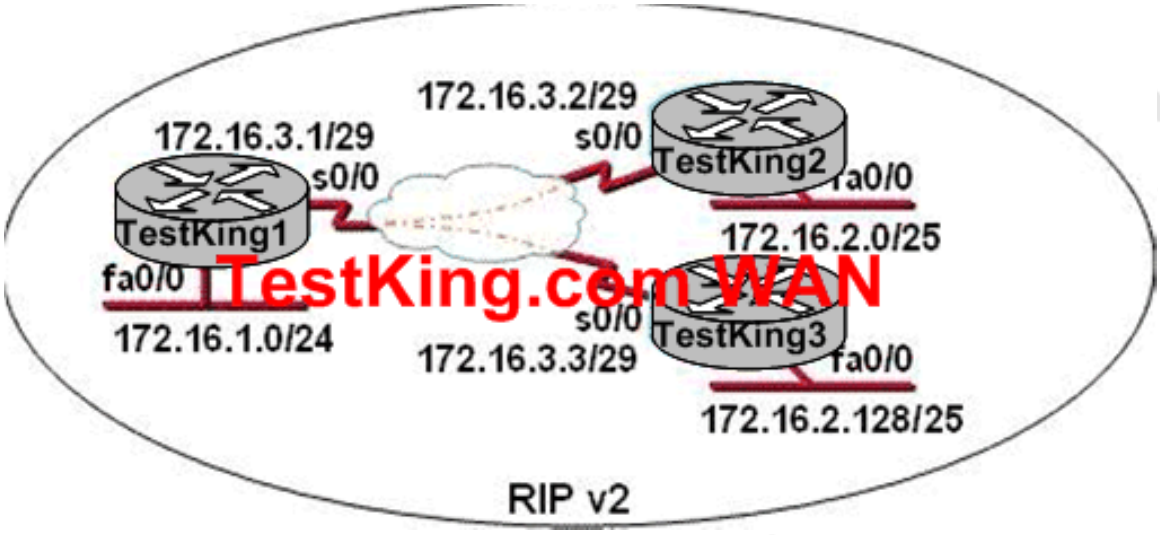
QUESTION NO: 5
Three TestKing routers are connected as shown below:



Here, serial 0/0 on TestKing1 is configured as a multipoint interface to communicate with TestKing2 and TestKing3 in this hub-and-spoke Frame Relay topology. While testing this configuration, a technician notes that pings are successful from hosts on the 172.16.1.0/24 network to hosts on both the 172.16.2.0/25 and 172.16.2.128/25 networks. However, pings between hosts on the 172.16.2.0/25 and 172.16.2.128/25 networks are not successful. Of the following choices, what could explain this connectivity problem?

A. The 172.16.3.0/29 network used on the Frame Relay links is creating a discontiguous network between the TestKing2 and TestKing3 router subnetworks
B. The 172.16.2.0/25 and 172.16.2.128/25 networks are overlapping networks that can be seen by TestKing1 but not between TestKing2 and TestKing3
C. The ip subnet-zero command has been issued on the TestKing1 router
D. Split Horizon is preventing TestKing2 from learning about the TestKing3 networks and TestKing3 from learning about the TestKing2 networks
E. The RIP v2 dynamic routing protocol can't be used across Frame Relay network
F. None of the above

Answer: D
Explanation:

The problem in this situation is related to split horizon, which reduces incorrect routing information and routing overhead in a distance-vector network by enforcing the rule that information cannot be sent back in the direction from which it was received. In other words, the routing protocol differentiates which interface a network route was learned on, and once it determines this, it won't advertise the route back out of that same interface. in a spoke and hub Frame Relay topology, the Frame Relay interface for the hub router must have split-horizon processing disabled. Otherwise, the spoke routers never receive each other's routes.

QUESTION NO: 6
You are implementing a new frame relay network to provide connectivity between you offices. To do this, you set up the frame relay network using point-to-point subinterfaces.

Which of the following does NOT need to be configured?

A. The Frame Relay encapsulation on the physical interface.
B. The local DLCI on each subinterface.
C. An IP address on the physical interface.
D. The subinterface type as point-to-point.

Answer: C
Explanation:
When using point to point subinterfaces in a frame relay network, the subinterfaces will each have their own IP addresses and will each be contained within their own IP subnet. The physical interface does not require an IP address.
Incorrect Answers:
A. The physical interface will need to be configured with a layer two encapsulation type, so in this case it must be frame relay.
B. The subinterfaces will have the local DLCI assigned to each one, using the "frame-relay interface-dlci" command for each of the subinterfaces.
D. Each subinterface should be configured as a point to point network type.

QUESTION NO: 7
It has become necessary to configure an existing serial interface to accept a second Frame Relay virtual circuit. Which of the following procedures are required to accomplish this task? (Choose three.)

A. Encapsulate the physical interface with multipoint PPP.
B. Configure static Frame Relay map entries for each subinterface network.
C. Disable split horizon to prevent routing loops between the subinterface networks.
D. Remove the IP address from the physical interface.
E. Create the virtual interfaces with the interface command.
F. Configure each subinterface with its own IP address.

Answer: D, E, F
Explanation:
Normally, when only one logical virtual circuit (PVC) is assigned to a router it is placed on the physical serial interface. To accept a second PVC, subinterfaces must be created, with each PVC using its own logical interface as shown in the example below:

```
interface serial 0
encapsulation frame-relay
interface serial 0.1 point-to-point
ip address 10.0.1.1 255.255.255.0
frame-relay interface-dlci 142
interface serial 0.2 multipoint
ip address 10.0.2.1 255.255.255.0
frame-relay map 10.0.2.2 118
```

In this example, two virtual circuits are used (one pt-pt and one point-multipoint), each with its own IP address. Note that the physical serial 0 interface was not assigned an IP address.

QUESTION NO: 8
You are a technician at TestKing. Your newly appointed TestKing trainee is setting up a new frame relay connection to a remote branch and wants to know what the valid options for frame relay LMI types are.

What would your reply be? (Choose all that apply.)

A. EIA/TIA
B. Q.932
C. Q.933 A
D. IEEE
E. IETF

F. Cisco
G. ANSI

Answer: C, F, G
Explanation:
The following describe the various frame relay LMI options:

Name Document IOS LMI-Type
* Cisco Proprietary cisco
* ANSI T1.617 Annex D ansi
* ITU Q.933. Annex A q.933a

You can set one of three types of LMIs on our devices: ANSI T1.617 Annex D, Cisco, and ITU-T Q.933 Annex A. To do so, use the following commands beginning in interface configuration mode:

	Command	Purpose
Step 1	**frame-relay lmi-type {ansi | cisco | q933a}**	Sets the LMI type.

Reference:
CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 382

QUESTION NO: 9
How should router TK1, which will be used in the TestKing Frame Relay network, be configured to avoid split horizon issues from preventing routing updates?

A. Configure a single sub-interface to establish multiple PVC connections to multiple remote router interfaces.
B. Configure a separate sub-interface for each PVC with a unique DLCI and subnet assigned to the sub-interface.
C. Configure many sub-interfaces on the same subnet.
D. Configure each Frame Relay circuit as a point-to-point line to support multicast and broadcast traffic.
E. None of the above

Answer: B
Explanation:
Point-To-Point Subinterfaces:
The concept of subinterfaces was originally created in order to better handle issues caused by split-horizon over Non-Broadcast Multiple Access (NBMA) networks (e.g. frame relay, X.25) and distance-vector based routing protocols (e.g. IPX RIP/SAP, AppleTalk). Split-horizon dictates that a routing update received on an interface cannot be retransmitted out onto the same interface. This rule holds even if the routing update was received on one frame relay PVC and destined to retransmit out onto another frame relay PVC. Referring to figure 2, this would mean that sites B and C can exchange routing information with site A, but would not be able to exchange routing information with each other. Split-horizon does not allow Site A to send routing updates received from Site B on to Site C and vice versa.
Note: For TCP/IP, Cisco routers can disable split-horizon limitations on all frame relay interfaces and multipoint subinterfaces and do this by default. However, split-horizon cannot be disabled for other protocols like IPX and AppleTalk. These other protocols must use subinterfaces if dynamic routing is desired.

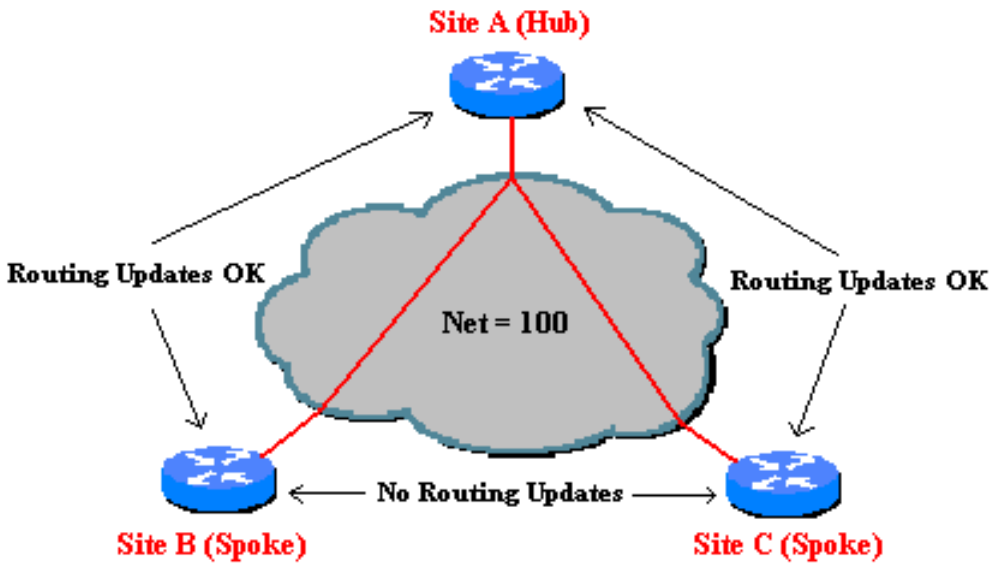


Figure 2: Split-horizon does not allow remote sites to send routing updates to each other.

By dividing the partially-meshed frame relay network into a number of virtual, point-to-point networks using subinterfaces, the split-horizon problem can be overcome. Each new point-to-point subnetwork is assigned its own network number. To the routed protocol, each subnetwork now appears to be located on separate interfaces (Figure 3). Routing updates received from Site B on one logical point-to-point subinterface can be forwarded to site C on a separate logical interface without violating split horizon.

QUESTION NO: 10
Router TK1 is being used in the TestKing frame relay network. When this frame relay router is connected to a WAN link using a serial DTE interface, how is the interface clock rate determined?

A. It is supplied by the far end router.
B. It is supplied by the Layer 1 bit stream timing.
C. It is supplied by the CSU/DSU.
D. It is determined by the clock rate command.
E. None of the above

Answer: C

QUESTION NO: 11
TK1 is a Cisco router was providing Frame Relay connectivity at a remote TestKing branch site. This router was replaced with a different vendor's frame relay router. Connectivity is now down between the central and remote site. What is the most likely cause of the problem?

A. Mismatched encapsulation types
B. Incorrect IP address mapping
C. Mismatched LMI types
D. Incorrect DLCI
E. None of the above

Answer: A

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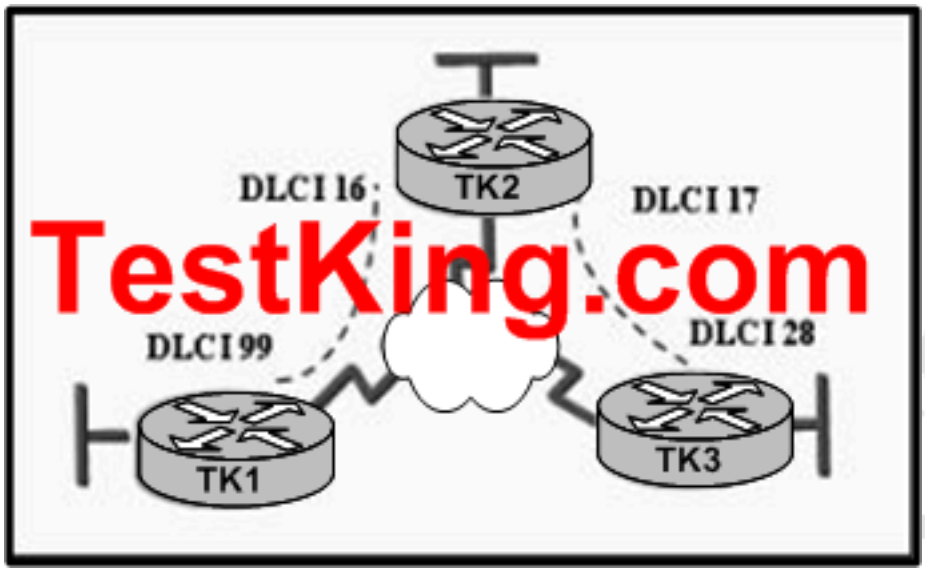
QUESTION NO: 12
The TestKing frame relay network is shown below:



In this network, which statement describes DLCI 17?

A. DLCI 17 is the Layer 2 address used by TK2 to describe a PVC to TK3.
B. DLCI 17 describes the ISDN circuit between TK2 and TK3.
C. DLCI 17 describes a PVC on TK2. It cannot be used on TK3 or TK1.
D. DLCI 17 describes the dial-up circuit from TK2 and TK3 to the service provider.
E. None of the above

Answer: A
Explanation:
DLCI-Data Link Connection Identifier Bits: The DLCI serves to identify the virtual connection so that the receiving end knows which information connection a frame belongs to. Note that this DLCI has only local significance. Frame Relay is strictly a Layer 2 protocol suite

QUESTION NO: 13
When configuring Frame Relay using point-to-point subinterfaces, which of the following must not be configured? (Select one)

A. The local DLCI on each subinterface of the Frame Relay.

B. The Frame Relay encapsulation on the physical interface.
C. An IP address on the physical interface.
D. The subinterface type as point-to-point
E. None of the above

Answer: C
Explanation:
Frame Relay does not require IP addresses on physical interfaces. A subnet address is usually assigned to each point-to-point connection. Therefore, only one DLCI can be configured per point-to-point subinterface. On point-to-point subinterfaces, the destination is identified and configured with the frame-relay interface-dlci command beginning in interface configuration mode. When configured on a point-to-point subinterface, the command associates the selected point-to-point subinterface with a DLCI. The command also allows users to select the type of Frame Relay encapsulation to be used on the specific VC. The command can be executed without specifying the Frame Relay encapsulation type to be used. By default, the Cisco Frame Relay encapsulation type will be used.

QUESTION NO: 14
You are in the midst of configuring a router for a Frame Relay network. What could you do to prevent split horizon problems? (Select all that apply)

A. Configure a separate sub-interface for each PVC. Assign a unique DLCI and subnet to each sub-interface.
B. Configure each Frame Relay circuit as a point-to-point line to support multicast and broadcast traffic.
C. Configure one sub-interface to disperse into multiple PVC connections to multiple remote router interfaces.
D. Configure as many as possible sub-interfaces on the same subnet.
E. Use the "no ip split-horizons" command on the physical interface.

Answer: A, E
Explanation:

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The best solution is to configure subinterfaces for each virtual connection, because the individual virtual circuits can be maintained and split horizon can remain on.Routing update information that is received through one subinterface can be propagated to other subinterfaces, because each sub-interface is treated as a completely separate interface. Configuring Frame Relay subinterfaces ensures that a single physical interface is treated as multiple virtual interfaces. This capability allows you to overcome split horizon rules so packets received on one virtual interface can be forwarded to another virtual interface, even if they are configured on the same physical interface. Another alternative to using sub-interfaces is to simply disable the split horizon mechanism as shown in choice E.
Reference: http://www.cisco.com/warp/public/116/fr_faq.html

QUESTION NO: 15
A new frame-relay network is being implemented and inverse ARP does not appear to be operating correctly. Which alternative command can be used to provide connectivity?

