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100-101

Cisco Interconnecting Cisco Networking Devices Part 1 (ICND)

Version 13.0

Sections

1. Operation of IP Data Networks
2. LAN Switching Technologies
3. IP addressing (IPv4 / IPv6)
4. IP Routing Technologies
5. IP Services
6. Network Device Security
7. Troubleshooting
8. Simulation

Exam A**QUESTION 1**

Which three statements are true about the operation of a full-duplex Ethernet network? (Choose three.)

- A. There are no collisions in full-duplex mode.
- B. A dedicated switch port is required for each full-duplex node.
- C. Ethernet hub ports are preconfigured for 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. The host network card and the switch port must be capable of operating in full-duplex mode.

Correct Answer: ABE

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

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 2

DRAG DROP

On the left are various network protocols. On the right are the layers of the TCP/IP model. Assuming a reliable connection is required, move the protocols on the left to the TCP/IP layers on the right to show the proper encapsulation for an email message sent by a host on a LAN. (Not all options are used.)

Select and Place:

On the left are various network protocols. On the right are the layers of the TCP/IP model. Assuming a reliable connection is required, move the protocols on the left to the TCP/IP layers on the right to show the proper encapsulation for an email message sent by a host on a LAN. (Not all options are used.)

UDP	application layer
SNMP	transport layer
IP	internet layer
ARP	network access layer
Ethernet	
TCP	
SMTP	

Correct Answer:

On the left are various network protocols. On the right are the layers of the TCP/IP model. Assuming a reliable connection is required, move the protocols on the left to the TCP/IP layers on the right to show the proper encapsulation for an email message sent by a host on a LAN. (Not all options are used.)

UDP	SMTP
SNMP	TCP
	IP
ARP	Ethernet

Section: Operation of IP Data Networks**Explanation****Explanation/Reference:****QUESTION 3**

Which OSI layer header contains the address of a destination host that is on another network?

- A. application
- B. session
- C. transport
- D. network
- E. data link
- F. physical

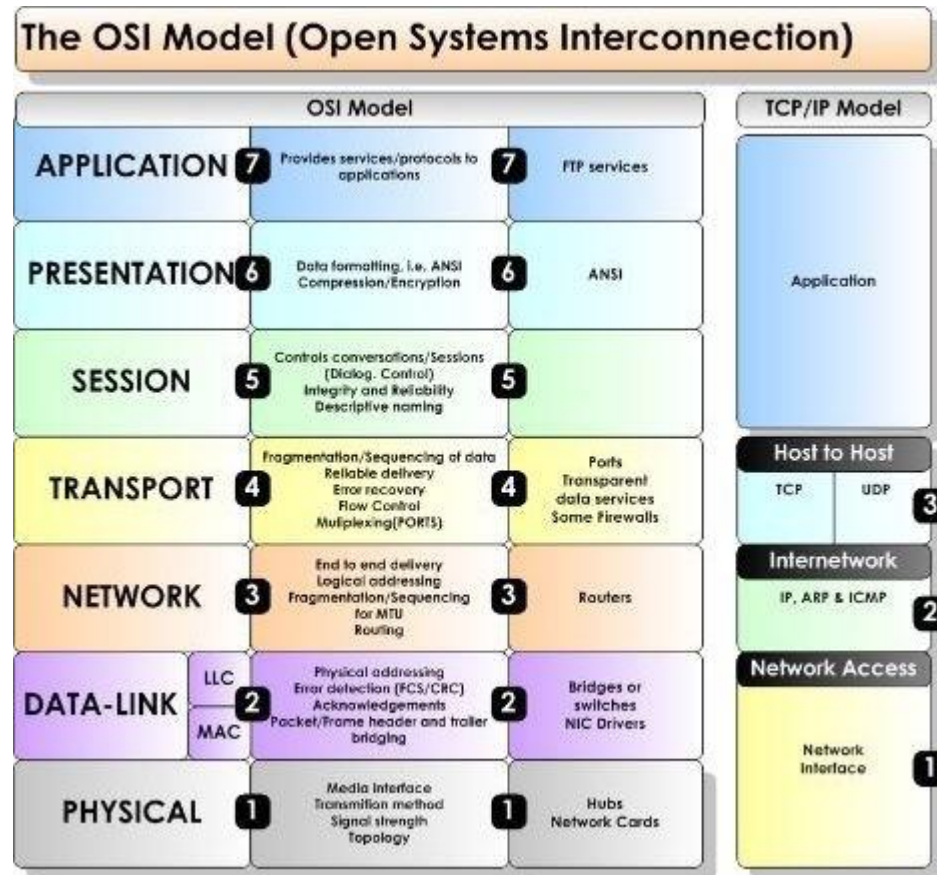
Correct Answer: D

Section: Operation of IP Data Networks
Explanation

Explanation/Reference:

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 4

Which layer of the TCP/IP stack combines the OSI model physical and data link layers?

A. Internet layer

- B. transport layer
- C. application layer
- D. network access layer

Correct Answer: D

Section: Operation of IP Data Networks

Explanation

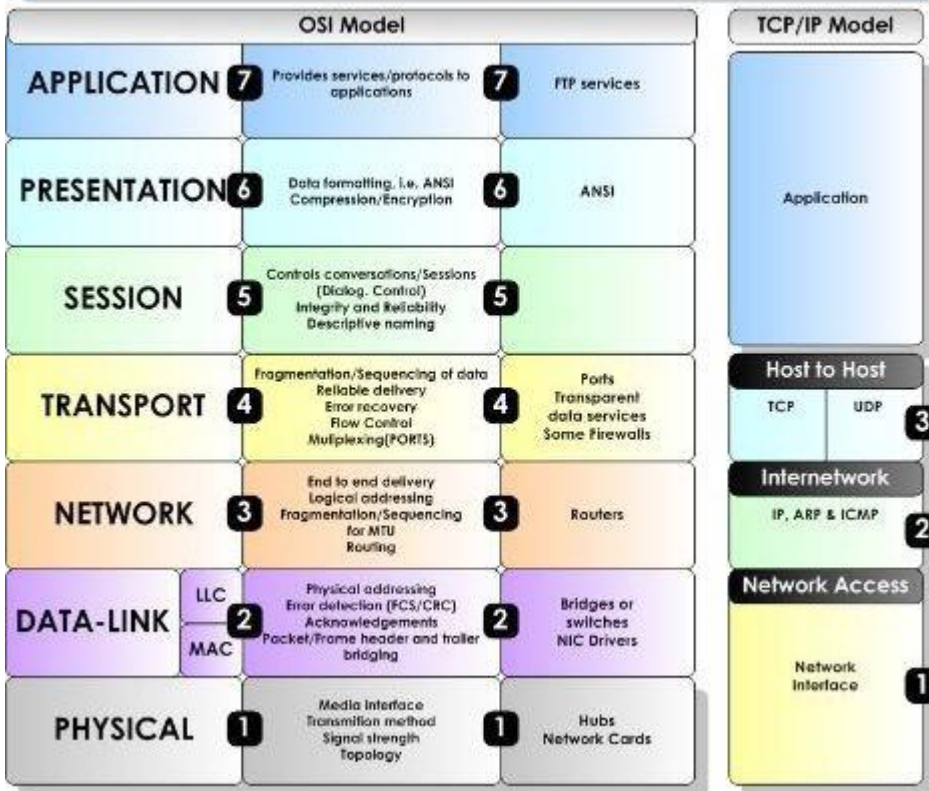
Explanation/Reference:

Explanation:

The Internet Protocol Suite, TCP/IP, is a suite of protocols used for communication over the internet. The TCP/ IP model was created after the OSI 7 layer model for two major reasons. First, the foundation of the Internet was built using the TCP/IP suite and through the spread of the World Wide Web and Internet, TCP/IP has been preferred. Second, a project researched by the Department of Defense (DOD) consisted of creating the TCP/IP protocols. The DOD's goal was to bring international standards which could not be met by the OSI model.

Since the DOD was the largest software consumer and they preferred the TCP/IP suite, most vendors used this model rather than the OSI. Below is a side by side comparison of the TCP/IP and OSI models.

The OSI Model (Open Systems Interconnection)



QUESTION 5

Which protocol uses a connection-oriented service to deliver files between end systems?