A. frame-relay arp
B. frame-relay map
C. frame-relay interface-dlci
D. frame-relay lmi-type
E. frame-relay pvc

Answer: B
Explanation:
When using dynamic address mapping, Inverse ARP requests a next-hop protocol address for each active PVC. Once the requesting router receives an Inverse ARP response, it updates its DLCI-to-Layer 3 address mapping table. Dynamic address mapping is enabled by default for all protocols enabled on a physical interface. If the Frame Relay environment supports LMI autosensing and Inverse ARP, dynamic address mapping takes place automatically. Therefore, no static address mapping is required.
If the environment does not support LMI autosensing and Inverse ARP, a Frame Relay map must be manually configured. Use the frame-relay map command to configure static address mapping. Once a static map for a given DLCI is configured, Inverse ARP is disabled on that DLCI.

QUESTION NO: 16

Which of the following Frame-Relay encapsulation commands would you use, if you had to connect your Cisco router to a non-Cisco router?

A. TestKRouter(config-if)# Encapsulation frame-relay dot1q
B. TestKRouter(config-if)# Encapsulation frame-relay aal5snap
C. TestKRouter(config-if)# Encapsulation frame-relay ietf
D. TestKRouter(config-if)# Encapsulation frame-relay isl
E. None of the above

Answer: C
Explanation:
In general, the IETF Frame Relay encapsulation should be used when connecting a Cisco router to non-Cisco equipment across a Frame Relay network. The IETF Frame Relay encapsulation allows interoperability between equipment from multiple vendors.
Both Cisco and IETF encapsulations for Frame Relay can be configured on a per-virtual-circuit (VC) basis. This gives greater flexibility when configuring Frame Relay in a multi-vendor environment. A user can specify the Frame Relay encapsulation types to be used on different virtual circuits configured under the same physical interface.
Incorrect Answers:
A, D: 802.1Q and ISL are trunking encapsulation types and have nothing to do with frame relay.
B. AAL 5 SNAP is an ATM encapsulation and is not related to frame relay.

QUESTION NO: 17
In Frame Relay; what is the purpose of Inverse ARP? (Select only one answer choice)

A. It is used to map a known IP address to a MAC address
B. It is used to map a known DLCI to a MAC address
C. It is used to map a known MAC address to an IP address
D. It is used to map a known DLCI to an IP address
E. It is used to map a known MAC address to DLCI
F. None of the above

Answer: D
Explanation:

Just as ARP resolves IP addresses to MAC addresses, Inverse ARP maps a known DLCI to an IP address.

Incorrect Answers:

A, C: ARP and Reverse ARP (RARP) are used for IP address/MAC address mappings.

B, E: DLCI do not have a need to discover the MAC address of a host, so a DLCI is never mapped to a MAC address.

QUESTION NO: 18

In regard to a default Frame-Relay data network, what kind of physical network is it classified as?

A. Point-to-point
B. Broadcast multi-access
C. Nonbroadcast multipoint
D. Nonbroadcast multi-access
E. Broadcast point-to-multipoint
F. None of the above

Answer: D

Explanation:

Frame relay networks are considered to be NBMA networks. Frame Relay is a WAN protocol that operates at the physical and data link layers of the Open System Interconnection (OSI) reference model. This protocol is standardized by both the International Telecommunication Union Telecommunications Standardization Sector (ITU-T) and American National Standards Institute (ANSI).

Frame Relay uses statistical multiplexing techniques to provide network access in a packet-switched network. It is strictly a Layer 2 protocol suite. Being a Layer 2 protocol enables Frame Relay to offer higher performance WAN applications (such as LAN interconnection) than the older protocols (such as X.25), which incorporated Layer 3 functions. Given these performance benefits, Frame Relay is a popular WAN medium. However, it has some limitations with regard to IP multicast. To illustrate, Frame Relay is a Layer 2 nonbroadcast multiaccess (NBMA) network protocol. IP multicast networks are designed to utilize the capabilities of Layer 2 broadcast media such as on a LAN.

QUESTION NO: 19

Which of the following statements correctly describes the characteristics of a Frame Relay point-to-point subinterface? (Select two answer choices)

A. Needs to use Inverse ARP.
B. Maps a single IP subnet per DLCI.
C. Maps a single IP subnet across multiple DLCIs.
D. Resolves NBMA (non broadcast multi access) split horizon issues.
E. Requires use of the frame-relay map command.
F. None of the above

Answer: B, D
Explanation:
B is correct because only one DLCI can be configured per point-to-point subinterface. The command 'frame-relay interface-dlci' associates the selected point-to point subinterface with only one DLCI.
Subinterfaces were originally created to take care of split-horizon issues from distance vector routing protocols over non-broadcast multiple access networks, because split horizon prevents routing updates received on one interface from retransmitting out onto the same interface. This is true even if the routing update is received on one frame relay PVC destined out to another frame relay PVC! By partitioning the frame relay network into numerous point-to point networks using subinterfaces; each new point-to-point subnetwork gets their own network number assigned. Therefore, the routed protocol views each subnetwork as if it was located on a separate interface.

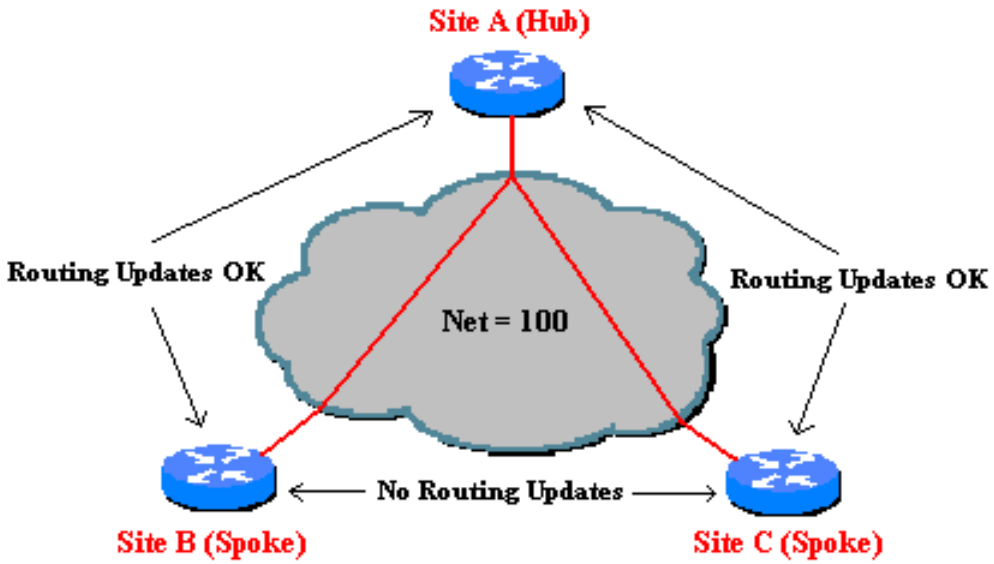


Figure 2: Split-horizon does not allow remote sites to send routing updates to each other.

Incorrect Answers:
A. Since only one DLCI is assigned per subnet in a logical point to point interface, there is no need for Inverse ARP, since both the DLCI and IP addresses are already known.
C. The IP subnet is mapped across a single virtual circuit, so only one DLCI is mapped per subinterface.
E. This command would be needed when multiple virtual circuits are being configured on one physical interface. When logical subinterfaces are used, the "frame-relay interface-dlci" command is used, not this command.
Reference: http://www.ciscopress.com/articles/article.asp?p=170741&seqNum=6

QUESTION NO: 20
Regarding Frame Relay Multipoint subinterfaces; which statement is true?

A. An IP address is required on the physical interface
B. All routers are required to be fully meshed
C. All routers must be in the same subnet to forward routing updates and broadcasts
D. Multipoint is the default configuration for Frame Relay subinterfaces
E. None of the above

Answer: C
Explanation:
Unlike Frame Relay point-to-point connections, multipoint Frame Relay router interfaces must all be in the same subnet. With multipoint, a single subinterface is used to establish multiple PVC connections to multiple physical interfaces or subinterfaces on remote routers. In this case, all the participating interfaces are in the same subnet, and each interface has its own local DLCI. Because the subinterface is acting like a regular NBMA Frame Relay network in this environment, broadcast traffic is subject to the split horizon rule.
Incorrect Answers:
A. The IP address is required on the logical subinterface, not the physical interface.
B. It is never an absolute requirement for a frame relay network to be fully meshed. The vast majority of frame relay networks are configured in a hub and spoke fashion, to avoid all of the charges associated with the numerous PVC's needed to be fully meshed.
D. Point to point is the default frame relay subinterface type.

QUESTION NO: 21
The TestKing Frame Relay network is displayed below:

In regard to router TestKing1; what is the function of the Frame Relay DLCI?

A. Defines the signaling standard between TestKing1 and TestKing2.
B. Classifies the encapsulation used between TestKing1 and TestKing2.
C. Identifies the circuit between TestKing2 and the frame switch.
D. Classifies the circuit between TestKing1 and TestKing2.
E. Defines the signaling standard between TestKing1 and the frame switch.

Answer: C
Explanation:
TestKing1 sends frames with DLCI, and they reach the local switch. The local switch sees the DLCI field and forwards the frame through the Frame Relay network until it reaches the switch connected to TestKing2. The TestKing2's local switch forwards the frame out of the access link to TestKing2. DLCI information is considered to be locally significant, meaning that the DLCI is used between the end router and the carrier's local frame relay switch.
Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 386
Incorrect Answers:
A, E. DLCI is used only as a circuit identifier (DLCI=Data Link Circuit Identifier), and not used for signaling.
B. The encapsulation options are not defined with DLCIs.
D. The DLCI information is considered to be locally significant, meaning that the DLCI is used between the end router and the carrier's local frame relay switch. The DLCI is not used end to end (router to router).

QUESTION NO: 22
Your frame relay network uses DLCI information on each of the PVC's. What is the purpose of them?

A. They determine the encapsulation type employed by the Frame Relay.
B. They identify the logical circuit between a local router and a Frame Relay WAN switch.
C. They represent the physical address of the router.
D. They represent the keepalives in the maintenance of PVC.

Answer: B
Explanation:
Routers use the data-link connection identifier (DLCI) as the Frame Replay address, which identifies the VC over which the frame should travel.
Data Link Connection Identifiers are the "hardware address" on a Frame Relay network. They identify a routers PVC to the Frame Relay switch.
Incorrect Answers:
A. DLCI information is not used to determine the encapsulation of the frame relay circuit in any way.
C. A DLCI is used at layer two, but it is a separate identifier that is not related to the hardware MAC address of any device.
D. The function of a keepalive is handled by LMI in a frame network, not the DLCI.
Reference:
CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) page 377

QUESTION NO: 23
The TestKing international frame relay network is shown below:

The Frame Relay circuit between Mexico and Canada is experiencing congestion. Which types of notification are used to alleviate the congestion? (Choose three.)

A. FECN
B. CIR
C. BECN
D. DE
E. DLCI 100 is down
F. DLCI 200 is down

Answer: A, C, D
Explanation:
In a frame relay network, FECN (forward explicit congestion notification) is a header bit transmitted by the source (sending) terminal requesting that the destination (receiving) terminal slow down its requests for data. BECN (backward explicit congestion notification) is a header bit transmitted by the destination terminal requesting that the source terminal send data more slowly. FECN and BECN are intended to minimize the possibility that packets will be discarded (and thus have to be resent) when more packets arrive than can be handled.
If the source terminal in a communications circuit generates frequent FECN bits, it indicates that the available network bandwidth (at that time) is not as great as can be supported by the destination terminal. Likewise, if the destination generates frequent BECN bits, it means the available network bandwidth (at that time) is not as great as can be supported by the source. In either case, the root cause is lack of available bandwidth at the times during which FECN or BECN bits are generated. This can occur because of outdated or inadequate network infrastructure, heavy network traffic, high levels of line noise, or portions of the system going down. Identifying and resolving these issues can improve overall network performance, especially when the system is called upon to carry a large volume of traffic.
Discard Eligibility (DE)
When there is congestion on the line, the network must decide which frames to discard in order to free the line. Discard Eligibility provides the network with a signal to determine which frames to discard. The network will discard frames with a DE value of 1 before discarding other frames.
The DE bit may be set by the user on some of its lower-priority frames. Alternatively, the network may set the DE bit to indicate to other nodes that a frame should be preferentially selected for discard, if necessary.

QUESTION NO: 24

Exhibit:

Please study the exhibit carefully. What does the STATUS=ACTIVE refer to in the output of the show frame-relay pvc command shown above?

A. The PVC is experiencing congestion.
B. The Frame Relay switch is correctly programmed with the DLCI and is operational.
C. The router is actively broadcasting to establish a link to the Frame Relay switch.
D. The router is connected to the local Frame Relay switch, but not to the far end device.
E. None of the above

Answer: B
Explanation:
The Frame Relay switch uses LMI to report the status of configured PVCs. The three possible PVC states are as follows:
Active state - Indicates that the connection is active and that routers can exchange data. This is the state of an operational PVC.
Inactive state - Indicates that the local connection to the Frame Relay switch is working, but the remote router connection to the Frame Relay switch is not working.
Deleted state - Indicates that no LMI is being received from the Frame Relay switch, or that there is no service between the CPE router and Frame Relay switch.

QUESTION NO: 25
Study the output script and the network topology exhibit below:

```
TestKing1# show running-config

<some output text omitted>

interface serial0/0
bandwidth 64
ip address 172.16.100.2 255.255.0.0
encapsulation frame-relay
frame-relay map ip 172.16.100.1 100 broadcast
```

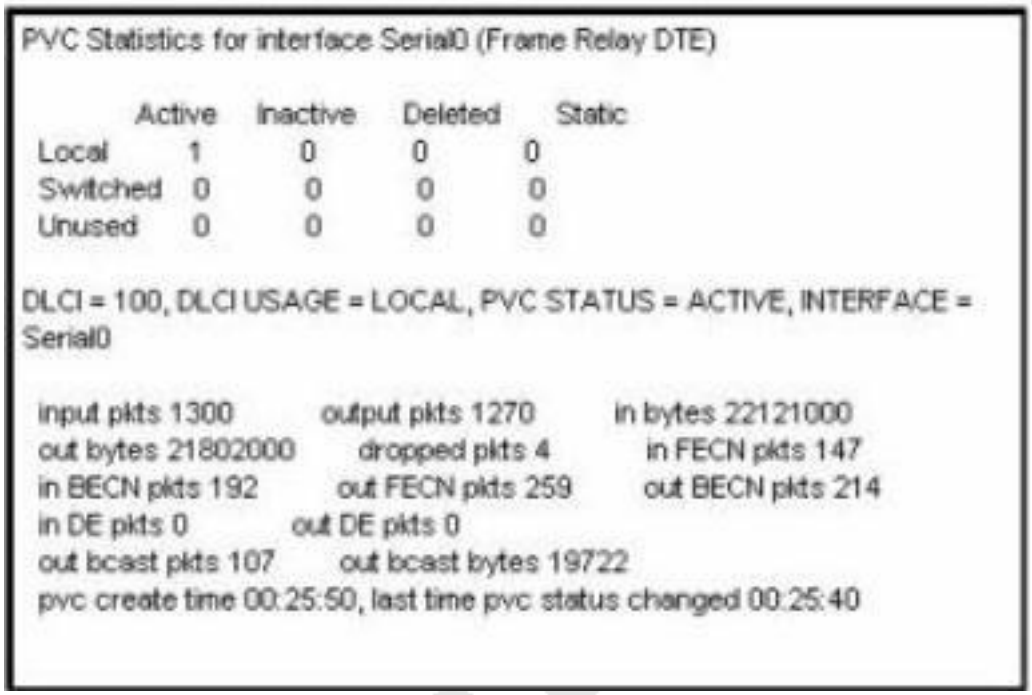
The Router TestKing1 in Hong Kong is connected to the router TestKing2 in Tokyo via a new Frame Relay link. However, TestKing1 is unable to communicate with TestKing2. Based on the above output, what do you suspect as the underlying cause of this problem?