- A. TFTP
- B. DNS
- C. FTP
- D. SNMP
- E. RIP

Correct Answer: C

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

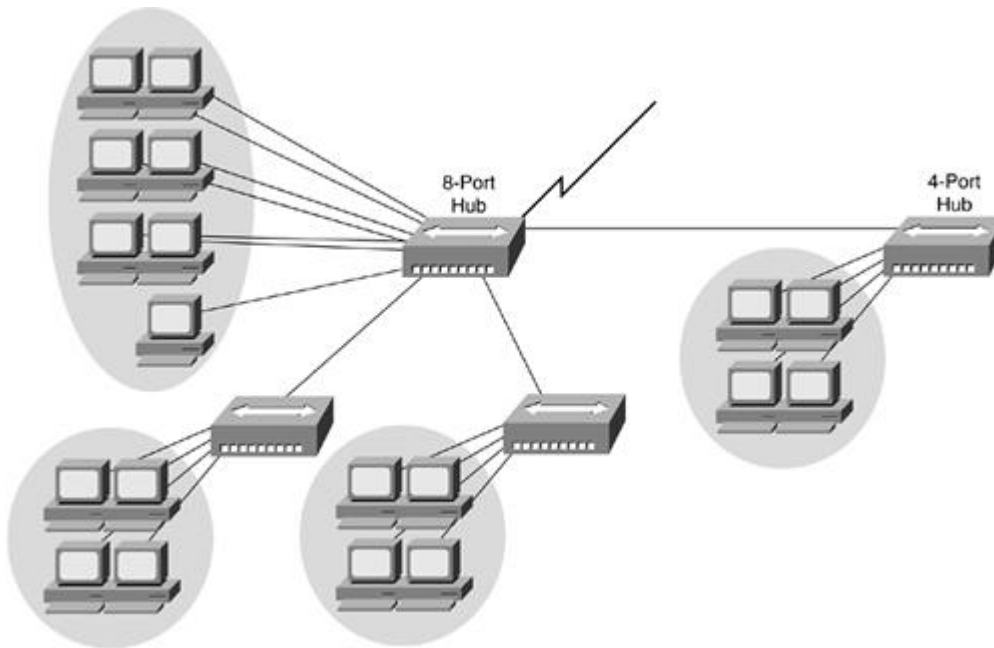
Explanation:

TCP is an example of a connection-oriented protocol. It requires a logical connection to be established between the two processes before data is exchanged. The connection must be maintained during the entire time that communication is taking place, then released afterwards. The process is much like a telephone call, where a virtual circuit is established--the caller must know the person's telephone number and the phone must be answered--before the message can be delivered.

TCP/IP is also a connection-oriented transport with orderly release. With orderly release, any data remaining in the buffer is sent before the connection is terminated. The release is accomplished in a three-way handshake between client and server processes. The connection-oriented protocols in the OSI protocol suite, on the other hand, do not support orderly release. Applications perform any handshake necessary for ensuring orderly release. Examples of services that use connection-oriented transport services are telnet, rlogin, and ftp.

QUESTION 6

Refer to the exhibit.



If the hubs in the graphic were replaced by switches, what would be virtually eliminated?

- A. broadcast domains
- B. repeater domains
- C. Ethernet collisions

- D. signal amplification
- E. Ethernet broadcasts

Correct Answer: C

Section: Operation of IP Data Networks

Explanation

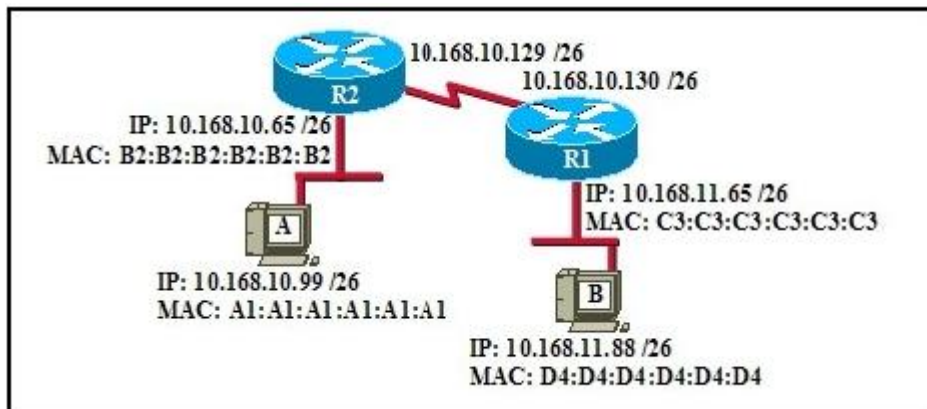
Explanation/Reference:

Explanation:

Modern wired networks use a network switch to eliminate collisions. By connecting each device directly to a port on the switch, either each port on a switch becomes its own collision domain (in the case of half duplex links) or the possibility of collisions is eliminated entirely in the case of full duplex links.

QUESTION 7

Refer to the exhibit.



If host A sends an IP packet to host B, what will the source physical address be in the frame when it reaches host B?

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

Correct Answer: E

Section: Operation of IP Data Networks
Explanation

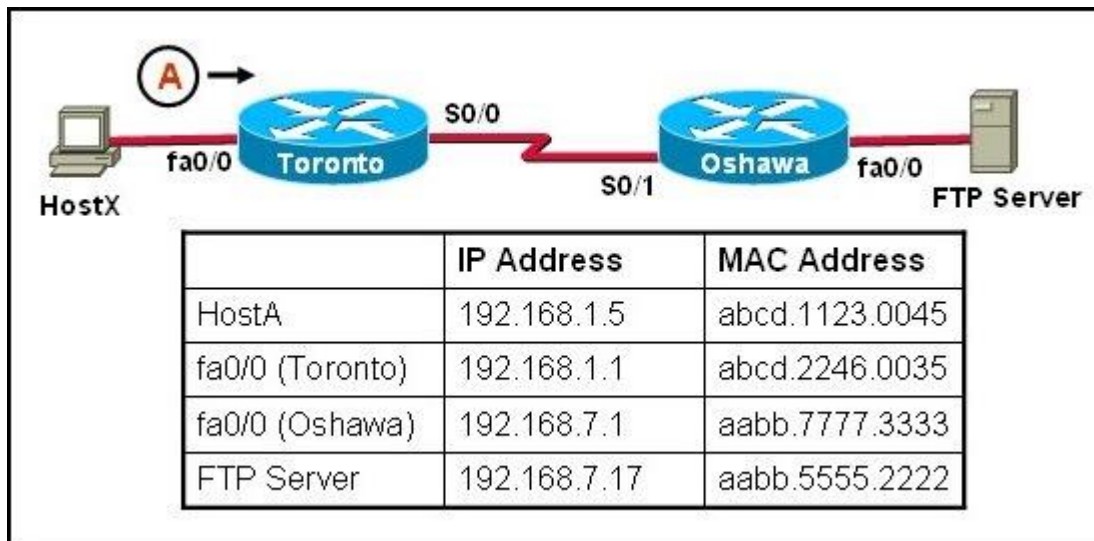
Explanation/Reference:

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 8

Refer to the exhibit.



HostX is transferring a file to the FTP server. Point A represents the frame as it goes toward the Toronto router. What will the Layer 2 destination address be at this point?

- A. abcd.1123.0045
- B. 192.168.7.17
- C. aabb.5555.2222
- D. 192.168.1.1
- E. abcd.2246.0035

Correct Answer: E

Section: Operation of IP Data Networks

Explanation**Explanation/Reference:**

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 its default gateway, which is Toronto.

QUESTION 9

Which network device functions only at Layer 1 of the OSI model?

A)



B)



C)



D)



E)



- A. Option A
- B. Option B
- C. Option C
- D. Option D
- E. Option E

Correct Answer: B

Section: Operation of IP Data Networks

Explanation

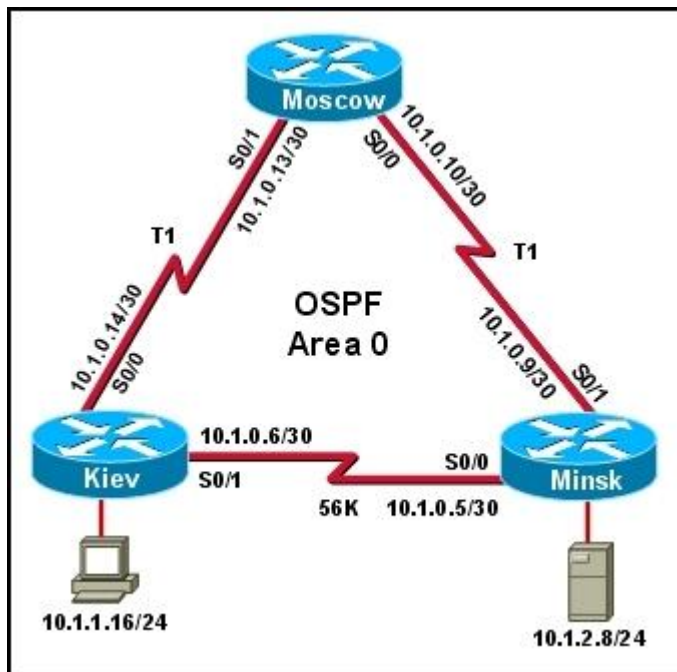
Explanation/Reference:

Explanation:

Most hubs are amplifying the electrical signal; therefore, they are really repeaters with several ports. Hubs and repeaters are Layer 1 (physical layer) devices.

QUESTION 10

Refer to the exhibit.



The host in Kiev sends a request for an HTML document to the server in Minsk. What will be the source IP address of the packet as it leaves the Kiev router?

- A. 10.1.0.1
- B. 10.1.0.5
- C. 10.1.0.6

- D. 10.1.0.14
- E. 10.1.1.16
- F. 10.1.2.8

Correct Answer: E

Section: Operation of IP Data Networks

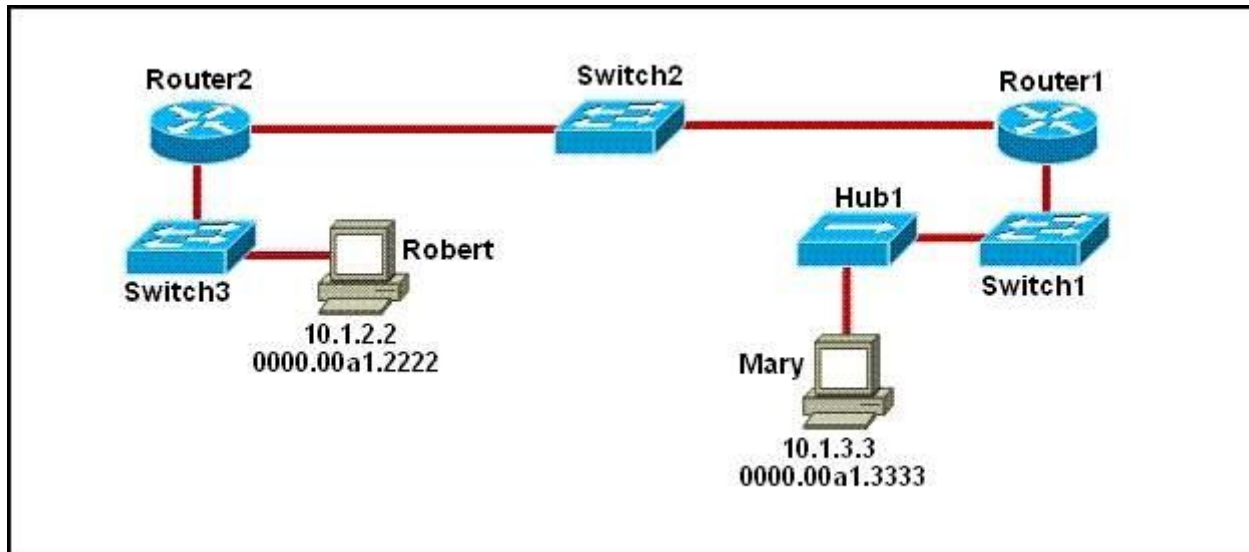
Explanation

Explanation/Reference:

Although the source and destination MAC address will change as a packet traverses a network, the source and destination IP address will not unless network address translation (NAT) is being done, which is not the case here.

QUESTION 11

Refer to the exhibit.



As packets travel from Mary to Robert, which three devices will use the destination MAC address of the packet to determine a forwarding path? (Choose three.)

- A. Hub1
- B. Switch1
- C. Router1
- D. Switch2

- E. Router2
- F. Switch3

Correct Answer: BDF

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

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.

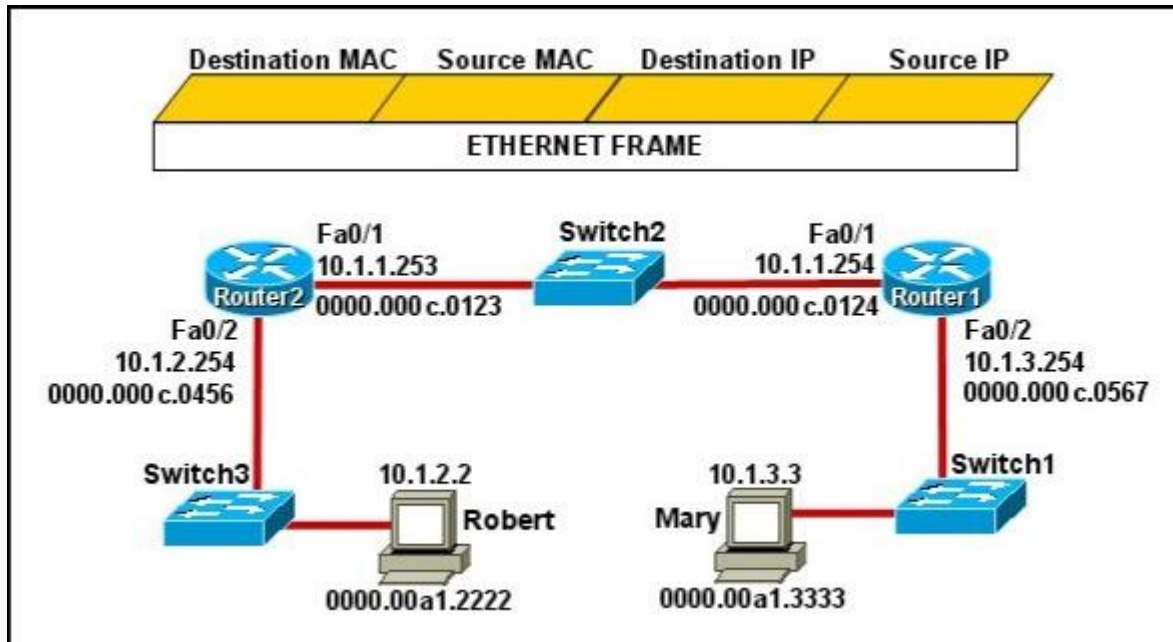
To accomplish the above functions switches and bridges carry out the following tasks:

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.

When a switch or bridge is listening to 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 12

Refer to the exhibit.



Mary is sending an instant message to Robert. The message will be broken into a series of packets that will traverse all network devices. What addresses will populate these packets as they are forwarded from Router1 to Router2?

- A.
- | Destination MAC | Source MAC | Destination IP | Source IP |
|-----------------|----------------|----------------|-----------|
| 0000.00a1.2222 | 0000.00a1.3333 | 10.1.2.2 | 10.1.3.3 |
- B.
- | Destination MAC | Source MAC | Destination IP | Source IP |
|-----------------|----------------|----------------|-----------|
| 0000.000c.0123 | 0000.000c.0124 | 10.1.2.2 | 10.1.3.3 |
- C.
- | Destination MAC | Source MAC | Destination IP | Source IP |
|-----------------|----------------|----------------|------------|
| 0000.000c.0123 | 0000.000c.0124 | 10.1.1.253 | 10.1.1.254 |
- D.
- | Destination MAC | Source MAC | Destination IP | Source IP |
|-----------------|----------------|----------------|------------|
| 0000.00a1.2222 | 0000.00a1.3333 | 10.1.1.253 | 10.1.1.254 |
- E.
- | Destination MAC | Source MAC | Destination IP | Source IP |
|-----------------|----------------|----------------|-----------|
| 0000.000c.0456 | 0000.000c.0567 | 10.1.2.2 | 10.1.3.3 |

- A. Option A
B. Option B
C. Option C
D. Option D
E. Option E

Correct Answer: B

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

The Source and Destination IP address is not going to change. Host 1 IP address will stay as being the source IP and the Host 2 IP address will stay the destination IP address. Those two are not going to change.

For the MAC address it is going to change each time it goes from one host to another. (Except switches... they don't change anything)

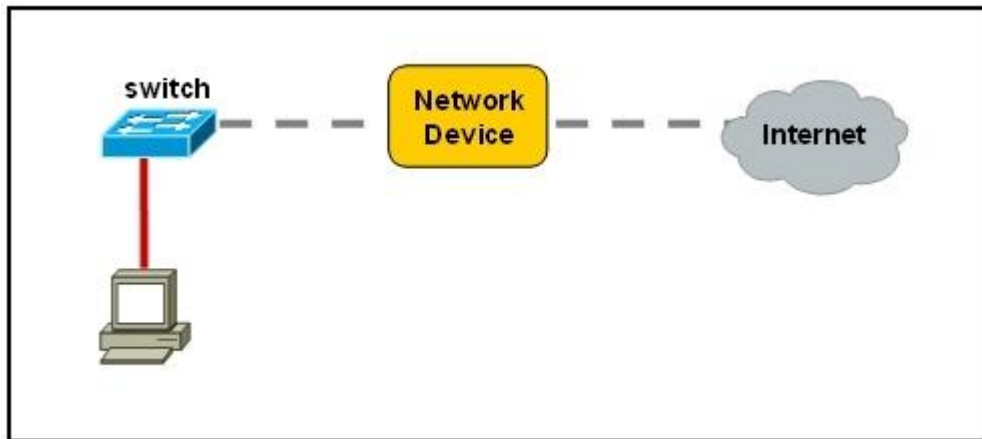
Frame leaving HOST 1 is going to have a source MAC of Host 1 and a destination MAC of Router 1.