A. Bandwidth configuration incorrect
B. IP address not correct
C. Improper map statement
D. Improper LMI configuration
E. None of the above

Answer: C
Explanation: From looking at the diagram you can see that Hong Kong's DLCI is 100, while Tokyo's DLCI is 200.
The Frame Relay map command is an interface configuration mode command that statically defines a mapping between a network layer address and a DLCI.
Incorrect Answers:

A. The bandwidth statement is not used by the routers at a physical or data link layer, so this statement will not have any impact on the function of the frame relay circuit.
B. We do not know what the IP address of the Tokyo side is, so this can not be assumed.
D. The default LMI type is Cisco, and since both routers in this network appear to be Cisco's, we can assume that this is acceptable.

QUESTION NO: 26
While troubleshooting an issue with your frame relay network, you issue the "show frame pvc" command as shown in the exhibit below:



You're a network administrator at a TestKing branch office, that's connected to the central headquarters by means of Frame Relay. You've been getting complaints that the connection has suddenly become slow, so you make the assumption that there's too much traffic going through the link.

Taking into consideration the above output from the 'show frame relay pvc' command; which command output value is indicating that there's congestion between the local router and the corporate site?

A. in DE packets 0

B. last time PVC status changed 00:25:40
C. in BECN packets 192
D. DLCI = 100
E. in FECN packets 147

Answer: C
Explanation:
BECN stands for Backward Explicit Congestion Notification. The BECN tells the transmitting device that the Frame Relay network is congested and that it should "back off" to allow better throughput. BECN and FECN go hand to hand together, but since the question specifically asks for what's indicating congestion between the local router and corporate site, BECN is correct.

QUESTION NO: 27
You are attempting to troubleshoot a frame relay problem you are having within the Testking network, but you are unsure where to start. You begin by entering the command:

Router# show frame-relay ?

Which three options will you be prompted for? (Select three answers choices)

A. dlci
B. clients
C. pvc
D. neighbors
E. lmi
F. map

Answer: C, E, F
Explanation:
The valid options for, 'show frame-relay' are: show frame-relay map, show frame-relay lmi, & show frame-relay pvc. In the Cisco IOS, if you don't type in a command specific enough, it will prompt you to select an option.
Incorrect Answers:
A, B, D. Show frame-relay dlci, show frame-relay clients, and show frame-relay neighbors are all invalid commands.

QUESTION NO: 28
Exhibit:

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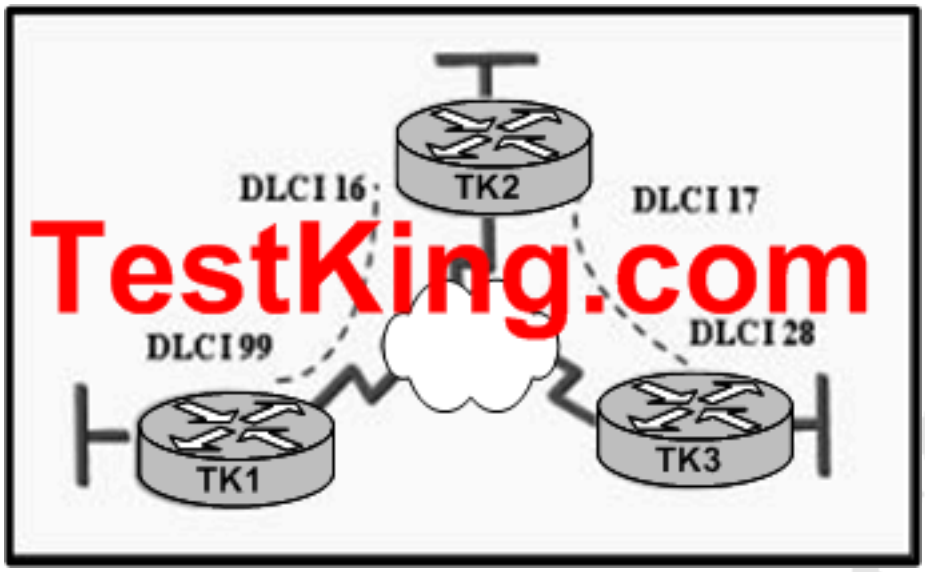
In the example above, A Testking router interface is being configured for Frame Relay. However, as the exhibit shows, the router will not accept the command to configure the LMI type. What is the problem?

A. The interface does not support Frame Relay connections.
B. The interface does not have an IP address assigned to it yet.
C. The interface requires that the no shutdown command be configured first.
D. The interface requires that the encapsulation frame-relay command be configured first.

Answer: D
Explanation:
Before entering LMI type in interface, you should type the encapsulation frame-relay command. By default, serial interfaces use HDLC encapsulation, where the LMI type is not a configurable option as HDLC does not understand the concept of LMI.
See the sample Configuration steps:
Router(config-if)#encapsulation frame-relay {cisco | ietf}
Router(config-if)#frame-relay lmi-type {ansi | cisco | q933a}

QUESTION NO: 29
Refer to the TestKing frame relay exhibit below:



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In this frame relay network, which IP addresses would be assigned to the TK1, TK2, and TK3 interfaces when using point-to-point PVCs?

A. DLCI 16: 192.168.10.1 /24
DLCI 17: 192.168.10.1 /24
DLCI 99: 192.168.10.2 /24
DLCI 28: 192.168.10.3 /24
B. DLCI 16: 192.168.10.1 /24
DLCI 17: 192.168.11.1 /24
DLCI 99: 192.168.12.1 /24
DLCI 28: 192.168.13.1 /24
C. DLCI 16: 192.168.10.1 /24
DLCI 17: 192.168.10.2 /24
DLCI 99: 192.168.10.3 /24
DLCI 28: 192.168.10.4 /24
D. DLCI 16: 192.168.10.1 /24
DLCI 17: 192.168.11.1 /24
DLCI 99: 192.168.10.2 /24
DLCI 28: 192.168.11.2 /24

Answer: D
Explanation:

With Point to point PVC's, two subinterfaces would be created on router TK2, one for each connection to the remote locations. In this network, the connection to TK1 would require one IP subnet, and the connection to router TK3 would require another. These two subnets must be separated, as each subinterface requires a distinct IP network. Only choice D correctly shows one IP subnet allocated to the TK1-TK2 network, and one for the TK2-TK3 connection.

Section 4: Troubleshoot WAN implementation issues (4 questions)

QUESTION NO: 1
What is the advantage of using a multipoint interface instead of point-to-point subinterfaces when configuring a Frame Relay hub in a hub-and-spoke topology?

A. It avoids split-horizon issues with distance vector routing protocols.
B. IP addresses can be conserved if VLSM is not being used for subnetting.
C. A multipoint interface offers greater security compared to point-to-point subinterface configurations.
D. The multiple IP network addresses required for a multipoint interface provide greater addressing flexibility over point-to-point configurations.
E. None of the above

Answer: B
Explanation:
Frame Relay supports two types of interfaces: point-to-point and multipoint. The one you choose determines whether you need to use the configuration commands that ensure IP address to data-link connection identifier (DLCI) mappings. After configuring the PVC itself, you must tell the router which PVC to use in order to reach a specific destination. Let's look at these options:
1. Point-to-point subinterface - With point-to-point subinterfaces, each pair of routers has its own subnet. If you put the PVC on a point-to-point subinterface, the router assumes that there is only one point-to-point PVC configured on the subinterface. Therefore, any IP packets with a destination IP address in the same subnet are forwarded on this VC. This is the simplest way to configure the mapping and is therefore the recommended method. Use the

frame-relay interface-dlci command to assign a DLCI to a specified Frame Relay subinterface.

2. Multipoint networks - Multipoint networks have three or more routers in the same subnet. If you put the PVC in a point-to-multipoint subinterface or in the main interface (which is multipoint by default), you need to either configure a static mapping or enable inverse Address Resolution Protocol (ARP) for dynamic mapping.

QUESTION NO: 2
Part of the TestKing network is shown below:

After the router interfaces shown in the diagram above have been configured, it is discovered that hosts in the Branch LAN cannot access the Internet.
Further testing reveals additional connectivity issues. What will fix this problem?

A. Change the address of the Branch router LAN interface.
B. Change the address of the Branch router WAN interface.
C. Change the subnet mask of the HQ router LAN interface.
D. Change the address of the HQ router LAN interface.
E. Change the address of the HQ router interface to the Internet.
F. Change the subnet mask of the HQ router interface to the Internet.
G. None of the above

Answer: B

Explanation:
The serial line connection between the Branch office and the HG office should have interfaces that belong in the same subnet. Based on the diagram above, the WAN interface of the Branch router is configured with an IP address that is in a different IP network than the serial interface of the HG router. As it is set up currently, no traffic will pass from the Branch router to the HG until these two interfaces are in the same subnet.

QUESTION NO: 3
Two TestKing routers are connected as shown below:

TestKing1 command output exhibit:

```
TestKing1# sh cdp entry *
-------------------------
Device ID: TestKing2
Entry address (es):
  IP address: 10.1.1.2
Platform: cisco 2610, Capabilities: Router
Interface: Serial0/0, Port ID (outgoing port): Serial0/1
Holdtime : 125 sec
<output omitted>
```

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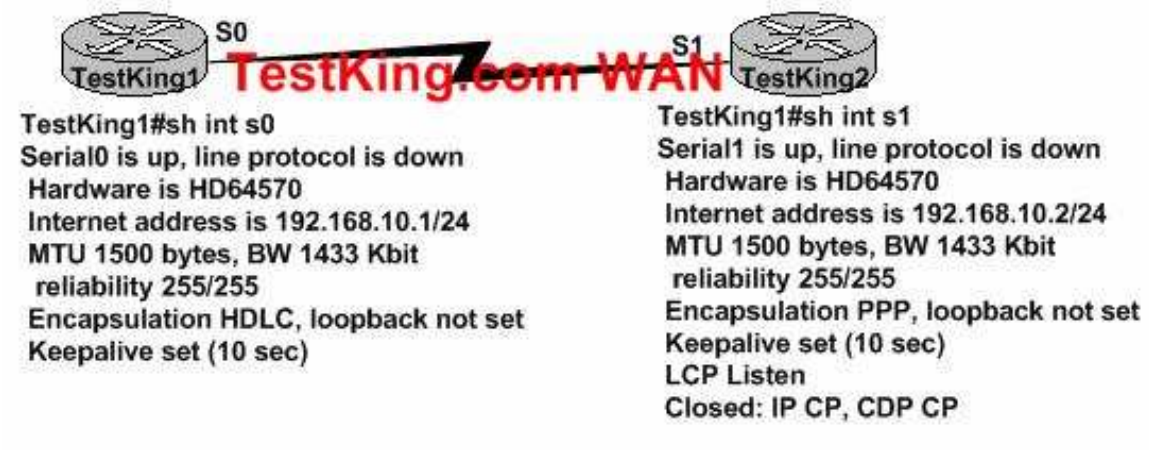
The two TestKing routers shown above are the only Cisco devices on the network. The serial network between the two devices has a mask of 255.255.255.252 (/30). Given the output that is shown, what three statements are true of these devices? (Choose three)

A. The TestKing1 serial address is 10.1.1.1.
B. The CDP information was received on port Serial0/0 of the TestKing1 router.
C. The CDP information was sent by port Serial0/0 of the TestKing2 router.
D. The TestKing2 router is a Cisco 2610.

E. The TestKing1 router is a Cisco 2610.
F. The TestKing1 serial address is 10.1.1.2.
G. CDP is not enabled on TestKing2

Answer: A, B, D

QUESTION NO: 4
A point to point leased line connecting routers TestKing1 and TestKing2 is installed as shown below:



The two serially connected routers can't communicate. Can you identify the fault on router TestKing2?

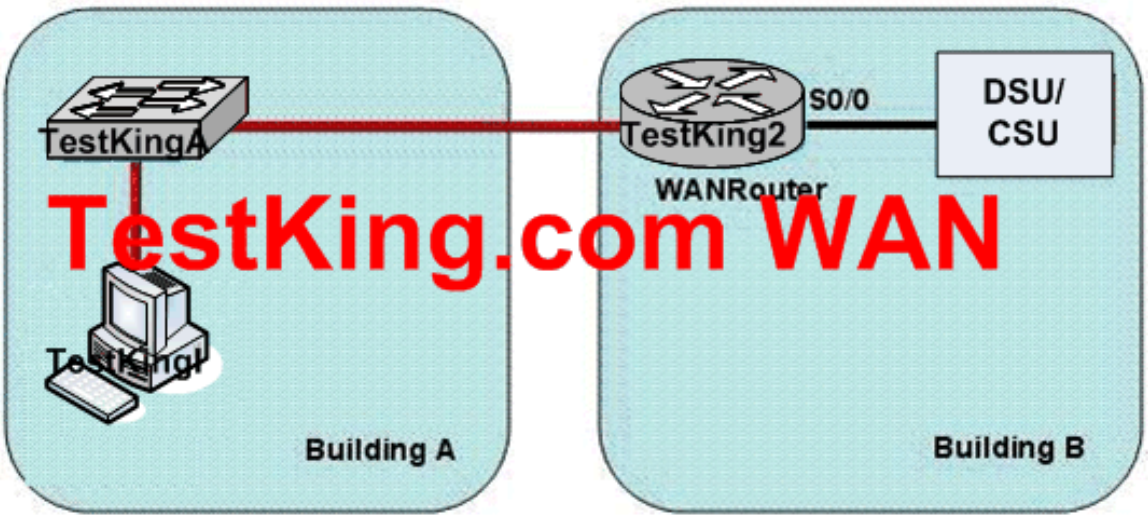
A. Link reliability is insufficient
B. IPCP is not open
C. Incorrect subnet mask
D. Incompatible encapsulation
E. Bandwidth allocation is too low
F. Incomplete IP address
G. None of the above

Answer: D
Explanation:
HDLC and PPP configuration is straightforward. You just need to be sure to configure the same WAN data-link protocol on each end of the serial link. Otherwise, the routers will misinterpret the incoming frames, because each WAN data-link protocol uses a different frame format. The routers must match at each end of the private leased line link.
Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 310.

Section 5: Describe VPN technology (including: importance, benefits, role, impact, components) (0 questions)

Section 6: Configure and verify a PPP connection between Cisco routers (10 questions)

QUESTION NO: 1
Two TestKing buildings are connected together as shown below:



The TestKing network administrator is in a campus building distant from Building B. The WANRouter is hosting a newly installed WAN link on interface S0/0. The new link is not functioning and the administrator needs to determine if the correct cable has been attached to the S0/0 interface. How can the administrator accurately verify the correct cable type on S0/0 in the most efficient manner?

A. Physically examine the cable between TestKing2 S0/0 and the DCE
B. Telnet to TestKing2 and execute the command show interface S0/0
C. Telnet to TestKing2 and execute the command show controller S0/0
D. Telnet to TestKing2 and execute the command show processes S0/0
E. None of the above

Answer: C

QUESTION NO: 2
Two TestKing routers are connected via a PPP connection. Which of the following are key characteristics of this PPP connection? (Choose three)

A. PPP can be used over analog circuits
B. PPP encapsulates several routed protocols
C. PPP maps Layer 2 to Layer 3 address
D. PPP provides error correction
E. PPP supports IP only
F. PPP provides encryption services

Answer: A, B, D

QUESTION NO: 3
In a point to point connection between two TestKing offices, which PPP subprotocol negotiates authentication options?

A. NCP
B. ISDN

C. SLIP
D. LCP
E. DLCI

Answer: D
Explanation:
LCP: A method of establishing, configuring, maintaining, and terminating the point-to-point connection.
Link-establishment phase LCP packets are sent by each PPP device to configure and test the link. These packets contain a field called the Configuration Option that allows each device to see the size of the data, compression, and authentication. If no Configuration Option field is present, then the default configurations are used.

QUESTION NO: 4
Routers TK1 and TK2 are connected via a private line using PPP. On this link, which of the following options lists the steps in PPP session establishment in the correct order?

A. network layer protocol phase, optional authentication phase, link establishment phase
B. link establishment phase, network layer protocol phase, optional authentication phase
C. optional authentication phase, network layer protocol phase, link establishment phase
D. link establishment phase, optional authentication phase, network layer protocol phase
E. network layer protocol phase, link establishment phase, optional authentication phase
F. optional authentication phase, link establishment phase, network layer protocol phase
G. None of the above

Answer: D
Explanation:
According to the related RFC on CHAP: In order to establish communications over a point-to-point link, each end of the PPP link must first send LCP packets to configure the data link during Link Establishment phase. After the link has been established, PPP provides for an optional Authentication phase before proceeding to the Network-Layer Protocol phase.
Reference: http://www.ietf.org/rfc/rfc1994.txt

QUESTION NO: 5

You are about to configure PPP n the interface of a Cisco router. Which authentication methods could you use? (Select two answer choices)

A. SSL
B. SLIP
C. PAP
D. LAPB
E. CHAP
F. VNP

Answer: C, E
Explanation:
Password Authentication Protocol (PAP) and Challenge Handshake Authentication Protocol (CHAP) authenticate the endpoints on either end of a point-to-point serial link. Chap is the preferred method today because the identifying codes flowing over the link are created using a MD5 one-way hash, which is more secure that the clear-text passwords sent by PAP.
Reference:
CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 314

QUESTION NO: 6
In a lab, two routers are connected directly together using serial interfaces in a back-to-back configuration. No external DCE devices are being used. What additional command is needed to bring this link up?

A. serial up
B. clockrate
C. clock rate
D. dce rate
E. dte rate
F. None of the above

Answer: C
Explanation:
The clock rate command (two words), is used to provide clocking on a line where no DCE device is located. Clocking must be provided by one end of this link. Normally in a point to point HDLC or PPP connection the clock rate is supplied by the network provider.

Incorrect Answers:
A. This is an invalid command
B. This command will not work. The clock rate command must use two words.
D, E: These are invalid commands.

QUESTION NO: 7
An ISDN link can be encapsulated using either PPP or HDLC. What are the advantages of using PPP? (Select two answer choices)

A. PPP is easier to configure and maintain than HDLC.
B. PPP is consistently implemented among different equipment vendors.
C. PPP will run faster and more efficiently than HDLC on circuit-switched ISDN links.
D. PPP authentication will prevent unauthorized callers from establishing an ISDN circuit.
E. PPP can be routed across public facilities, while HDLC is not routable in circuit-switched networks.
F. PPP supports asynchronous communication.

Answer: B, D
Explanation:
PPP has numerous advantages over HDLC. Unlike HDLC which is Cisco proprietary, PPP was designed for multi-protocol interoperability. Secondly, PPP supports authentication, using either PAP or CHAP. Finally, PPP supports error correction and the use of bonded multilink circuits.
Incorrect Answers:
A. The default encapsulation is HDLC. PPP must be explicitly configured and there are many more options available with it, so it is more complicated than HDLC.
C. HDLC is slightly more efficient than PPP.
E. Neither PPP nor HDLC work in public circuit switched environments.
F. Although this is true, it would not be considered an advantage on an ISDN link, as ISDN signaling is not asynchronous.
Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 308-310

QUESTION NO: 8
Which of the following correctly describe characteristics of PPP? (Select all valid answer choices)

A. Encapsulates several different types of routing protocols.
B. Supports only IP.
C. Can be used over analog circuits.
D. Is proprietary to Cisco
E. Supports error correction.

Answer: A, C
Explanation:
Characteristics of PPP:
* PPP can be used on either type of line (dial or switched lines), because data-link protocols are designed for point-to-point environment.
* PPP uses one LCP per link and one Control Protocol for each Layer 3 protocol defined on the link. If a router is configured for IPX, Apple Talk, and IP on a PPP serial link, the router configured for PPP encapsulation automatically tries to bring up the appropriate control protocols for each layer 3 protocol.
Incorrect Answers:
B. PPP can be used to support any higher layer protocol, including IP, IPX, AppleTalk, etc.
D. PPP is an industry standard used in point to point data networks. The Cisco proprietary method that is similar to PPP is HDLC.
Reference:
CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 309

QUESTION NO: 9
You are preparing to create a point to point WAN by connecting a Cisco router with a Juniper router by way of their serial links. Which one of the following commands would you use?

A. TK1(config-if)# encapsulation hdlc ansi
B. TK1(config-if)# encapsulation ppp
C. TK1(config-if)# encapsulation LAPD
D. TK1(config-if)# encapsulation frame-relay ietf
E. TK1(config)#encapsulation ppp

Answer: B
Explanation:

PPP is the best encapsulation type to use, when connecting routers of different manufacturers, because PPP is non proprietary (unlike HDLC). PPP is an industry standard layer 2 encapsulation type that is supported by every router manufacturer.

Incorrect Answers:

A. HDLC is a cisco proprietary method of encapsulation for connecting a point to point connection. Although HDLC has become so popular that many other router vendors also support it, HDLC ANSI is not an option that can be used.

C. LAPD is used as an out of band signaling protocol on connections such as ISDN. It is not a choice that can be made in this case.

D. This would be the correct choice if the connection was a frame relay connection, instead of a leased line connection. The ietf keyword is needed for connecting frame links to routers that are non-cisco.

E. This command needs to be placed in interface configuration mode, not in global configuration mode.

QUESTION NO: 10

Router TestKing1 exhibit:

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Router TestKing2 exhibit:

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Referring to the command outputs from the TestKing routers shown above , which of the following reasons would you attribute the connectivity problem between the two routers?

A. The authentication needs to be changed to PAP for both routers.
B. The serial IP addresses of routers are not on the same subnet.
C. The username/password combination is incorrectly configured.
D. The router names are incorrectly configured.
E. None of the above

Answer: C
Explanation:
When configuring for CHAP authentication, you must enters the other router's user name and password. In this case on router TestKing2 has entered incorrect router TestKing1's password, witch is "cisco1" (it must be "cisco"). As a result CHAP authentication will fail, therefore the connection establishment between the routers will be refused.
Reference:
CCNA Self-Study CCNA ICND Exam Certification Guide
Chapter 9 page 315ISBN: 1-58720-083-x
Incorrect Answers:
A. Either PAP or CHAP can be used for these routers.
B. Although this appears to be true at first glance, the subnet mask is 255.255.248.0, and the IP addresses on each side of the link are indeed on the same subnet.

D. The hostnames are configured correctly, but the passwords do not match.

Topic 9, TESTKING NETWORK, SCENARIO

Refer to the diagram of the TestKing network below for the following 5 questions:

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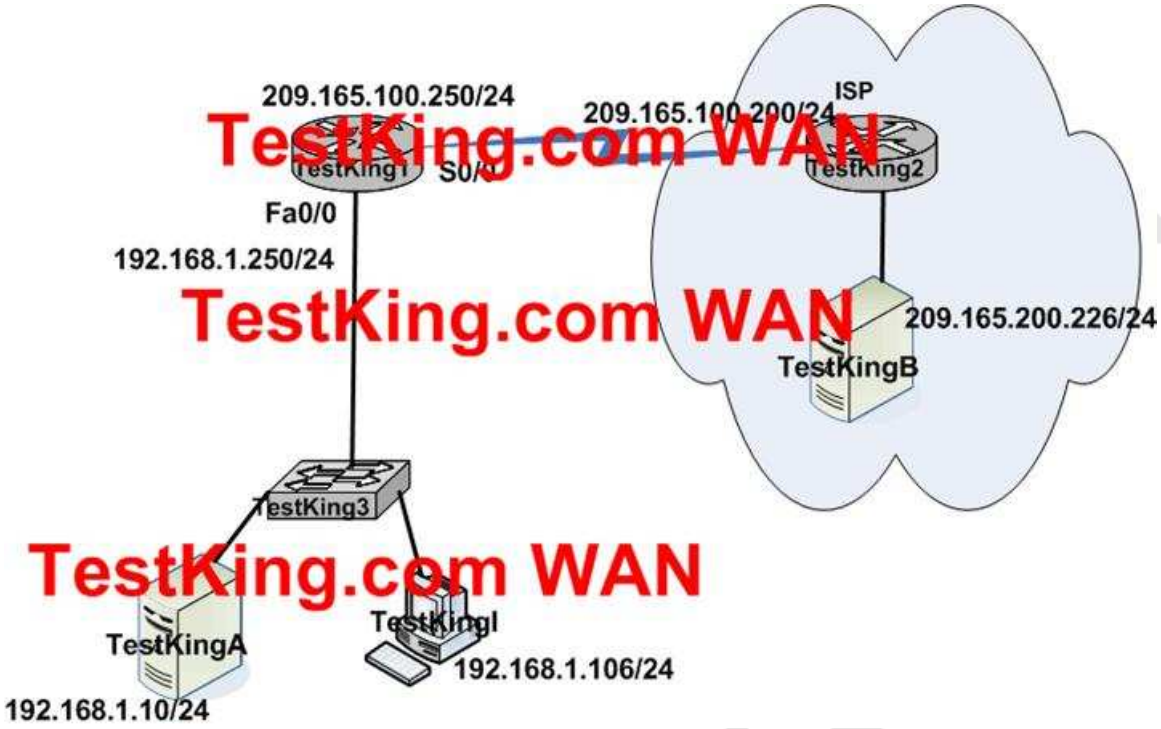


The TestKing network shown above depicts how a satellite office is connected to the Internet via a single connection. The following 5 questions will all refer to this diagram.

Topic 9, TESTKING NETWORK (5 questions)

QUESTION NO: 1
Note: Please refer to the TestKing Network scenario.

Assuming that Router TestKing1 has a packet with a destination address of192.168.1.255, what describes the operation of how the network will handle this traffic?

A. As TestKing1 forwards the frame containing this packet, switch TestKing3 will forward it to the device assigned the IP address of 192.168.1.255
B. TestKing1 will forward the packet out all interfaces.
C. TestKing1 will encapsulate the packet in a frame with a destination MAC address of FF-FF-FF-FF-FF-FF.
D. TestKing1 will drop this packet because this is not a valid IP address.
E. As TestKing1 forwards the frame containing this packet, switch TestKing3 will add 192.168.1.255 to its MAC table.
F. None of the above.

Answer: A

QUESTION NO: 2
Note: Please refer to the TestKing Network scenario.

Files located on the TestKingB server must be used by clients on the 192.168.1.0/24 network. You need to configure a route which accomplishes this on router TestKing1. Which route configuration statement should you use?

A. ip route 192.168.1.0 255.255.255.0 209.165.100.250
B. ip route 0.0.0.0 0.0.0.09 s0/0/0
C. ip route 209.165.200.0 255.255.255.0 209.165.100.200
D. ip route 0.0.0.0 0.0.0.0 209.165.200.226
E. None of the above

Answer: C

QUESTION NO: 3
Note: Please refer to the TestKing Network scenario.

Assuming that a packet is sent from host TestKingI to Server TestKingB, in how many frames will this packet be encapsulated when it is delivered through the network?

A. 3
B. 0
C. 6
D. 2
E. 1
F. 4
G. 5
H. None of the above

Answer: A

QUESTION NO: 4
Note: Please refer to the TestKing Network scenario.

Your boss at TestKing.net, Mrs. Tess King, has asked you to ensure that web pages located on the Web server TestKingA, can be viewed by users on the Internet. What steps should you take?

A. On Router TestKing1, configure DHCP to assign a registered IP address on the 209.165.100.0/24 network to Web server TestKingA.
B. On Router TestKing2, configure a default static route to the 192.168.1.0 network.
C. On router TestKing1, configures NAT to translate an address on the 209.165.100.0/24 network to 192.168.1.0.
D. On Router TestKing2, configure DNS to resolve the URL assigned to Web Server TestKing to the 192.168.1.10 address.
E. None of the above

Answer: B

QUESTION NO: 5
Note: Please refer to the TestKing Network scenario.

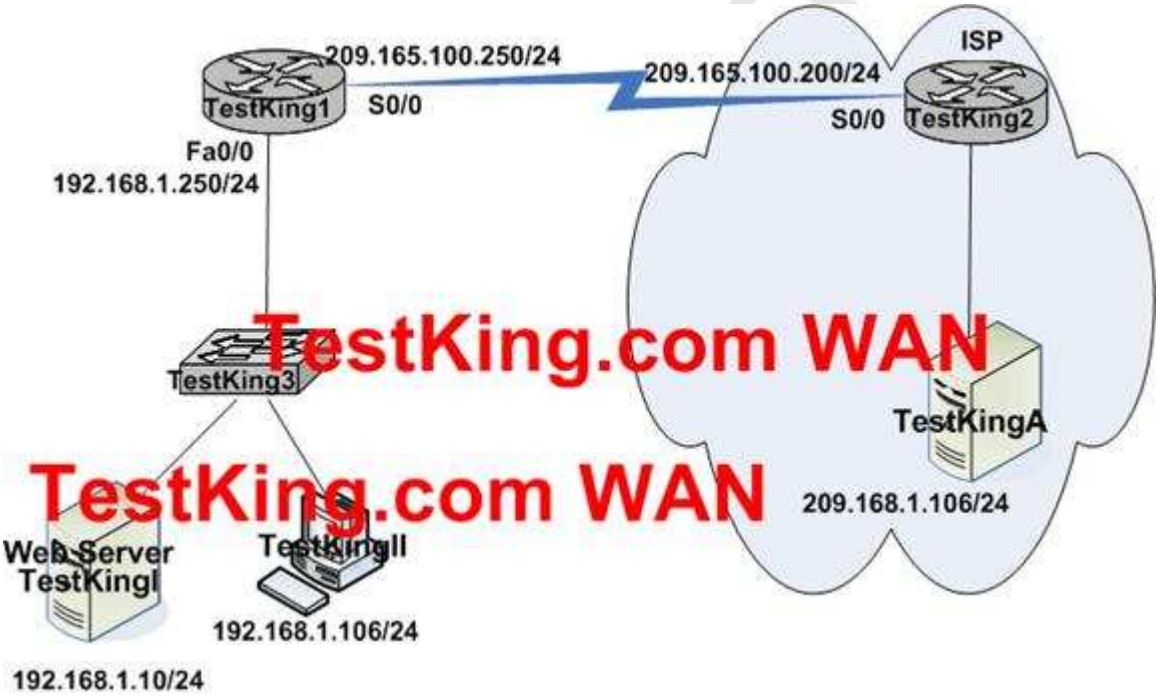
The default gateway for both Host TestKingI and Web Server TestKingA is the router address 192.168.1.250. Your are required to assign the correct subnet mask for this network.

A. 255.255.255.252
B. 255.255.255.0
C. 255.255.255.250
D. 255.255.255.192
E. None of the above

Answer: B

Topic 10, TestKing.com network, Scenario

Network topology exhibit:



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TestKing.com WAN

You work as a network engineer at TestKing.com. Study the network topology exhibit carefully.

Topic 10, TestKing.com network, (5 questions)

QUESTION NO: 1
Note: Please refer to the TestKing.com Network scenario.

Host TestKingII sends a request for a file to remote server TestKingA. Which destination address does host TestKingII place in the layer 3 header of the packet containing the request?

A. the MAC address of the s0/0/0 interface of router TestKing2.
B. the MAC address of the NIC in server TestKingA..
C. the MAC address of the Fa0/0 interface of router TestKing1.
D. The IP address of server TestKingA.
E. The IP address of the s0/0/0 interface of Router TestKing2.
F. The IP address of the Fa0/0/0 interface of Router TestKing1.