Router 1 is going to strip that info off and then will make the source MAC address of Router1's exiting interface, and making Router2's interface as the destination MAC address.

Then the same will happen... Router2 is going to change the source/destination info to the source MAC being the Router2 interface that it is going out, and the destination will be Host2's MAC address.

QUESTION 13

Refer to the exhibit.



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

- A. a router with two Ethernet interfaces
- B. a switch with two Ethernet interfaces
- C. a router with one Ethernet and one serial interface
- D. a switch with one Ethernet and one serial interface
- E. a router with one Ethernet and one modem interface

Correct Answer: C

Section: Operation of IP Data Networks

Explanation**Explanation/Reference:**

Explanation:

Only a router can terminate a leased line attachment 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 line attachment and one Ethernet interface to connect to the switch on the LAN.

QUESTION 14

Which transport layer protocol provides best-effort delivery service with no acknowledgment receipt required?

- A. HTTP
- B. IP
- C. TCP
- D. Telnet
- E. UDP

Correct Answer: E

Section: Operation of IP Data Networks

Explanation**Explanation/Reference:**

Explanation:

UDP provides a connectionless datagram service that offers best-effort delivery, which means that UDP does not guarantee delivery or verify sequencing for any datagrams. A source host that needs reliable communication must use either TCP or a program that provides its own sequencing and acknowledgment services.

QUESTION 15

Which layer of the OSI model controls the reliability of communications between network devices using flow control, sequencing and acknowledgments?

- A. Physical
- B. Data-link
- C. Transport
- D. Network

Correct Answer: C

Section: Operation of IP Data Networks

Explanation**Explanation/Reference:**

Explanation:

Layer	Function	Examples
Application (Layer 7)	User interface	Telnet, HTTP
Presentation (Layer 6)	Handles encryption & changes to syntax	ASCII/EBCDIC, JPEG/MP3
Session (Layer 5)	Manages multiple applications and maintains synchronisation points	Operating systems, scheduling
Transport (Layer 4)	Provides reliable or best-effort delivery and (optional) error and flow control	TCP, UDP
Network (Layer 3)	Provides logical end-to-end addressing used by routers and hosts	IP
Data Link (Layer 2)	Creates frames from data bits, uses MAC addresses to access endpoints, and provides error detection but no correction	802.3, 802.2, HDLC, Frame Relay
Physical (Layer 1)	Specifies voltage, wire speed, and cable pin-outs	EIA/TIA, V.35

QUESTION 16

Which statements are true regarding ICMP packets? (Choose two.)

- A. They acknowledge receipt of TCP segments.
- B. They guarantee datagram delivery.
- C. TRACERT uses ICMP packets.
- D. They are encapsulated within IP datagrams.
- E. They are encapsulated within UDP datagrams.

Correct Answer: CD

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

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

QUESTION 17

Which statements accurately describe CDP? (Choose three.)

- A. CDP is an IEEE standard protocol.
- B. CDP is a Cisco proprietary protocol.
- C. CDP is a datalink layer protocol.
- D. CDP is a network layer protocol.
- E. CDP can discover directly connected neighboring Cisco devices.
- F. CDP can discover Cisco devices that are not directly connected.

Correct Answer: BCE

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

CDP (Cisco Discovery Protocol) 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 containing useful info for troubleshooting and documenting the network.

QUESTION 18

How does a switch differ from a hub?

- A. A switch does not induce any latency into the frame transfer time.
- B. A switch tracks MAC addresses of directly-connected devices.
- C. A switch operates at a lower, more efficient layer of the OSI model.
- D. A switch decreases the number of broadcast domains.
- E. A switch decreases the number of collision domains.

Correct Answer: B

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

Some of the features and functions of a switch include:

A switch is essentially a fast, multi-port bridge, which can contain dozens of ports.

Rather than creating two collision domains, each port creates its own collision domain.

In a network of twenty nodes, twenty collision domains exist if each node is plugged into its own switch port.

If an uplink port is included, one switch creates twenty-one single-node collision domains.

A switch dynamically builds and maintains a Content-Addressable Memory (CAM) table, holding all of the necessary MAC information for each port.

For a detailed description of how switches operate, and their key differences to hubs, see the reference link below.

Reference: <http://www.cisco.com/warp/public/473/lan-switch-cisco.shtml>

QUESTION 19

What must occur before a workstation can exchange HTTP packets with a web server?

- A. A UDP connection must be established between the workstation and its default gateway.
- B. A UDP connection must be established between the workstation and the web server.
- C. A TCP connection must be established between the workstation and its default gateway.
- D. A TCP connection must be established between the workstation and the web server.
- E. An ICMP connection must be established between the workstation and its default gateway.
- F. An ICMP connection must be established between the workstation and the web server.

Correct Answer: D

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

HTTP uses TCP port 80, and a TCP port 80 connection must be established for HTTP communication to occur.

<http://pentestlab.wordpress.com/2012/03/05/common-tcpip-ports/>

QUESTION 20

How does TCP differ from UDP? (Choose two.)

- A. TCP provides best effort delivery.
- B. TCP provides synchronized communication.
- C. TCP segments are essentially datagrams.
- D. TCP provides sequence numbering of packets.
- E. TCP uses broadcast delivery.

Correct Answer: BD

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

Because TCP is a connection-oriented protocol responsible for ensuring the transfer of a datagram from the source to destination machine (end-to-end communications), TCP must receive communications messages from the destination machine to acknowledge receipt of the datagram. The term virtual circuit is usually used to refer to the handshaking that goes on between the two end machines, most of which are simple acknowledgment messages (either confirmation of receipt or a failure code) and datagram sequence numbers.

Rather than impose a state within the network to support the connection, TCP uses synchronized state between the two endpoints. This synchronized state is set up as part of an initial connection process, so TCP can be regarded as a connection-oriented protocol. Much of the protocol design is intended to ensure that each local state transition is communicated to, and acknowledged by, the remote party.

Reference: http://en.wikibooks.org/wiki/Communication_Networks/TCP_and_UDP_Protocols

QUESTION 21

A workstation has just resolved a browser URL to the IP address of a server. What protocol will the workstation now use to determine the destination MAC address to be placed into frames directed toward the server?

- A. HTTP
- B. DNS
- C. DHCP
- D. RARP
- E. ARP

Correct Answer: E

Section: Operation of IP Data Networks

Explanation

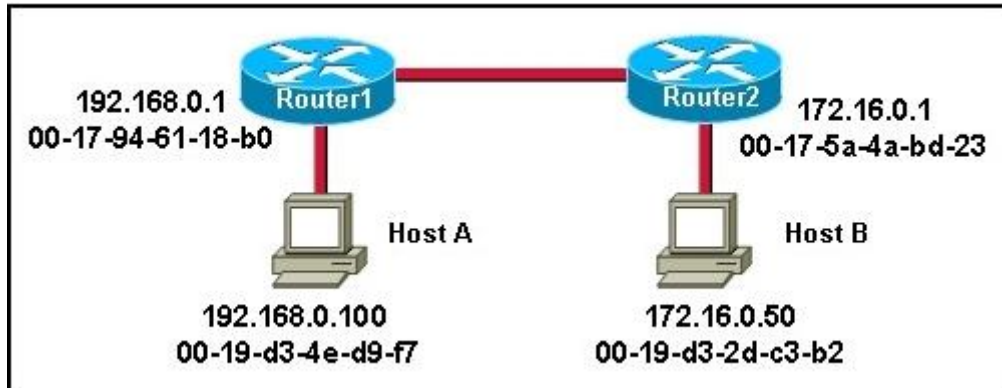
Explanation/Reference:

Explanation:

The RARP protocol is used to translate hardware interface addresses to protocol addresses. The RARP message format is very similar to the ARP format. When the booting computer sends the broadcast ARP request, it places its own hardware address in both the sending and receiving fields in the encapsulated ARP data packet. The RARP server will fill in the correct sending and receiving IP addresses in its response to the message. This way the booting computer will know its IP address when it gets the message from the RARP server

QUESTION 22

Refer to the exhibit.



Host A is sending a packet to Host B for the first time. What destination MAC address will Host A use in the ARP request?

- A. 192.168.0.1
- B. 172.16.0.50
- C. 00-17-94-61-18-b0
- D. 00-19-d3-2d-c3-b2
- E. ff-ff-ff-ff-ff
- F. 255.255.255.255

Correct Answer: E

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

For the initial communication, Host A will send a broadcast ARP (all F's) to determine the correct address to use to reach the destination.

ARP sends an Ethernet frame called an ARP request to every host on the shared link-layer legmen. The Ethernet header includes the source host MAC address and a destination address of all Fs representing a broadcast frame. The ARP request contains the sender's MAC and IP address and the target (destination) IP address. The target's MAC address is set to all 0s.

ARP Request

Reference:

<http://www.technicalhowto.com/protocols/arp/arp.html>

QUESTION 23

What are two common TCP applications? (Choose two.)

- A. TFTP
- B. SMTP
- C. SNMP
- D. FTP
- E. DNS

Correct Answer: BD

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

SMTP uses TCP port 25, while FTP uses TCP ports 20 and 21.

Reference: <http://pentestlab.wordpress.com/2012/03/05/common-tcpip-ports/>

QUESTION 24

Refer to the exhibit.

SwitchA# **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

Frame received by SwitchA:

Source MAC	Destination MAC	Source IP	Destination IP
00b0.d056.fe4d	00b0.d0da.cb56	192.168.40.5	192.168.40.6

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

- A. It will drop the frame.
- B. It will forward the frame out port Fa0/6 only.
- C. It will flood the frame out all ports.
- D. It will flood the frame out all ports except Fa0/3.

Correct Answer: B

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

Switches keep the learned MAC addresses in a table, so that when a frame comes in with a destination MAC address that the switch has already learned, it will forward it to that port only. If a frame comes in with a destination MAC that is not already in the MAC address table, then the frame will be flooded to all ports except for the one that it came in on. In this case, Switch A already knows that 00b0.d0da.cb56 resides on port fa0/6, so it will forward the frame out that port.

QUESTION 25

Refer to the exhibit.

SwitchA# **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

Frame received by SwitchA:

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

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

- A. It will drop the frame.
- B. It will forward the frame out port Fa0/6 only.
- C. It will forward the frame out port Fa0/3 only.
- D. It will flood the frame out all ports.
- E. It will flood the frame out all ports except Fa0/3.

Correct Answer: E

Section: Operation of IP Data Networks

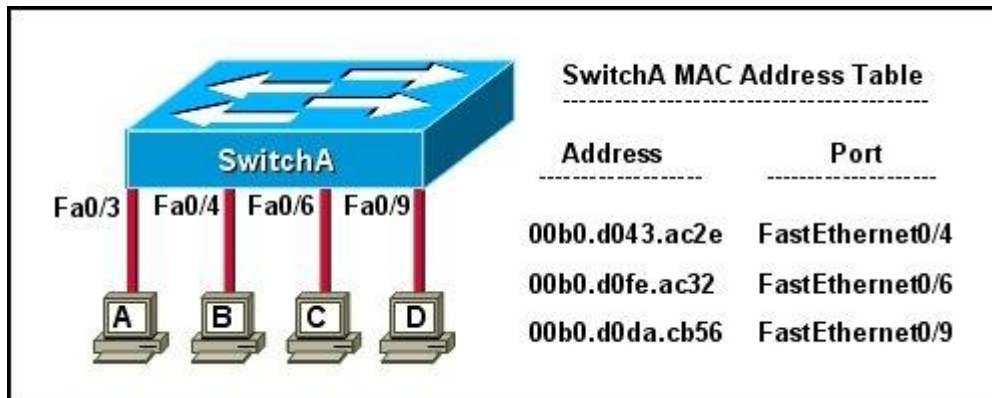
Explanation

Explanation/Reference:

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.

QUESTION 26

Refer to the exhibit.



The exhibit is showing the topology and the MAC address table. Host A sends a data frame to host D. What will the switch do when it receives the frame from host A?

- A. The switch will add the source address and port to the MAC address table and forward the frame to host D.
- B. The switch will discard the frame and send an error message back to host A.
- C. The switch will flood the frame out of all ports except for port Fa0/3.
- D. The switch will add the destination address of the frame to the MAC address table and forward the frame to host D.

Correct Answer: A

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

When switch receives the data frame from the host not having the MAC address already on the MAC table, it will add the MAC address to source port on MAC address table and sends the data frame.

QUESTION 27

Which two statements describe the operation of the CSMA/CD access method? (Choose two.)

- A. In a CSMA/CD collision domain, multiple stations can successfully transmit data simultaneously.
- B. In a CSMA/CD collision domain, stations must wait until the media is not in use before transmitting.
- C. The use of hubs to enlarge the size of collision domains is one way to improve the operation of the CSMA/CD access method.
- D. After a collision, the station that detected the collision has first priority to resend the lost data.
- 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.

Correct Answer: BE

Section: Operation of IP Data Networks

Explanation

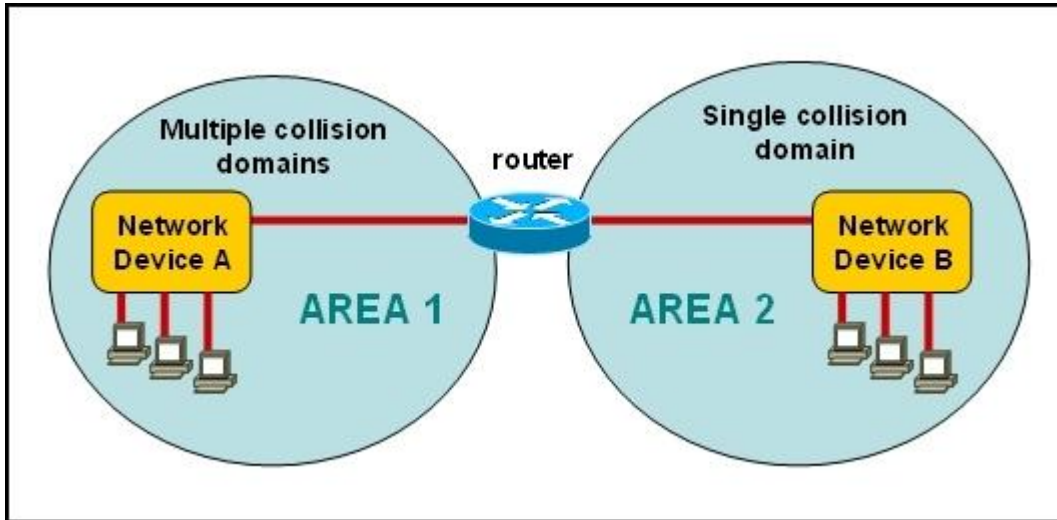
Explanation/Reference:

Explanation:

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 28

Refer to the exhibit.



A network has been planned as shown. Which three statements accurately describe the areas and devices in the network plan? (Choose three.)

- A. Network Device A is a switch.
- B. Network Device B is a switch.
- C. Network Device A is a hub.
- D. Network Device B is a hub.
- E. Area 1 contains a Layer 2 device.
- F. Area 2 contains a Layer 2 device.

Correct Answer: ADE

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

Switches use a separate collision domain for each port, so device A must be a switch. Hubs, however, place all ports in the same collision domain so device B is a hub. Switches reside in layer 2 while hubs are layer 1 devices.

QUESTION 29

On a Cisco switch, which protocol determines if an attached VoIP phone is from Cisco or from another vendor?

- A. RTP

- B. TCP
- C. CDP
- D. UDP

Correct Answer: C

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

The Cisco Unified IP Phone uses CDP to communicate information such as auxiliary VLAN ID, per port power management details, and Quality of Service (QoS) configuration information with the Cisco Catalyst switch.

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 the network.

CDP messages are generated every 60 seconds as multicast messages on each of its active interfaces.

The information shared in a CDP packet about a Cisco device includes the following:

Name of the device configured with the hostname command

IOS software version

Hardware capabilities, such as routing, switching, and/or bridging

Hardware platform, such as 2600, 2950, or 1900

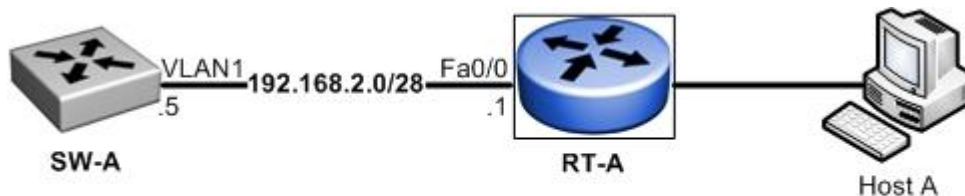
The layer-3 address(es) of the device

The interface the CDP update was generated on

Reference: <http://computernetworkingnotes.com/cisco-devices-administration-and-configuration/cisco-discoveryprotocol.html>

QUESTION 30

Refer to the exhibit.