Answer: D

QUESTION NO: 2
Note: Please refer to the TestKing.com Network scenario.

Host TestKingII sends an ICMP echo requests to remote server TestKingA. Which destination address does host TestKingII place in the Layer 2 header of the frame containing the ping packet?

A. the MAC address of the s0/0/0 interface of router TestKing2.
B. the MAC address of the NIC in server TestKingA..
C. the MAC address of the Fa0/0 interface of router TestKing1.
D. The IP address of server TestKingA.
E. The IP address of the s0/0/0 interface of Router TestKing2.
F. The IP address of the Fa0/0/0 interface of Router TestKing1.

Answer: C

QUESTION NO: 3
Note: Please refer to the TestKing.com Network scenario.

Host TestKingII receives a file from the remote server TestKingA. Which MAC address appears as the source address in the header of the frames received by TestKingII

A. the MAC address of the Fa0/0 interface of router TestKing1.
B. the MAC address of the NIC in host TestKingII.
C. the MAC address of the NIC in server TestKingA.
D. the MAC address of the s0/0/0 interface of router TestKing2.

Answer: C

QUESTION NO: 4
Note: Please refer to the TestKing.com Network scenario.

Host TestKingII has just started up and requests a web page from the web server TestKingI.
Which two statements describe steps in the process host TestKingII uses to send the requests TestKingI. Select two.

A. Host TestKingII addresses the frame to the MAC address of router TestKing1.
B. Host TestKingII sends the packets to router TestKing1 to be forwarded to web server TestKingI.
C. Host TestKingII looks in its ARP cache for the MAC address of router TestKing1.
D. Host TestKingII sends a broadcast ARP requests to obtain the MAC address of web server TestKingI.
E. Host TestKingII addresses the frames to the MAC address of web server TestKingI.

Answer: D, E

QUESTION NO: 5
Note: Please refer to the TestKing.com Network scenario.

Router TestKing1 forwards a packet from host TestKingA to remote server TestKingA.
Which statement describes the use of a MAC as the frame carrying this packet leaves the S0/0/0 interface of router TestKing1?

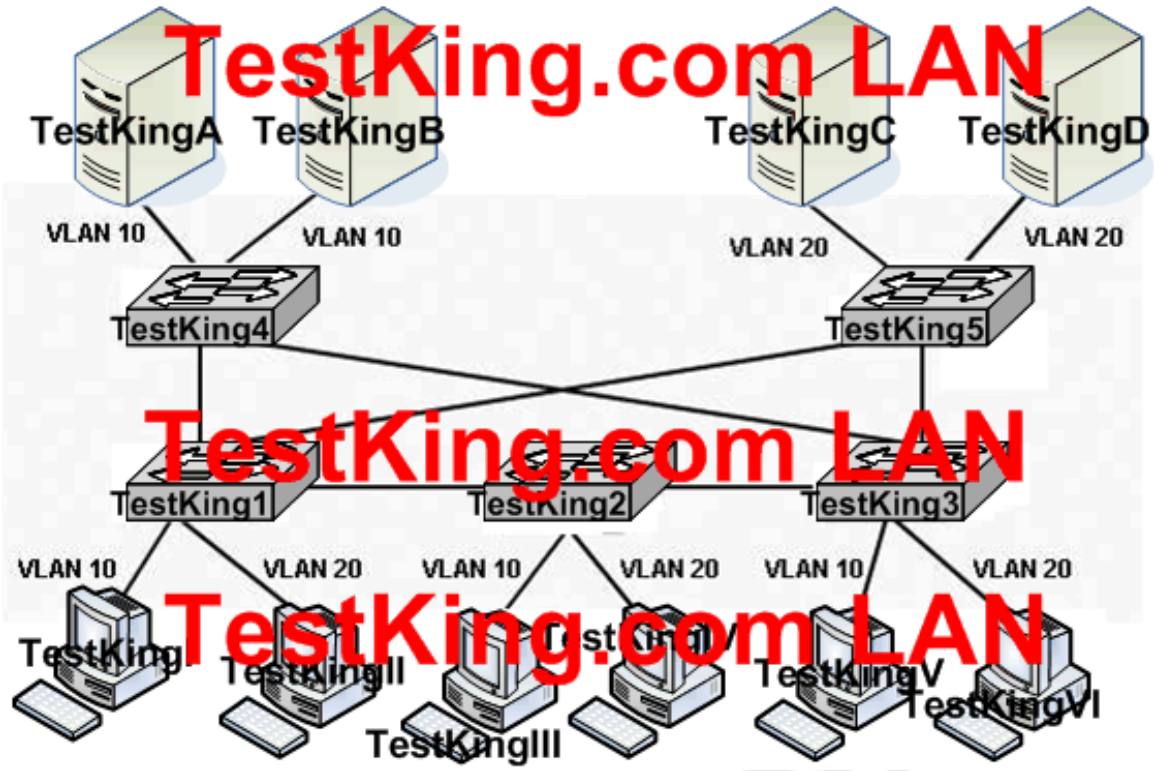
A. The destination MAC address in the frame is the MAC address of the NIC of server TestKingA.
B. The frame does not have MAC addresses.
C. The source MAC address in the frame is the MAC address of the NIC of host TestKingII.
D. The source MAC address in the frame is the MAC address of the S0/0/0 Interface of router TestKing1.
E. The destination MAC address in the frame is the MAC address of the S0/0/0 Interface of router TestKing2.

Answer: E

Topic 11, Switched Network, Scenario

Network topology exhibit:

TestKing.com



You work as a network administrator at TestKing.com. You are required to make an initial assessment of the TestKing.com switched LAN. Study the network topology exhibit carefully.

Topic 11, Switched Network, (5 questions)

QUESTION NO: 1
Note: Please refer to the Switched Network Scenario.

Assume that the TestKing5 switch is the root for all VLANs. What path would be a valid path from PC TestKingI to server TestKingA?

A. Switch TestKing1, Switch TestKing2, Switch TestKing3, Switch TestKing4
B. Switch TestKing1, Switch TestKing5, Switch TestKing3, Switch TestKing4
C. Switch TestKing1, Switch TestKing5, Switch TestKing1, Switch TestKing4
D. Switch TestKing1, Switch TestKing4
E. Switch TestKing1, Switch TestKing5, Switch TestKing4

Answer: D

QUESTION NO: 2
Note: Please refer to the Switched Network Scenario.

Your boss, Mrs. Tess King, is worried about communications between PC TestKingIII and server TestKingC.
What is needed for this communication to occur?

A. nothing is required
B. DHCP
C. A router
D. A trunk link between switch TestKing2 and switch TestKing5

Answer: C

QUESTION NO: 3
Note: Please refer to the Switched Network Scenario.

Assume the most communications are between the Personal PCs of the LAN and the server. With this assumption which would be the preferred root switch for VLAN 20?

A. Switch TestKing5
B. Switch TestKing2
C. Switch TestKing4
D. Switch TestKing1
E. Switch TestKing3

Answer: A

QUESTION NO: 4
Note: Please refer to the Switched Network Scenario.

Your boss, Mrs. Tess King, is worried about communications between PC TestKingIII and PC TestKingIV
What link between Switch TestKing1 and TestKing2 is needed for this communication to occur?

A. nothing is required
B. access
C. straight-through
D. multi-access
E. trunk

Answer: E

QUESTION NO: 5
Note: Please refer to the Switched Network Scenario.

Your boss, Mrs. Tess King, is worried that the frames would start looping in the network. You tell her not to worry, since the ..... technology prevents frame looping switched networks,

A. VTP
B. CSAM/CD
C. STP
D. ARP
E. VTP

Answer: C

TestKing.com

Topic 12, TestKing Communications, Scenario

TestKing network topology exhibit:

You work as a network administrator for TestKing.com. There has been recent problem with the network and you have been ordered to investigate these problems. Your boss, Mrs. Tess King, tells you that she have had some problems while accessing the TestKingC internal TestKing web server on another LAN within the TestKing WAN. Her PC is named TestKing6.
In particular you will examine the communication between the PC TestKing6 and the web server TestKingC.

Topic 12, TestKing Communications, (4 Questions)

QUESTION NO: 1
Note: Please refer to the TestKing Communications scenario.

Your boss Tess King at PC TestKing6 starts communicating with the TestKingC internal web server. Her PC sends out an ARP request. How will the other devices in the network act upon this request?

A. Router TestKingA will respond with the IP address of the web server TestKingC.
B. Switch TestKingB will reply with the MAC address of the server.
C. Router TestKing2 will respond with the MAC address of its Fa0/0 interface.
D. Hosts TestKing4 and TestKing5 will respond that the destination is not on the local LAN.
E. Router TestKing2 will forward the ARP request to router TestKingA.
F. Switch TestKingB will block the request since the server is not on the LAN.

Answer: E

QUESTION NO: 2
Note: Please refer to the TestKing Communications scenario.

The TestKing6 PC has sent the ARP request, and has now received the ARP reply. TestKing6 now build a packet that will be sent to TestKingC web server in order to establish the communication.
What information will be placed in the header of this packet? Select two.

A. The source address will be the IP address of the Fa0/0 interface of Router TestKing2.
B. The source address will be the IP address of the Fa0/0 interface of Switch TestKingB.
C. The source address will be the IP address of PC TestKing6.
D. The destination address will be the IP address of interface Fa0/0 of Router TestKing2.
E. The destination address will be the IP address of interface Fa0/0 of Router TestKingA.
F. The destination address will be the IP address of interface S0/0 of Router TestKing2.
G. The destination address will be the IP address of interface S0/0 of Router TestKingA.
H. The destination address will be the IP address of the TestKing3 web server.

Answer: C, D

QUESTION NO: 3
Note: Please refer to the TestKing Communications scenario.

The TestKing6 PC has sent the ARP request, received an ARP Reply, and sent a packet to the TestKingC web server. The Ethernet frame has now been received by Router TestKingA and will now be delivered to the local LAN. Consider the addressing of the Ethernet frame that now has been created by Router TestKingA. Which two statements apply in this context? Select two.

A. The source address will be the MAC address of PC TestKing6.
B. The source address will be the MAC address of interface S0/0 of router TestKingA
C. The source address will be the MAC address of interface S0/0 of router TestKing2.
D. The source address will be the MAC address of interface Fa0/0 of router TestKingA
E. The source address will be the MAC address of interface Fa0/0 of router TestKing2.
F. The destination address will be the MAC address of Switch TestKingA port attached to the TestKingC web server.
G. The destination address will be the IP address of Switch TestKingA port attached to the TestKingC web server.
H. The destination address will be the MAC address of Switch TestKingA port attached to the TestKingA Fa0/0 interface..
I. The destination address will be the MAC address of the TestKingC web server.

Answer: D, I

QUESTION NO: 4
Note: Please refer to the TestKing Communications scenario.

Tess King has opened two Internet Explorer windows on her local PC TestKing6. She uses them to simultaneously access the local web server TestKingC at the time to browse WWW documents on the intranet.
What mechanism makes the data to end up in the correct Internet Explorer window?

A. The OSI application layer tracks the conversations and directs them to the correct browser.
B. The IP Source addresses of the packets will be used to direct the data to the correct browser window.
C. The browser track the data by the URL.
D. The TCP port numbers are used to direct the data to the correct application window.

Answer: D

Topic 13, TestKing India, Scenario

Network topology exhibit:

TestKing.com WAN
TestKing.com WAN

Exhibit #2:

TestKing.com

```
TestKing0#sh frame-relay map
Serial1/0 (up): ip 172.30.0.2 dlci 704 (0x7B,0x1CB0), dynamic,
                broadcast,, status defined, active
Serial1/0 (up): ip 172.30.0.3 dlci 196 (0xEA,0x38A0), dynamic,
                broadcast,, status defined, active
Serial1/0 (up): ip 172.30.0.4 dlci 702 (0x159,0x5490), dynamic,
                broadcast,, status defined, active
Serial1/0 (up): ip 172.30.0.5 dlci 344 (0x1C8,0x7080), dynamic,
                broadcast,, status defined, active
TestKing0#
interface FastEthernet0/0
 no ip address
 shutdown
!
interface Serial1/0
 ip address 172.30.0.1 255.255.255.240
 encapsulation frame-relay
 no fair-queue
!
interface Serial1/1
 ip address 192.168.0.1 255.255.255.252
!
interface Serial1/2
 ip address 192.168.0.5 255.255.255.252
 encapsulation ppp
!
interface Serial1/3
 ip address 192.168.0.9 255.255.255.252
 encapsulation ppp
 ppp authentication chap
!
router rip
 version 2
 network 172.30.0.0
 network 192.168.0.0
 no auto-summary
!
line con 0
 exec-timeout 0 0
line aux 0
line vty 0 4
 password Tlnet
 login
!
end
```

TestKing.com

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You work as a network administrator for TestKing.com in Mumbai. TestKing have local offices throughout India. TestKing also have internal sites. These are connected through a multinational core network.
You use terminal TestKingA to access TestKing0. You issue the command: sh frame-relay map

Topic 13, TestKing India, Scenario (4 questions)

QUESTION NO: 1
If required, what password should be configured on the router in the TestKing2 branch office to allow a connection to be established with the TestKing1 router?

A. C0nsole
B. No password is required
C. T1net
D. En8ble
E. Scr8

Answer: B
Explanation:
No password is required because there is no authentication type is specified, it's just encapsulation type is changed. By default encapsulation type on serial interface is hdlc on Cisco router, that is Cisco proprietary code added hdlc . If you are going with different vendor router connection with cisco router on serial interface, you need to change hdlc encapsulation type to ppp.

QUESTION NO: 2
What destination Layer 2 address will be used in the frame header containing a packet for host 172.30.4.4?

A. 344
B. 704
C. 702
D. 196

Answer: C
Explanation:

Circuits are identified by data-link connection identifiers (DLCI). DLCIs are assigned by your provider and are used between your router and the Frame Relay provider. In other words, DLCIs are locally significant.

See the exhibit of show frame-relay map output, IP address 172.30.4.4 is mapped with 702 DLCI address, so layer 2 destination address (DLCI on frame-relay) will be 702.

You can map IP to DLCI with:
* frame-relay interface-dlci <dlci_num>
or
* frame-relay map ip <IP Address> <dlci>

QUESTION NO: 3
A static map to the TestKing12 location is required. Which command should be used to create this map?

A. frame-relay map ip 172.30.0.3 344 broadcast
B. frame-relay map ip 172.30.0.3 704 broadcast
C. frame-relay map ip 172.30.0.3 702 broadcast
D. frame-relay map ip 172.30.0.3 196 broadcast

Answer: D
Explanation:
Configuring a static Frame Relay map, is optional unless you are using subinterfaces. The Frame Relay map will map a Layer 3 address to a local DLCI. This step is optional because inverse-arp will automatically perform this map for you.
Syntax for frame-relay map is:

frame-relay map protocol address dlci [broadcast] [cisco | ietf]

The broadcast option allows packets, such as RIP updates to be forwarded across the PVC. If you are not using the broadcast option, you need to specify the neighbor to forward unicast packet using neighbor command.

neighbor a.b.c.d

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Specify RIP neighbor. When a neighbor doesn't understand multicast, this command is used to specify neighbors. In some cases, not all routers will be able to understand multicasting, where packets are sent to a network or a group of addresses. In a situation where a neighbor cannot process multicast packets, it is necessary to establish a direct link between routers. The neighbor command allows the network administrator to specify a router as a RIP neighbor. The no neighbor a.b.c.d command will disable the RIP neighbor.

QUESTION NO: 4
Which connection uses the default encapsulation for serial interfaces on Cisco routers?

A. The serial connection to the Multinational Core
B. The serial connection to the TestKing1 branch office
C. The serial connection to the TestKing2 branch office
D. The serial connection to the TestKing3 branch office

Answer: B
Explanation:
The default encapsulation on a serial interface is HDLC. The original HDLC encapsulation was defined by the International Organization for Standards (ISO), those same folks who developed the OSI model. The ISO version of HDLC had one shortcoming, however; it had no options to support multiple Layer 3 routed protocols. As a result, most vendors have created their own form of HDLC. Cisco is no exception because it has its own proprietary form of HDLC to support various Layer 3 protocols such as IPX, IP, and AppleTalk.

The Serial connection to the Testking1 branch office using the default encapsulation type. You can change using:
* encapsulation <type> command on interface

Topic 14, Mixed (24 questions)

QUESTION NO: 1
What are two drawbacks of implementing a link-state routing protocols? Select two.

A.

the large size of the topology table listing all advertised routes in the converged network

B. the sequencing and acknowledgement of link-state packets
C. the high demand on router resources to run the link-state routing algorithmn
D. the requirement for hierarchical IP addressing scheme for optimal functionality
E. the high volume of link-state advertisments in a converged network

Answer: C,D

QUESTION NO: 2
Exhibit:

```
TestKing2# show ip protocols
 Routing Protocol is "ospf 109"
   Outgoing update filter list for all interfaces is not set
   Incoming update filter list for all interfaces is not set
   Router ID 221.130.149.10
   Number of areas in this router is 1. 1 normal 0 stub 0 nssa
   Maximum path: 4
   Routing for Networks:
     190.171.23.0 0.0.0.255 area 0
     190.172.32.0 0.0.0.255 area 0
   Routing Information Sources:
     Gateway         Distance      Last Update
     208.149.23.66         110      00:20:09
     208.149.23.194        110      00:20:09
     208.149.23.130        110      00:20:09
   Distance: (default is 110)
TestKing2# show ip ospf interface
 Ethernet1 is up, line protocol is up
   Internet Address 190.172.32.11/24, Area 0
   Process ID 109, Router ID 221.130.149.10, Network Type BROADCAST, Cost: 10
   Transmit Delay is 1 sec, State BDR, Priority 1
   Designated Router (ID) 208.149.23.194, Interface address 190.172.32.10
   Backup Designated router (ID) 221.130.149.10, Interface address 190.172.32.11
 <output omitted>
```

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You work as a network administrator at TestKing.com. You study the exhibit carefully. Why was TestKing2 not elected as the designated router?

A. TestKing2 is not advertising the interface with address 221.130.149.10.
B. The OSPF process ID of TestKing2 is lower than the process ID of the elected DR.
C. The interface address of TestKing2 is a higher value than the interface address of the DR.
D. TestKing has a lower OSPF priority value than the router elected as DR.

Answer: A
Explanation:

On broadcast and non-broadcast multi-access networks, a designated router and backup designated router are elected. The election is done by first choosing the routers with the highest priority value or, if the priorities are same, choosing the routers with the highest router ID. The router ID is chosen by the highest IP address on any loopback interface or, if no loopback interfaces are configured, the highest IP address on any active physical interface.

See the exhibit of show ip protocols command: Router ID is: 221.130.149.10 but this network is not advertised using network command on OSPF. So interface having 221.130.149.10 IP address is not participating on OSPF routing. So, TestKing2 is not elected as the designated router.

QUESTION NO: 3
Exhibit #1:

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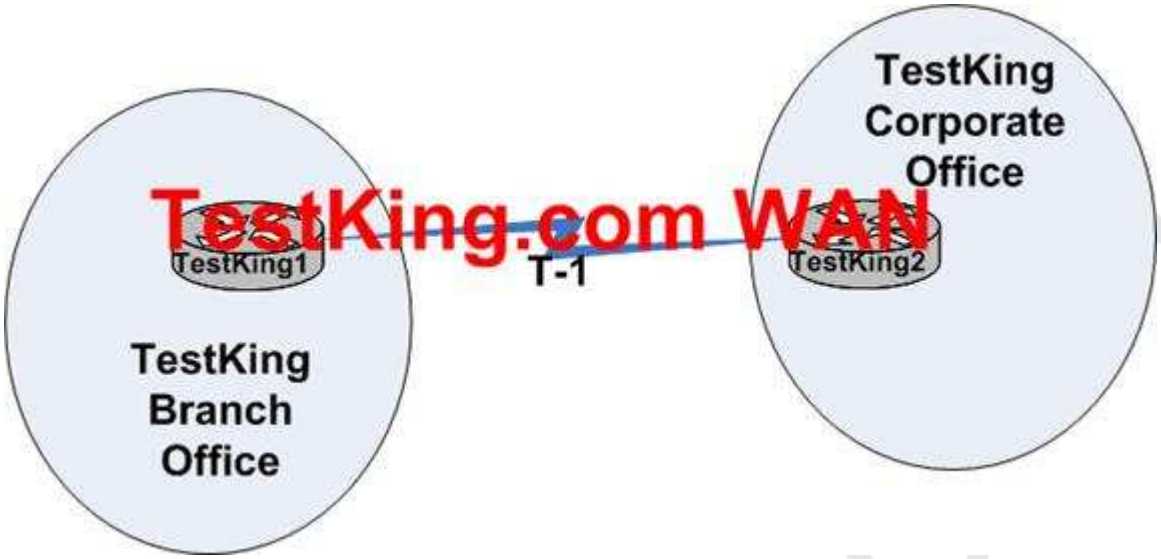

Exhibit #2:

```
    TestKing2 # show interface serial 0/0
Serial0/0 is up, line protocol is down
  Hardware is PowerQUICC Serial
  Internet address is 172.16.10.1/30
  MTU 1500 bytes, BW 64 Kbit, DLY 20000 usec, rely 255/255 load 1/255
  Encapsulation HDLC, loopback not set, keepalive set (10 sec)
<output omitted>
```

TestKing.com
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You work as a network administrator at TestKing.com. You study the exhibits carefully. The TestKing corporate office and branch office have been attached through two non-Cisco routers over a highly reliable WAN connection over a year. A new Cisco routers has been installed to replace the hardware at the branch location. Since the installation, IP communication cannot be verified across the link.

Given the outpout on router TestKing1, what could be a logical first step to take to resolve this problem?

A. Ensure an exact match between the bandwidth setting on TestKing1 and TestKing2
B. Change the encapsulation on TestKing1 to PPP.
C. Change the bandwidth setting on TestKing1 to match the actual line speed.
D. Verify successful DCE communication between the two sites.
E. Verify Layer 1 communication on the TestKing1 Serial 0/ interface.

Answer: B
Encapsulation:
By default encapsulation type on serial interface is hdlc on Cisco router, this is Cisco proprietary code added hdlc . If you are going with to connect different vendor router with cisco router on serial interface, you need to change the hdlc encapsulation type to ppp.

QUESTION NO: 4
Exhibit #1:

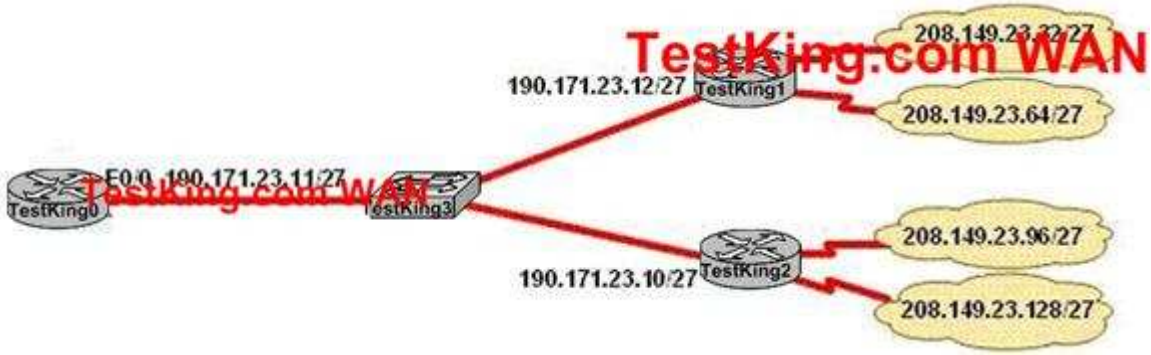

Exhibit #2:

You work as a network administrator at TestKing.com. You study the exhibits carefully. What is the most likely reason for disparity between the actual network numbers at the branches and the routes in the routing table on TestKing0?

A. TestKing1 is configured to only send RIPv1 updates.
B. TestKing0 is configured to receive only RIPv1 updates.
C. TestKing2 is configured to send both RIPv1 and RIPv2 updates.
D. TestKing0 is configured to only receive RIPv2 updates.

Answer: A
Explanation:

Default version of RIP is version 1, which doesn't supports multicast updates, classless network, authentication. Testking1 router is configured with RIP v1 so it's sending only v1 packets, which means all classful network are advertising.

On RIP version 2 added the benefits of optional authentication, multicast updates, summarization, and classless routing. Although RIP version 2 does support classless routing.

If you wish to enable to RIP version 2 on router use following command:

Router(Config)#router rip
Router(Config-router)#version 2

QUESTION NO: 5

A receiving host computes the checksum on a frame and determines that the frame is damaged. The frame is then discarded. At which OSI layer did this happen?

A. Application
B. Presentation
C. Session
D. Transport
E. Internet
F. Data Link
G. Physical

Answer: F
Explanation:
The Data Link layer provides the physical transmission of the data and handles error notification, network topology, and flow control. The Data Link layer formats the message into pieces, each called a data frame, and adds a customized header containing the hardware destination and source address. Protocols Data Unit (PDU) on Datalink layer is called frame. According to question frame is damaged and discarded means it will happen on Datalink layer.

QUESTION NO: 6
Exhibit:

You work as a network administrator at TestKing.com. You study the exhbibit carefully. What is the reason that the interface status is "administratively down, line protocol down"?

A. The wrong type of cable is connected to the interface.
B. There is no encapsulation type configured.
C. The interface needs to be configured as a DTE device

D. There is a mismatch in encapsulation types.
E. The interface has been configured with the shutdown command.
F. The interface is not receiving any keepalives.

Answer: E
Explanation:

Interface can be enabled or disabled with shutdown/no shutdown command. If you interface is down, it will display administratively down status. You can bring up an interface having administratively down interface using no shutdown command.

QUESTION NO: 7
Exhibit:

TestKing5# show ip interface brief

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/1	unassigned	YES	manual	up	up
FastEthernet0/2	unassigned	YES	manual	up	up
<output omitted>					
GigabitEthernet1/1	unassigned	YES	manual	down	down
GigabitEthernet1/2	unassigned	YES	manual	down	down
Vlan1	192.168.1.100	YES	manual	administratively down	down

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You work as a network administrator at TestKing.com. You study the exhbibit carefully. You are unable to connect remotely to a device. You initiatea console session. You executes the show ip interface brief command. Why did the remote connection fail?

A. The switch does not have a management IP address assigned.
B. The Gigabit Ethernet interfaces are not up.
C. VLAN1 is shut down.

D. The switch needs to have a clock rate entered on one of its interfaces.

Answer: C
Explanation:

Virtual LAN Interface, which also known as Switched Virtual Interface (SVI) can be enabled or disabled with shutdown/no shutdown command. If you interface is down, it will display administratively down status. You can bring up an interface having administratively down interface using no shutdown command.

QUESTION NO: 8 DRAG DROP
You work as a network administrator at TestKing.com. Your boss, Mrs. Tess King, is interested in network user applications. Match the application with the proper applications.

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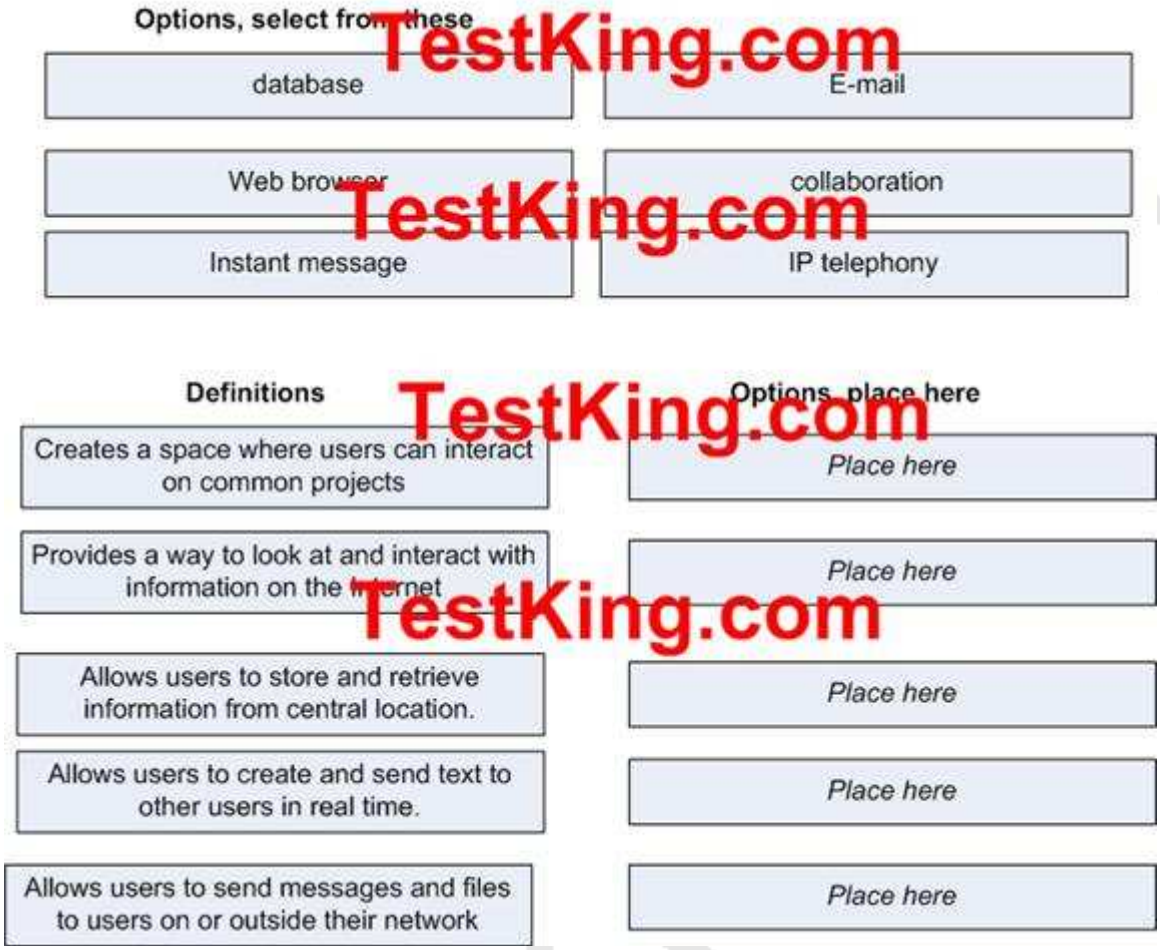

Answer:

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QUESTION NO: 9
Exhibit #1:

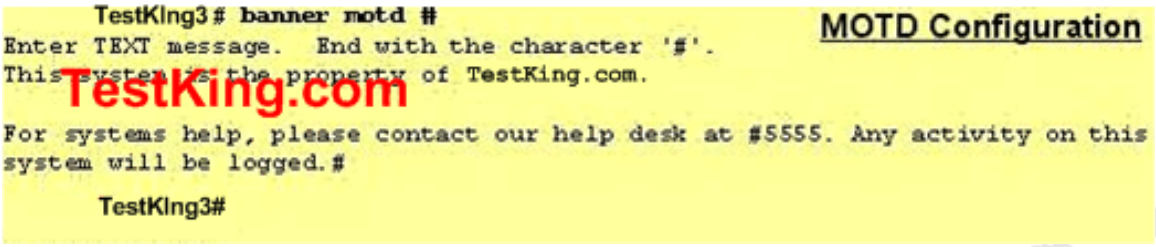
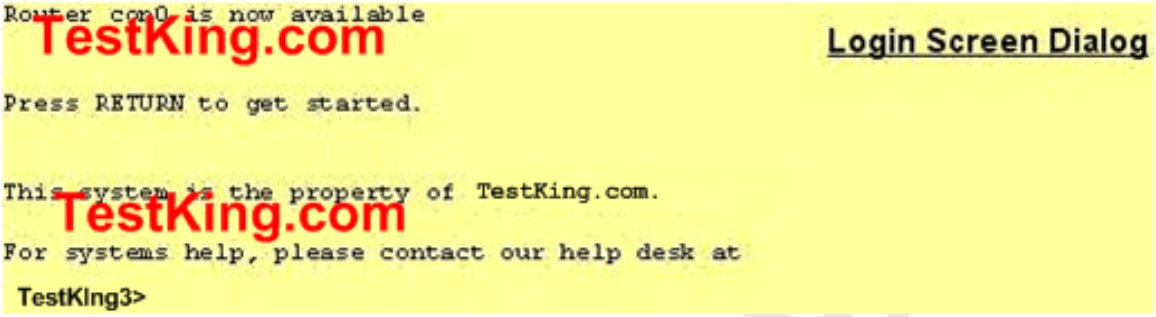


Exhibit #2:



You work as a network administrator at TestKing.com. You study the exhibits carefully. On an external router TestKing3, the network administrator enters the MOTD configuration that is shown in the upper box. You then log into TestKing3 router and see the login screen dialg that is shown in the lower box.