What must be configured to establish a successful connection from Host A to switch SW-A through router RT-A?

- A. VLAN 1 on RT-A

- B. IP routing on SW-A
- C. default gateway on SW-A
- D. crossover cable connecting SW-A and RT-A

Correct Answer: C

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

In order for the switch to reach networks that are not local, such as networks attached to different interfaces of the router, it will need to set its default gateway to be the IP address of the attached router.

QUESTION 31

At which layer of the OSI model does the protocol that provides the information that is displayed by the show cdp neighbors command operate?

- A. application
- B. transport
- C. network
- D. physical
- E. data link

Correct Answer: E

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

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.

CDP allows devices to share basic configuration information without even configuring any protocol specific information and is enabled by default on all interfaces.

CDP is a Datalink Protocol occurring at Layer 2 of the OSI model.

CDP is not routable and can only go over to directly connected devices.

CDP is enabled, by default, on all Cisco devices. CDP updates are generated as multicasts every 60 seconds with a hold-down period of 180 seconds for a missing neighbor. The no cdp run command globally disables CDP, while the no cdp enable command disables CDP on an interface. Use show cdp neighbors to list out your directly connected Cisco neighboring devices. Adding the detail parameter will display the layer-3 addressing configured on the neighbor.

Reference: <http://computernetworkingnotes.com/cisco-devices-administration-and-configuration/cisco-discoveryprotocol.html>

QUESTION 32

Which two characteristics apply to Layer 2 switches? (Choose two.)

- A. Increases the number of collision domains
- B. Decreases the number of collision domains
- C. Implements VLAN
- D. Decreases the number of broadcast domains
- E. Uses the IP address to make decisions for forwarding data packets

Correct Answer: AC

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

Layer 2 switches offer a number of benefits to hubs, such as the use of VLANs and each switch port is in its own separate collision domain, thus eliminating collisions on the segment.

QUESTION 33

Which two characteristics describe the access layer of the hierarchical network design model? (Choose two.)

- A. layer 3 support
- B. port security
- C. redundant components
- D. VLANs
- E. PoE

Correct Answer: BD

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Access layer

The main purpose of the access layer is to provide direct connection to devices on the network and controlling which devices are allowed to communicate over it. The access layer interfaces with end devices, such as PCs, printers, and IP phones, to provide access to the rest of the network. The access layer can include routers, switches, bridges, hubs, and wireless access points (AP).

Switch features in the Access layer:

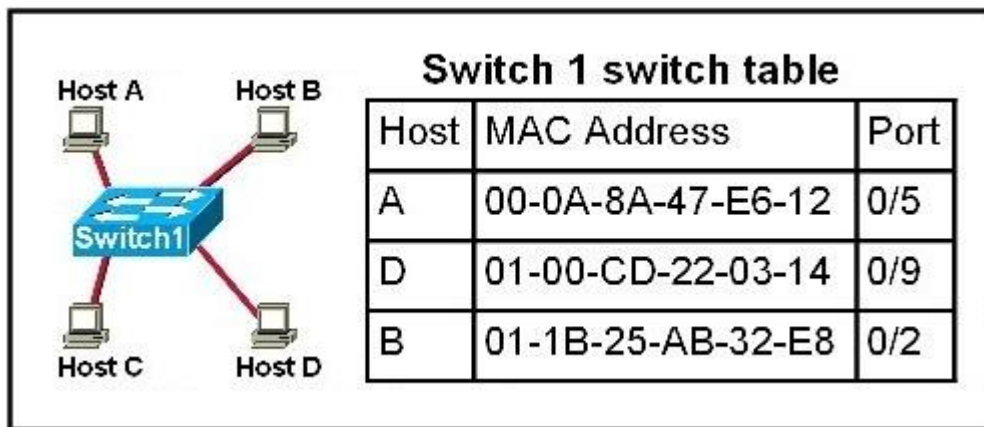
- Port security

- VLANs
- Fast Ethernet/Gigabit Ethernet
- Power over Ethernet (PoE)
- Link aggregation
- Quality of Service (QoS)

References: <http://www.ciscopath.com/content/61/>
http://www.mcmcse.com/cisco/guides/hierarchical_model.shtml

QUESTION 34

Refer to the topology and switching table shown in the graphic.



Host B sends a frame to Host C. 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 B
- D. Send an ARP request for Host C
- E. Send an ICMP Host Unreachable message to Host B
- F. Record the destination MAC address in the switching table and send the frame directly to Host C

Correct Answer: B

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

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 35

Refer to the exhibit.

RouterA# **show ip route**

Codes: C - connected, S - static, 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

i - IS-IS, su - IS-IS summary, 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 0.0.0.0 to network 0.0.0.0

172.16.0.0/24 is subnetted, 1 subnets

C 172.16.1.0 is directly connected, Ethernet0/1

10.0.0.0/30 is subnetted, 1 subnets

C 10.255.255.200 is directly connected, Serial0/0

S* 0.0.0.0/0 is directly connected, Serial0/0

RouterA#

The output is from a router in a large enterprise. From the output, determine the role of the router.

- A. A Core router.
- B. The HQ Internet gateway router.
- C. The WAN router at the central site.
- D. Remote stub router at a remote site.

Correct Answer: D

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

Since the routing table shows only a single default route using the single interface serial 0/0, we know that this is most likely a remote stub site with a single connection to the rest of the network. All the other answer options would mean that this router would have more connections, and would contain more routes.

QUESTION 36

To what type of port would a cable with a DB-60 connector attach?

- A. Serial port
- B. Console port
- C. Ethernet port
- D. Fibre optic port

Correct Answer: A

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

Serial Connection





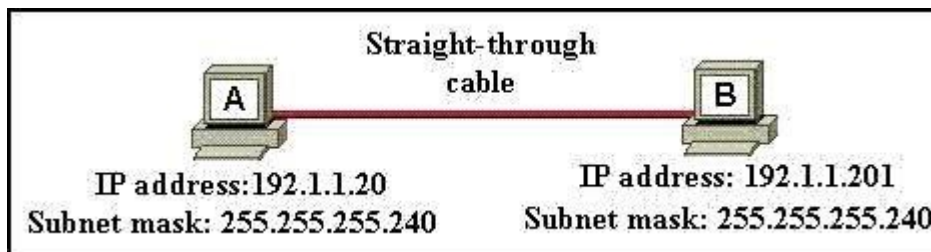
The picture on the left shows a V.35 DTE cable with a male DB60 connector and a male standard 34-pin Winchester-type connector. The right picture shows a V.35 DCE serial cable with a male DB60 connector and a female 34-pin Winchester-type connector. As you probably guessed already, the male connector of the DTE cable is attached to the DCE cable's female connector, this is depicted in the picture below. This is known as a back-to-back connection, and 'simulates' a WAN link. In a real world setup, the DTE cable's male connector typically connects to a port on a CSU/DSU provided by a service provider (i.e. telco), which in turn connects to a CSU/DSU at another location, thru a T1 link for example. The DB60 connector connects to a Serial interface on a router.



Reference: http://www.techexams.net/techlabs/ccna/lab_hardware.shtml

QUESTION 37

A network administrator is connecting PC hosts A and B 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. A crossover cable should be used in place of the straight-through cable.

- B. A rollover cable should be used in place of the straight-through cable.
- C. The subnet masks should be set to 255.255.255.192
- D. A default gateway needs to be set on each host.
- E. The hosts must be reconfigured to use private IP addresses for direct connections of this type.
- F. The subnet masks should be set to 255.255.255.0

Correct Answer: AF

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

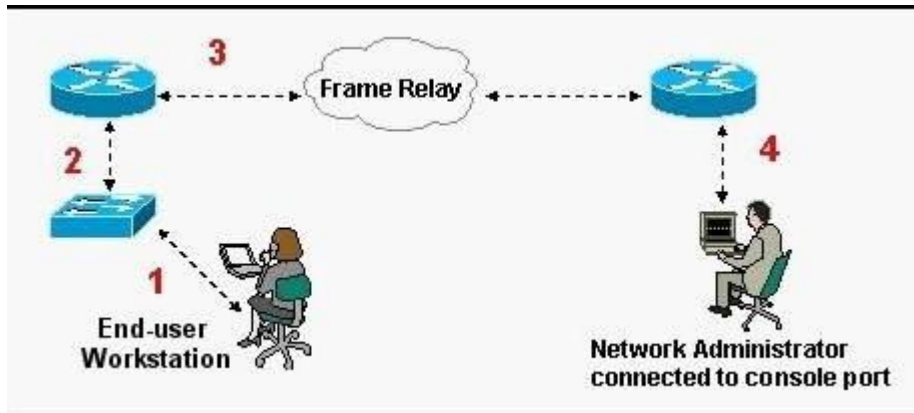
If you need to connect two computers but you don't have access to a network and can't set up an ad hoc network, you can use an Ethernet crossover cable to create a direct cable connection.

Generally speaking, a crossover cable is constructed by reversing (or crossing over) the order of the wires inside so that it can connect two computers directly. A crossover cable looks almost exactly like a regular Ethernet cable (a straight-through cable), so make sure you have a crossover cable before following these steps.

Both devices need to be on the same subnet, and since one PC is using 192.1.1.20 and the other is using 192.1.1.201, the subnet mask should be changed to 255.255.255.0.

QUESTION 38

Refer to the exhibit.



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 straight-through cable
- 2 - Ethernet straight-through cable
- 3 - Serial cable
- 4 - Rollover cable
- C. 1 - Ethernet rollover cable
- 2 - Ethernet crossover cable
- 3 - Serial cable
- 4 - Null-modem 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

Correct Answer: B

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

Explanation:

When connecting a PC to a switch, a standard Ethernet straight through cable should be used. This same cable should also be used for switch to router connections. Generally speaking, crossover cables are only needed when connecting two like devices (PC-PC, switch-switch, router-router, etc).

Routers connect to frame relay and other WAN networks using serial cables.

Rollover cables are special cables used for connecting to the console ports of Cisco devices.

QUESTION 39

Which of the following are types of flow control? (Choose three.)

- A. buffering
- B. cut-through
- C. windowing
- D. congestion avoidance
- E. load balancing

Correct Answer: ACD

Section: Operation of IP Data Networks
Explanation

Explanation/Reference:

Explanation:

During Transfer of data, a high speed computer is generating data traffic a lot faster than the network device can handle in transferring to destination, so single gateway or destination device cannot handle much amount of traffic that is called "Congestion".

Buffering

The Technie is used to control the data transfer when we have congestion, when a network device receive a data it stores in memory section and then transfer to next destination this process called "Buffering".

Windowing Whereas Windowing is used for flow control by the Transport layer.

Say the sender device is sending segments and the receiver device can accommodate only a fixed number of segments before it can accept more, the two devices negotiate the window size during the connection setup.

This is done so that the sending device doesn't overflow the receiving device's buffer.

Also the receiving device can send a single acknowledgement for the segments it has received instead of sending an acknowledgement after every segment received.

Also, this window size is dynamic meaning, the devices can negotiate and change the window size in the middle of a session. So if initially the window size is three and the receiving device thinks that it can accept more number of segments in its buffer it can negotiate with the sending device and it increases it to say 5 for example.

Windowing is used only by TCP since UDP doesn't use or allow flow control.

Reference: <http://www.info-it.net/cisco/ccna/exam-tips/flow-control.php>

QUESTION 40

Refer to the exhibit.

SwitchA# **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

Frame received by SwitchA:

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

Which option describes how SwitchA will handle the frame just received?

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

Correct Answer: D

Section: Operation of IP Data Networks

Explanation

Explanation/Reference:

QUESTION 41

Which two options will help to solve the problem of a network that is suffering a broadcast storm? (Choose two.)

- A. a bridge
- B. a router
- C. a hub

- D. a Layer 3 switch
- E. an access point

Correct Answer: BD

Section: LAN Switching Technologies

Explanation

Explanation/Reference:

Explanation:

Routers and layer 3 switches will not propagate broadcast traffic beyond the local segment, so the use of these devices is the best method for eliminating broadcast storms.

QUESTION 42

A switch receives a frame on one of its ports. There is no entry in the MAC address table for the destination MAC address. What will the switch do with the frame?

- A. drop the frame
- B. forward it out of all ports except the one that received it
- C. forward it out of all ports
- D. store it until it learns the correct port

Correct Answer: B

Section: LAN Switching Technologies

Explanation

Explanation/Reference:

Explanation:

Understanding this concept is prime for understanding that 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 its table for the destination, it will forward the frame directly to the destination port. If it was not already in its MAC table, then they frame would have been flooded out all ports except for the port that it came from.

QUESTION 43

Which address type does a switch use to make selective forwarding decisions?

- A. Source IP address
- B. Destination IP address
- C. Source and destination IP address
- D. Source MAC address
- E. Destination MAC address

Correct Answer: E

Section: LAN Switching Technologies

Explanation

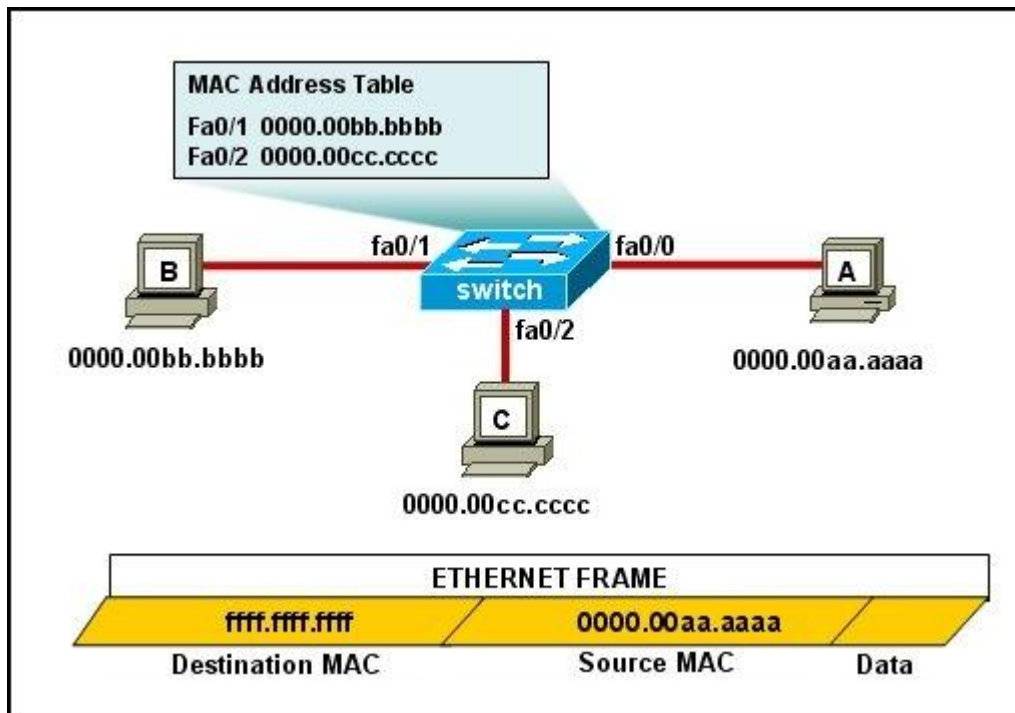
Explanation/Reference:

Explanation:

Switches analyze the destination MAC to make its forwarding decision since it is a layer 2 device. Routers use the destination IP address to make forwarding decisions.

QUESTION 44

Refer to the exhibit.



The MAC address table is shown in its entirety. The Ethernet frame that is shown arrives at the switch.

What two operations will the switch perform when it receives this frame? (Choose two.)

A. The switch will not forward a frame with this destination MAC address.

- B. The MAC address of 0000.00aa.aaaa will be added to the MAC Address Table.
- C. The MAC address of ffff.ffff.ffff will be added to the MAC address table.
- D. The frame will be forwarded out of all the active switch ports except for port fa0/0.
- E. The frame will be forwarded out of fa0/0 and fa0/1 only.
- F. The frame will be forwarded out of all the ports on the switch.

Correct Answer: BD

Section: LAN Switching Technologies

Explanation

Explanation/Reference:

Explanation:

If the switch already has the MAC address in its table for the destination, it will forward the frame directly to the destination port. If it was not already in its MAC table, then the frame would have been flooded out all ports except for the port that it came from.

QUESTION 45

What does a host on an Ethernet network do when it is creating a frame and it does not have the destination address?

- A. Drops the frame
- B. Sends out a Layer 3 broadcast message
- C. Sends a message to the router requesting the address
- D. Sends out an ARP request with the destination IP address

Correct Answer: D

Section: LAN Switching Technologies

Explanation

Explanation/Reference:

Explanation:

In this case, it will send out an ARP request for MAC address of the destination IP (assuming it doesn't already have it in its table) and then address it to the destination's MAC address.