Why does the intended message not display?

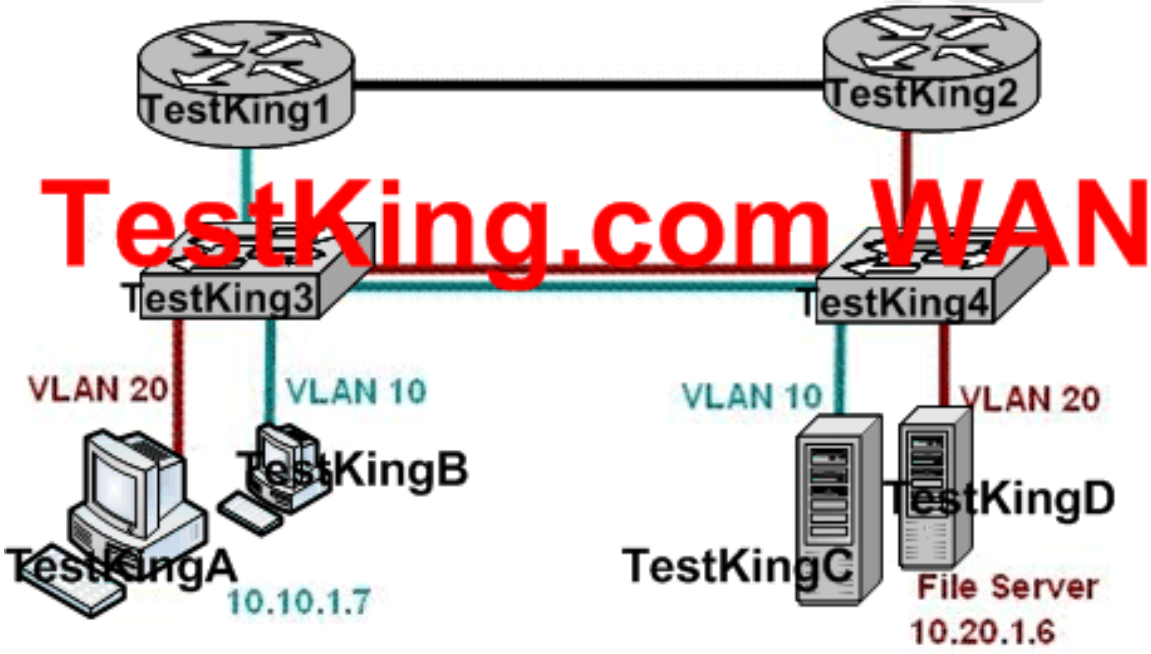
A. The banner message exceeds the number of characters allowed.
B. The network administrator defined an illegal delimiting character int eh MOTD command.
C. The MOTD delimiting character appeared in the body of the text.
D. MOTD banner text may contain only letters and numbers.
E. The IOS image on this router does not support the MOTD configuration shown.

Answer: C
Explanation:

one very good reason for having a banner is to give any and all who dare attempt to telnet or dial into your internetwork a little security notice. And you can create a banner to give anyone who shows up on the router exactly the information you want them to have.

Message of the day (MOTD) is the most extensively used banner. It gives a message to every person dialing into or connecting to the router via Telnet or an auxiliary port, or even through a console port as seen here:

QUESTION NO: 10
Exhibit:



You work as a network administrator at TestKing.com. You study the exhibit carefully. You are evaluating the efficiency of the current network design. RIPv2 is enabled on all Layer 3 devices in the network. What network devices participate in passing traffic from the PC at 10.10.1.7 to File Server TestKingA at 10.20.1.6 in the order that they will forward traffic from source to destination?

A. Switch TestKing3, Router TestKing1, Router TestKing2, Switch TestKing TestKing4
B. Switch TestKing3, Router TestKing1, Switch TestKing3, Switch TestKing TestKing4
C. Switch TestKing3, Switch TestKing TestKing4, Router TestKing2, Switch TestKing4

D. Switch TestKing3, Switch TestKing TestKing4

Answer: A
Explanation:

When data sending from the PC having 10.10.1.7 IP address to PC 10.20.1.6 goes through Switch TestKing3, Router TestKing1, Router TestKing2, Switch TestKing TestKing4.

Gateway of PC 10.10.1.7 is the router Testking1's Ethernet IP. So when sending the data it goes to gateway through Testking3 switch. When packet reached to Testking1 router it forwards to Testking2 router based on routing table. Then Router Testking2 forwards the packets to Testking4 switch.

QUESTION NO: 11
What is the purpose of an ARP request message?

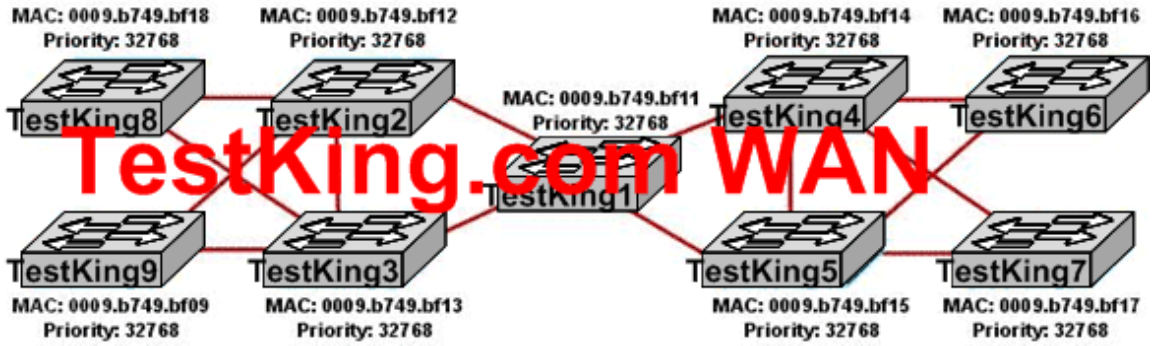
A. It creates a session by passing a header with destination Layer 2 address to the transport layer.
B. It binds the IP address of a host to the network that it is on.
C. It encapsulates the Layer 3 address and then passes the packet to Layer 2.
D. It builds a correlation between an IP address and a MAC address.
E. It provides connectivity and path selection between hosts on a network.

Answer: D
Explanation:
Address Resolution Protocol (ARP) finds the hardware address of a host from a known IP address. When IP has a datagram to send, it must inform a Network Access protocol, such as Ethernet or Token Ring, of the destination's hardware address on the local network. (It has already been informed by upper-layer protocols of the destination's IP address.) If IP doesn't find the destination host's hardware address in the ARP cache, it uses ARP to find this information.

This is the protocol operates on Network Layer. Source device sends the ARP broadcast to resolve the MAC address of destination device.

You can display the ARP table using:
#show arp

QUESTION NO: 12
Exhibit:



TestKing.com WAN

You work as a network administrator at TestKing.com. You study the exhibit carefully. The switches on the TestKing campus netowkr has been interconnected as displayed in the exhibit. All of the switches are running Spanning Tree Protocol with its default settings. Unusual traffic patterns are observed and it is discovered that Switch TestKing9 is the root bridge. Which change will ensure that Switch TestKing1 will be selected as the root bridge instead of Switch TestKing9?

A. Disable spanning tree on Switch TestKing9.
B. Lower the bridge priority on Switch TestKing1.
C. Lower the bridge priority on Switch TestKing9.
D. Physically replace switch TestKing9 with Switch TestKing9 in the topology.
E. Raise the bridge priority on Switch TestKing1.
F. Raise the bridge priority on Switch TestKing9.

Answer: B
Explanation:

The root bridge is the bridge or switch that is the root of the Spanning Tree, with the branches being loop-free paths to the other switches in the system. The Root is the switch with the lowest Bridge ID; the ID is determined by a combination of an administrative Priority and the MAC address of the switch. The Priority is set to 32,768 (8000 hex) by default; if we leave the Priority at the default, whatever switch has the lowest MAC will be the Root. So to elect the Testking1 switch as a root bridge need to set the lowest priority.

QUESTION NO: 13
What is the purpose of using the traceroute command?

A. to display the MTU values for each router in a specified network path from a source to a destination.
B. To map all the devices on a network.
C. To see the path a packet will take when traveling to a specified destination.
D. To display the current TCP/IP configuration values.
E. To see how a device MAC address is mapped to its IP address

Answer: C
Explanation:
The traceroute command allows you to determine the path a packet takes in order to get to a destination from a given source by returning the sequence of hops the packet has traversed

If you execute the traceroute ip-address command on a source device (such as a host, or a router acting as a host), it sends IP packets toward the destination with Time To Live (TTL) values that increment up to the maximum specified hop count. This is 30 by default. Typically, each router in the path towards the destination decrements the TTL field by one unit while it forwards these packets. When a router in the middle of the path finds a packet with TTL = 1, it responds with an Internet Control Message Protocol (ICMP) "time exceeded" message to the source. This message lets the source know that the packet traverses that particular router as a hop.

QUESTION NO: 14
Network Topology Exhibit:

Configuration Exhibit:

```
hostname TestKing1
!
interface FastEthernet0/0
 ip address 172.16.1.254 255.255.255.0
 ip nat inside
!
interface FastEthernet0/1
 ip address 172.16.2.254 255.255.255.0
 ip nat inside
!
interface Serial0/0
 ip address 128.107.1.1 255.255.255.252
 ip nat outside
!
ip nat inside source list 1 interface Serial0/0 overload
!
ip route 0.0.0.0 0.0.0.0 Serial0/0
!
access-list 1 permit 172.16.1.0 0.0.0.255
access-list 1 permit 172.16.2.0 0.0.0.255
```

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You work as a network administrator at TestKing.com. You study the exhibit carefully. What statement is true of the configuration for this network?

A. TestKing2 must be configured with static routes to networks 172.16.1.0/24 and 172.16.2.0/24.
B. Because of the addressing on interface FastEthernet0/1, the Serial0/0 interface address will not support the NAT configuration as shown.
C. The configuration that is shown provides inadequate outside address space for translation of the number of inside addresses that are supported.
D. The number 1 referred to in the ip nat inside source command references access-list number 1.

Answer: D
Explanation:
The ip nat inside source list 1 pool interface command tells the router to translate IP addresses that match access-list 1 to an IP address of Serail0/0 inteface.

The access list in this case is not being used to permit or deny traffic as we would use it for security reasons to filter traffic. It is being used in this case to select or designate what we often call interesting traffic. When interesting traffic has been matched with the access list, it is pulled into the NAT process to be translated.

QUESTION NO: 15
What is the purpose of the Cisco VLAN Trunking Protocol?

A. to allow native VLAN information to be carried over a trunk link.
B. To provide a mechanism to dynamically assign VLAN membership to switch ports.
C. To allow traffic to be carried from multiple VLANs over a single link between switches.
D. To provide a mechanism to dynamically assign VLAN membership to switch ports.
E. To allow for managing to additions, deletions, and changes of VLANs between switches.

Answer: E
Explanation:

The basic goals of VLAN Trunking Protocol (VTP) are to manage all configured VLANs across a switched internetwork and to maintain consistency throughout that network VTP allows you to add, delete, and rename VLANs-information that is then propagated to all other switches in the VTP domain.

QUESTION NO: 16
Which two statements describe the Cisco implementation of VLANs? Select two.

A. VLANs 1002 through 1005 are automatically created and cannot be deleted.
B. VLAN 1 is the default Ethernet VLAN.
C. By default, the switch IP address is in VLAN 1005.
D. CDP advertisments are only sent on VLAN 1002.

Answer: A,B
Explanation:

A VLAN can be defined as a virtual broadcast domain. Instead of segmenting the broadcast domain with routers at Layer 3, you segment using switches at Layer 2. Each VLAN should be associated with its own IP subnet.

See the output of show vlan command on cisco switch:
Switch#show vlan
VLAN Name Status Ports
---- -------------------------------- --------- -------------------------------
1 default active Fa0/1, Fa0/2, Fa0/3, Fa0/4
Fa0/5, Fa0/6, Fa0/7, Fa0/8
Fa0/9, Fa0/10, Fa0/11, Fa0/12
Fa0/13, Fa0/14, Fa0/15, Fa0/16
Fa0/17, Fa0/18, Fa0/19, Fa0/20
Fa0/21, Fa0/22, Fa0/23, Fa0/24
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active

Normally Cisco switches supports VLAN upto 1005 but among them VLAN 1 Default Ethernet VLAN, 1002 fddi-default VLAN, 1003 token-ring-default VLAN, 1004 fddinet-default VLAN, 1005 trnet-default are created. You can't remove these VLANs,

QUESTION NO: 17
Network topology exhibit:

Configuration status:

```
TestKing6# show running-configuration
<output omitted>
interface FastEthernet0/0
 ip address 172.16.6.6 255.255.255.0
 ip nat outside
interface FastEthernet0/1
 ip address 10.10.10.6 255.255.255.0
 ip nat inside
interface Serial0/0
 ip address 172.16.11.6 255.255.255.0
 ip nat outside
ip nat pool test 172.16.11.70 172.16.11.71 prefix-length 24
ip nat inside source static 10.10.10.4 172.16.6.14
ip nat inside source pool test
```