QUESTION 46

A switch has 48 ports and 4 VLANs. How many collision and broadcast domains exist on the switch (collision, broadcast)?

- A. 4, 48
- B. 48, 4
- C. 48, 1
- D. 1, 48
- E. 4, 1

Correct Answer: B

Section: LAN Switching Technologies

Explanation

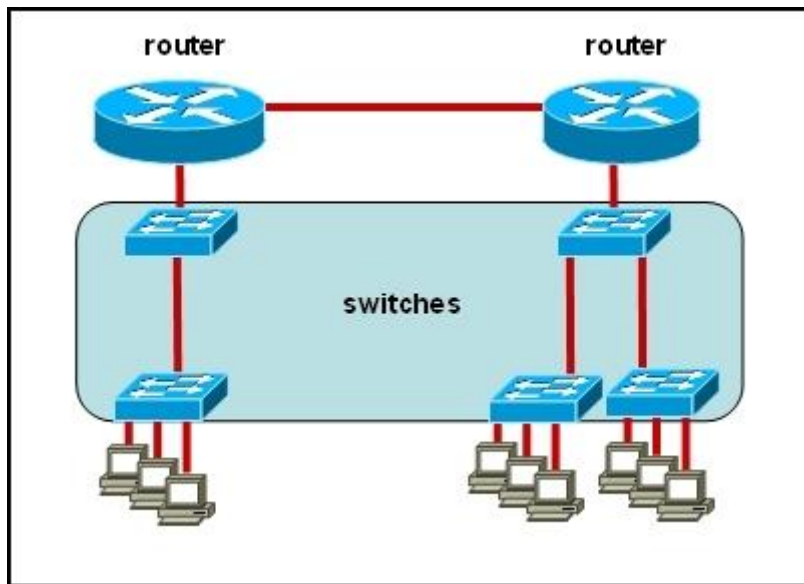
Explanation/Reference:

Explanation:

A switch uses a separate collision domain for each port, and each VLAN is a separate broadcast domain.

QUESTION 47

Refer to the exhibit.



All devices attached to the network are shown. How many collision domains are present in this network?

- A. 2
- B. 3
- C. 6
- D. 9
- E. 15

Correct Answer: E

Section: LAN Switching Technologies
Explanation

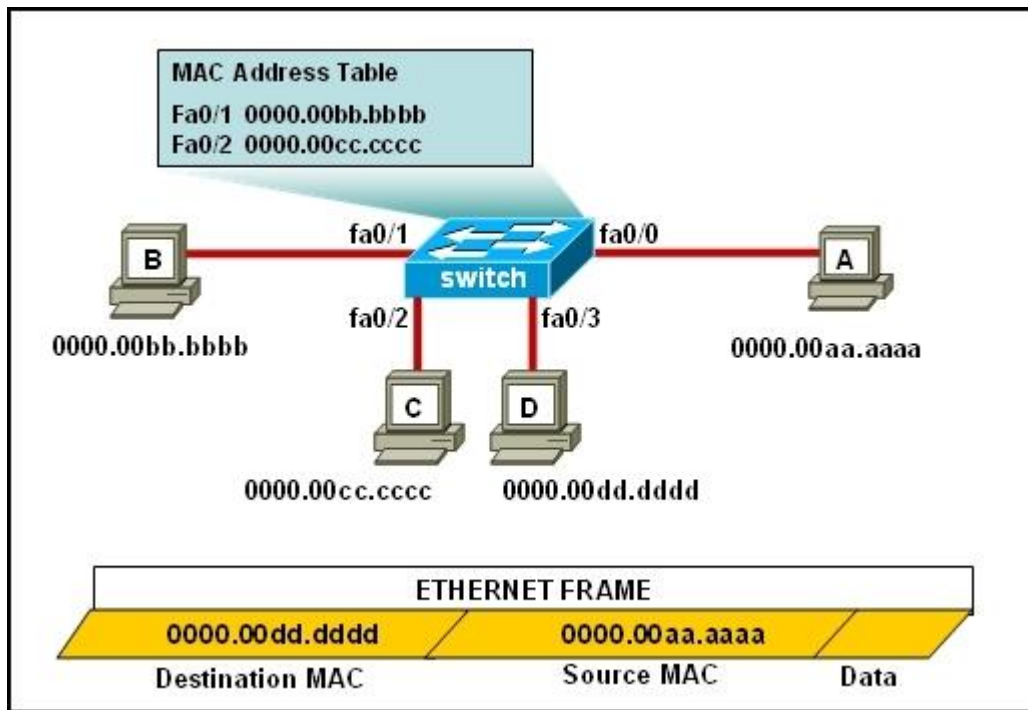
Explanation/Reference:

Explanation:

A switch uses a separate collision domain for each port so there are a total of 9 for each device shown. In addition to this, the switch to switch connections (3) are a separate collision domain. Finally, we add the switch to router connections (2) and the router to router connection (1) for a total of 15.

QUESTION 48

Refer to the exhibit.



The ports that are shown are the only active ports on the switch. The MAC address table is shown in its entirety. The Ethernet frame that is shown arrives at the switch.

What two operations will the switch perform when it receives this frame? (Choose two.)

A. The MAC address of 0000.00aa.aaaa will be added to the MAC address table.

- B. The MAC address of 0000.00dd.dddd will be added to the MAC address table.
- C. The frame will be forwarded out of port fa0/3 only.
- D. The frame will be forwarded out of fa0/1, fa0/2, and fa0/3.
- E. The frame will be forwarded out of all the active ports.

Correct Answer: AD

Section: LAN Switching Technologies

Explanation

Explanation/Reference:

Explanation:

If the switch already has the MAC address in its table for the destination, it will forward the frame directly to the destination port. If it was not already in its MAC table, then the frame would have been flooded out all ports except for the port that it came from. It will also add the MAC address of the source device to its MAC address table

QUESTION 49

How many simultaneous Telnet sessions does a Cisco router support by default?

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5
- F. 6

Correct Answer: E

Section: LAN Switching Technologies

Explanation

Explanation/Reference:

Explanation:

By default, Cisco routers support virtual terminal interfaces 0-4 (5 total) which are used for telnet sessions.

QUESTION 50

Refer to the exhibit.

Instructions
<p>This item contains several questions that you must answer. You can view these questions by clicking on the corresponding button to the left. Changing questions can be accomplished by clicking the numbers to the left of each question. In order to complete the questions, you will need to refer to the Exhibit.</p> <p>To gain access to the Exhibit, click on the Exhibit button at the bottom of the screen. When you have finished viewing the Exhibit, you can return to your questions by clicking on the Questions button to the left.</p> <p>Each of the windows can be minimized by clicking on the [-]. You can also reposition a window by dragging it by the title bar.</p>
Scenario
<p>Refer to the Exhibit. As the first step in verifying a local host configuration, a network technician issues the ipconfig /all command on a computer. Use the results of the command to answer the five questions shown on the Questions tab.</p>


```
Exhibit
C:\WINNT\system32\cmd.exe

Connection-specific DNS Suffix . : cisco.com
Description . . . . . : Intel(R) PRO/1000 MT Mobile

Physical Address. . . . . : 00-0D-60-FD-F0-34
DHCP Enabled. . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
IP Address. . . . . : 172.16.236.227
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 172.16.236.1
DHCP Server . . . . . : 172.16.3.2
DNS Servers . . . . . : 10.4.8.1
                       : 10.5.2.22
Primary WINS Server . . . . . : 10.69.2.87
Secondary WINS Server . . . . . : 10.69.235.228
Lease Obtained . . . . . : Monday, June 11, 2007 9:26:45 AM
Lease Expires . . . . . : Thursday, June 14, 2007 9:26:45 AM

Ethernet adapter Local Area Connection:

Media State . . . . . : Cable Disconnected
Description . . . . . : Cisco Systems Wireless LAN Adapter

Physical Address. . . . . : 00-0E-9B-48-86-2A
```

What two things can the technician determine by successfully pinging from this computer to the IP address 172.16.236.1? (Choose two)

- A. The network card on the computer is functioning correctly.
- B. The default static route on the gateway router is correctly configured.
- C. The correct default gateway IP address is configured on the computer.
- D. The device with the IP address 172.16.236.1 is reachable over the network.
- E. The default gateway at 172.16.236.1 is able to forward packets to the internet.

Correct Answer: AD

Section: LAN Switching Technologies

Explanation

Explanation/Reference:

Explanation:

The source and destination addresses are on the same network therefore, a default gateway is not necessary for communication between these two addresses.