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```
TestKing7# show ip route
<output omitted>
Gateway of last resort is not set
     172.16.0.0/24 is subnetted, 4 subnets
C       172.16.11.0 is directly connected, Serial0/0
```

You work as a network administrator at TestKing.com. You study the exhibits carefully. TestKing4 can ping TestKing5 (172.16.6.5), but not TestKing7 (172.16.11.7). There are no routing protocols running in any of the routers. TestKing4 has TestKing6 as its default gateway. What can be done to address this problem?

A. Change the inside and outside NAT commands.
B. Convert to static NAT.
C. Add a static route in TestKing7 back to TestKing4.
D. Convert to dynamic NAT.

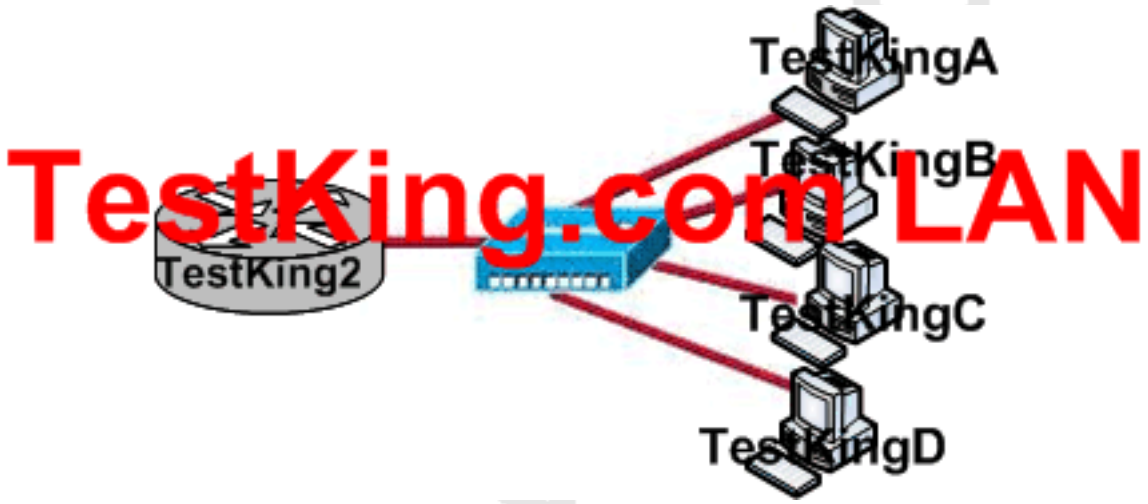
Answer: C
Explanation:
Static NAT is designed to allow one-to-one mapping between local and global addresses.

Syntax of static NAT is:
ip nat inside source static <inside local> <inside global>

Main reason of not pinging to 172.16.11.7 is, there is no NAT configured. See the exhibit,
Ip nat pool test 172.16.11.70 172.16.11.71 prefix-length 24 is configured.
To ping to 172.16.11.7 just configure the NAT using:

Ip nat inside source static 10.10.10.4 172.16.11.7

QUESTION NO: 18
Exhibit:



TestKing.com LAN

You work as a network administrator at TestKing.com. You study the exhibit carefully. What two results would occur if the hub were to be replaced with a switch that is configured with one Ethernet VLAN? Select two.

A. The number of broadcast domains would increase.
B. The number of broadcast domains would remain the same.
C. The number of broadcast domains would decrease.
D. The number of collision domains would increase.
E. The number of collision domains would remain the same.
F. The number of collision domains would decrease.

Answer: B,D
Explanation:

Switch break down the Collision domain, means switch creates the collision domain per port basis. But switch can't break down the Broadcast unless configuring the VLAN. When we replaced the hub with switch on above topology, number of collision domain will increase but broadcast domain will remain same.

QUESTION NO: 19
Network topology exhibit:

TestKing.com WAN

TestKing3 configuration exhibit:

```
TestKing3 # show interface fa0/1 switchport
  Name: Fa0/1
  Switchport: Enabled
  Administrative Mode: static access
  Operational Mode: static access
  Administrative Trunking Encapsulation: dot1q
  Negotiation of Trunking: Off
  Access Mode VLAN: 10 (Sales)
  Trunking Native Mode VLAN: 1 (default)
```

TestKing.com
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TestKing4 configuration exhibit:

You work as a network administrator at TestKing.com. You study the exhibits carefully. TestKing connections two locations, supporting two VLANs, through two switches as shown in the exhibit. Inter-VLAn communications is not required. The network is working properly and there is full connectivity, TestKing.com needs to add additional VLANs, so it has been decided to implement VTP. Both switches are configured as VTP servers in the same VTP domain. VLANs added to TestKing3 are not learned by TestKing4. Based on this information and the partial configurations in the exhibit, what is the problem?

A. STP has blocked one of the links between the switches, limiting connectivity.
B. TestKing4 should be configured as a VTP client.
C. The links between the switches are access links.
D. VTP is Cisco proprietary and requires a different trunking encapsulation.
E. A router is required to route VTP advertisements between the switches.

Answer: C
Explanation:
A trunk link is a special connection; the key difference between an ordinary connection (Access port) and a Trunk port is that although an Access port is only in one VLAN at a time, a Trunk port has the job of carrying traffic for all VLANs from one switch to another. Any time you connect a switch to another switch, you want to make it a trunk.

To carry on the data frames for all VLANs, you need to create the Trunk link on switch port as well as you need to select the encapsulation type.

Switchport mode trunk
Switchport trunk encapsulation dot1q or isl

In the above topology switch are connected on access port. So, it should be trunk.

QUESTION NO: 20
Network topology exhibit:

You work as a network administrator at TestKing.com. You study the exhibit carefully. The speed of all serial links is E1 and the speed of all Ethernet links is 100 Mb/s. A static route will be established on the TestKing3 router to direct traffic toward the Internet over the most direct path available. What configuration on the TestKing3 router will establish a route toward the Internet for traffic that originates from workstations on the TestKing Chicago Office LAN?

A. ip route 0.0.0.0 255.255.255.255 172.16.100.2
B. ip route 0.0.0.0 255.255.255.0 172.16.100.2
C. ip route 0.0.0.0 0.0.0.0 172.16.100.2
D. ip route 0.0.0.0 0.0.0.0 128.107.1.1
E. ip route 0.0.0.0 0.0.0.0 172.16.100.1
F. ip route 0.0.0.0 255.255.255.252 128.107.1.1

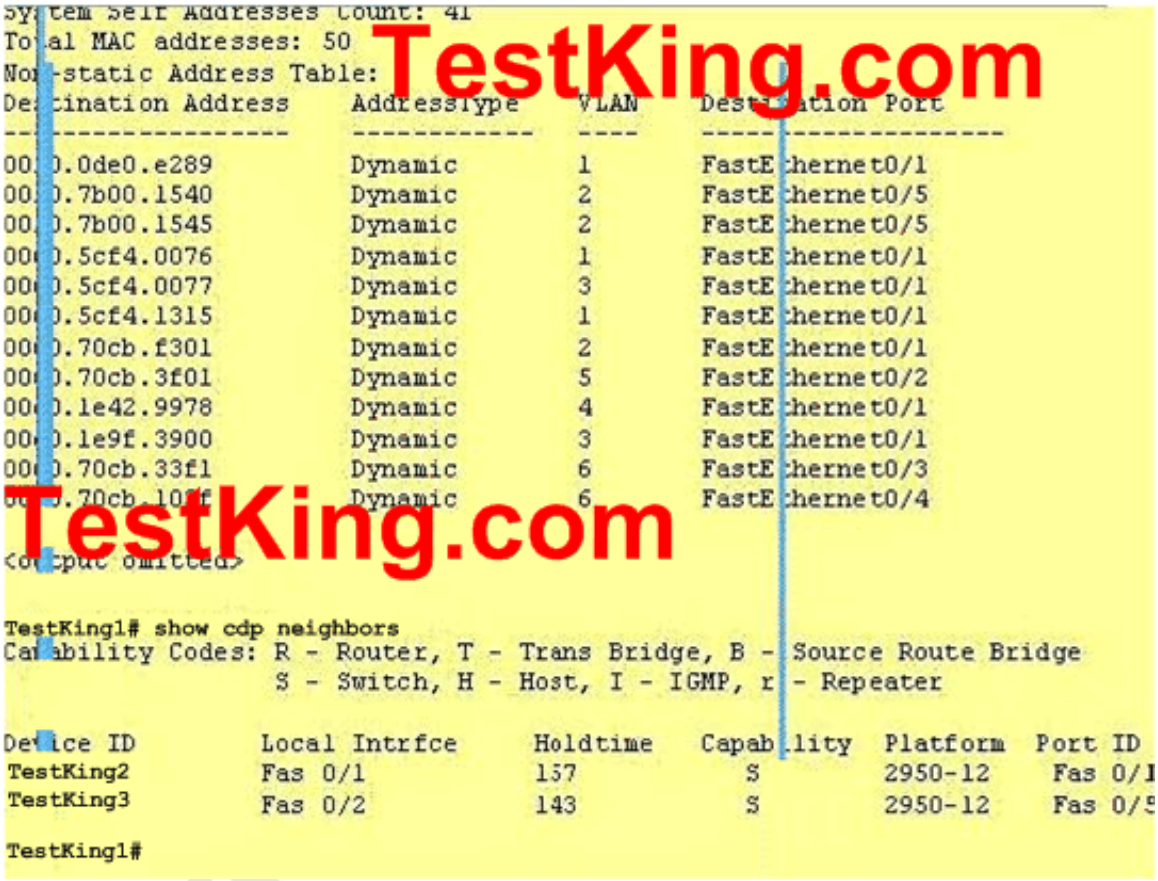
Answer: C
Explanation:

We use default routing to send packets with a remote destination network not in the routing table to the next-hop router. You should only use default routing on stub networks-those with only one exit path out of the network.

According to exhibit, all traffic towards Internet that originates from workstations should forward to Testking4 Router.

Syntax for default route is:
Ip route <Remote_Network> <Netmask> <Next_Hop_Address>.

QUESTION NO: 21
Exhibit:



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You work as a network administrator at TestKing.com. You study the exhibit carefully. Which two statements are true of the interfaces on TestKing1? Select two.

A. A hub is connected directly to FastEthernet0/5.
B. Inteface FastEthernet0/2 has been disabled.
C. Multiple devices are connected directly to FastEthernet0/1.
D. FastEthernet0/5 has statically assigned MAC addresses.
E. FastEthernet0/1 is connected to a host with multiple network interface cards.
F. FastEthernet0/1 is configured as a trunk link.

Answer: A,F

QUESTION NO: 22
Three access points have been installed and configured to cover a small office. What term defines the wireless topology?

A. SSID
B. BSS
C. ESS
D. IBSS

Answer: C
Explanation:
A single wireless AP supporting one or multiple wireless clients is known as a Basic Service Set (BSS). A set of two or more wireless APs connected to the same wired network is known as an Extended Service Set (ESS). An ESS is a single logical network segment (also known as a subnet), and is identified by its SSID
See the Figure:

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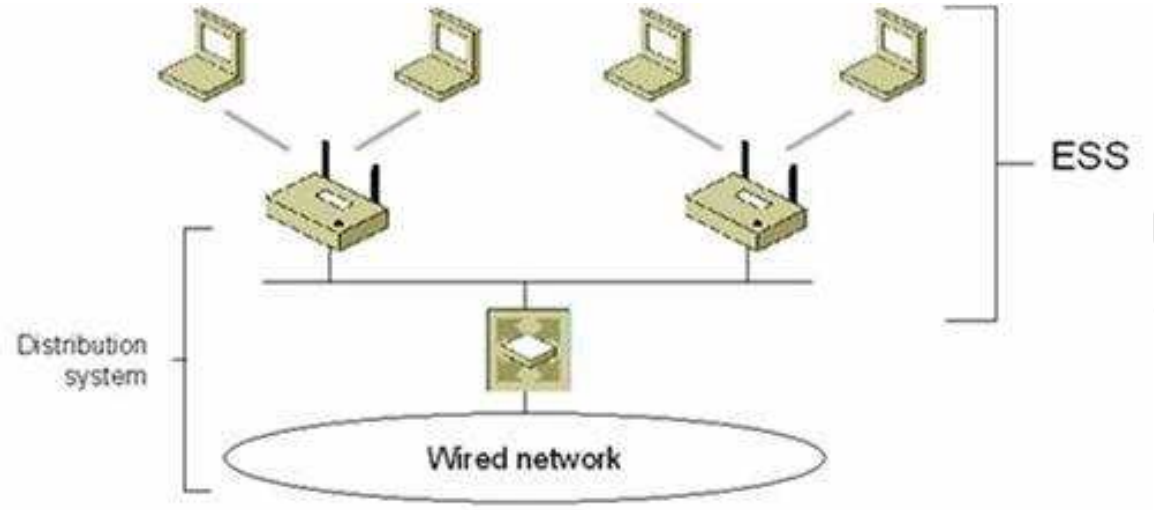
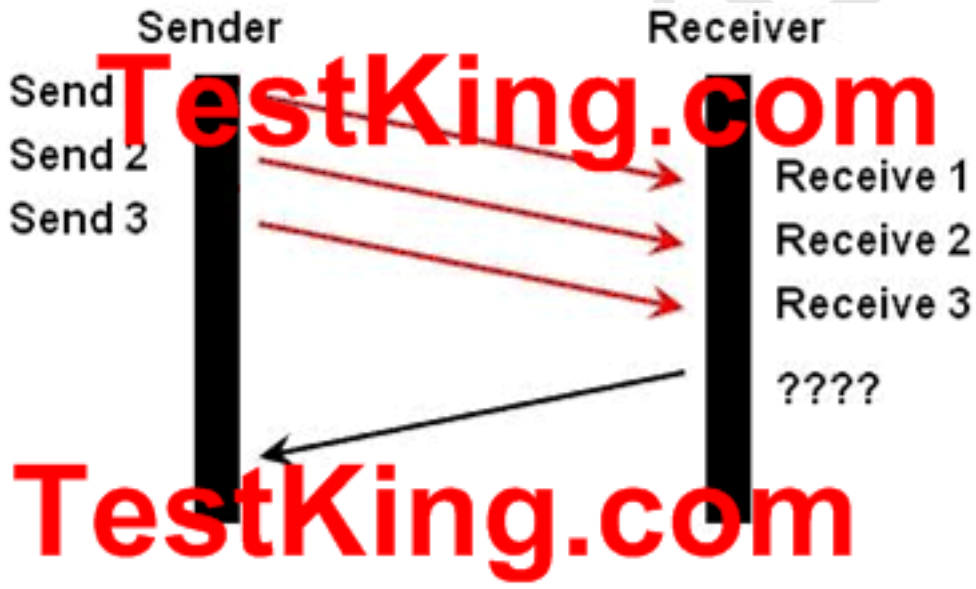


QUESTION NO: 23
Exhibit:



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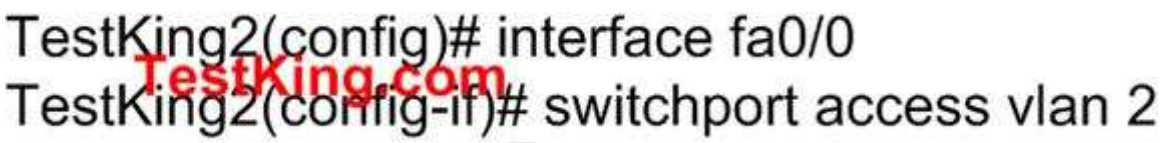
You work as a network administrator at TestKing.com. You study the exhibit carefully. A TCP/IP transfer is diagrammed in the exhibit. A window size of three has been negotiated for this transfer. Which message will be returned from the receiver to the sender as part of this TCP/IP transfer?

A. send ACK 6
B. send ACK 3
C. send ACK 7
D. send ACK 1-3
E. send ACK 4
F. send ACK 4-6

Answer: E
Explanation:
Reliable data delivery ensures the integrity of a stream of data sent from one machine to the other through a fully functional data link. It guarantees that the data won't be duplicated or lost. This is achieved through something called positive acknowledgment with retransmission a technique that requires a receiving machine to communicate with the transmitting source by sending an acknowledgment message back to the sender when it receives data.

The sender documents each segment it sends and waits for this acknowledgment before sending the next segment. When it sends a segment, the transmitting machine starts a timer and retransmits if it expires before an acknowledgment is returned from the receiving end.

QUESTION NO: 24
Exhibit:



You work as a network administrator at TestKing.com. You study the exhibit carefully. Which two statements about the configuration of the switch interface are correct? Select two.

A. A network host can be connected to this interface.
B. The switchport belongs only to VLAN 2.

C. The exhibit shows interface fa0/0 to be dynamically mapped to VLAN 2.
D. Interface fa0/0 will be in both VLAN 1 (by default) and VLAN 2.

Answer: A,B
Explanation:
An access port belongs to and carries the traffic of only one VLAN. Traffic is both received and sent in native formats with no VLAN tagging whatsoever. Anything arriving on an access port is simply assumed to belong to the VLAN assigned to the port. So, that port connected to host is a member of one particular VLAN and always on access mode.

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