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**Exam Code: 100-101**

**Exam Name: CCNA Interconnecting Cisco Networking Devices 1 (ICND1)**



**Sections**

1. Basic Cisco Networking
2. OSI Model
3. Protocols & Services
4. Router
5. Switch
6. OSPF
7. OSPF Hotspot LAB/SIM
8. Security
9. Subnetting
10. IP Routing
11. NAT/PAT
12. Troubleshooting
13. Drag and Drop

ICND1 100-101

### QUESTION 1

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:** Basic Cisco Networking

**Explanation**

**Explanation/Reference:**

**Explanation:**

CSMA/CD stands for Carrier Sense Multiple Access with Collision Detection. In an Ethernet LAN, before transmitting, a computer first listens to the network media. If the media is idle, the computer sends its data. If the media is not idle (another station is talking), the computer must wait for some time.

When a station transmits, the signal is referred to as a carrier. Carrier Sense means that before a station can send data onto an Ethernet wire, it have to listen to see if another "carrier" (of another station) is present. If another station is talking, this station will wait until there is no carrier present.

Multiple Access means that stations can access the network at any time. It is opposed to Token-Ring network where a station must have the "token" so that it can send data.

Although Carrier Sense help two stations not send data at the same time but sometimes two stations still send data at the same time! This is because two stations listen for network traffic, hear none, and transmit simultaneously -> a collision occurs and both stations must retransmit at some later time. Collision Detection is the ability of the media to detect collisions to know that they must retransmit.

Basically, the CSMA/CD algorithm can be summarized as follows:

- + A device that wants to send a frame must wait until the LAN is silent (no one is "talking")
- + If a collision still occurs, the devices that caused the collision wait a random amount of time and then try to send data again.

**Note:** A switch separates each station into its own collision domain. It means that station can send data without worrying its data is collided with the data of other stations. It is as opposed to a hub which can cause collision between stations connected to it.

**QUESTION 2**

On a live network, which commands will verify the operational status of router interfaces? (Choose two)

- A. Router#show interfaces
- B. Router#show ip protocols
- C. Router#debug interface
- D. Router#show ip interface brief
- E. Router#show start

**Correct Answer:** AD

**Section:** Basic Cisco Networking

**Explanation**

**Explanation/Reference:**

Only two commands “show interfaces” and “show ip interface brief” reveal the status of router interfaces (up/up, for example).

The outputs of two commands are shown below:

**Router#show interfaces**

**FastEthernet0/0 is administratively down, line protocol is down** (disabled)

Hardware is Lance, address is 0001.42e2.a401 (bia 0001.42e2.a401)

MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,

**Router#show ip interface brief**

Interface	IP-Address	OK?	Method	Status	Protocol
<b>FastEthernet0/0</b>	unassigned	YES	unset	<b>administratively down</b>	<b>down</b>
<b>FastEthernet0/1</b>	unassigned	YES	unset	<b>administratively down</b>	<b>down</b>
<b>Vlan1</b>	unassigned	YES	unset	<b>administratively down</b>	<b>down</b>

**QUESTION 3**

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:** Basic Cisco Networking

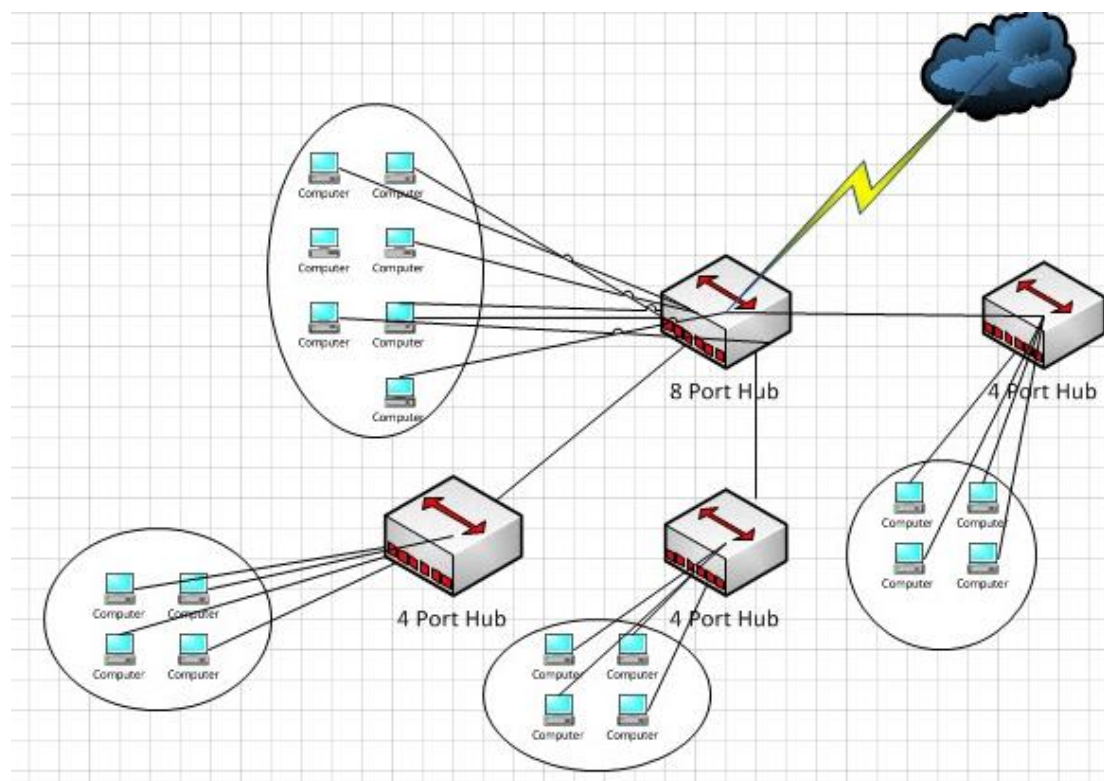
**Explanation**

**Explanation/Reference:**

**HTTP is based on TCP** connection so a TCP connection must be established first between the workstation and the web server.

#### QUESTION 4

**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: Basic Cisco Networking**

**Explanation**

**Explanation/Reference:**

Hubs do not separate collision domains so if hub is used in the topology above, we will have only 1 collision domain.

Switches do separate collision domains so if hubs are replaced by switches, we would have 22 collision domains (19 collision domains for hosts and 3 collision domains among three switches).

Please notice that the WAN (serial) connection is not counted as a collision (or broadcast) domain.

#### **QUESTION 5**

If a host experiences intermittent issues that relate to congestion within a network while remaining connected, what could cause congestion on this LAN?

- A. half-duplex operation
- B. broadcast storms
- C. network segmentation
- D. multicasting

**Correct Answer: B**

**Section: Basic Cisco Networking**

**Explanation**

**Explanation/Reference:**

A broadcast storm can cause congestion within a network.

**Spanning-Tree Protocol** Helps us avoid Broadcast Storms

To provide for fault tolerance, many networks implement redundant paths between devices using multiple switches. However, providing redundant paths between segments causes packets to be passed between the redundant paths endlessly. This condition is known as a bridging loop.

(Note: the terms bridge, switch are used interchangeably when discussing STP)

To prevent bridging loops, the IEEE 802.1d committee defined a standard called the spanning tree algorithm (STA), or spanning tree protocol (STP). Spanning-Tree Protocol is a link management protocol that provides path redundancy while preventing undesirable loops in the network. For an Ethernet network to function properly, only one active path can exist between two stations.

Let's see a situation when there is no loop-avoidance process in operation. Suppose you have two switches connected with redundant links. One switch connected to PC A and the other switch connected to PC B.

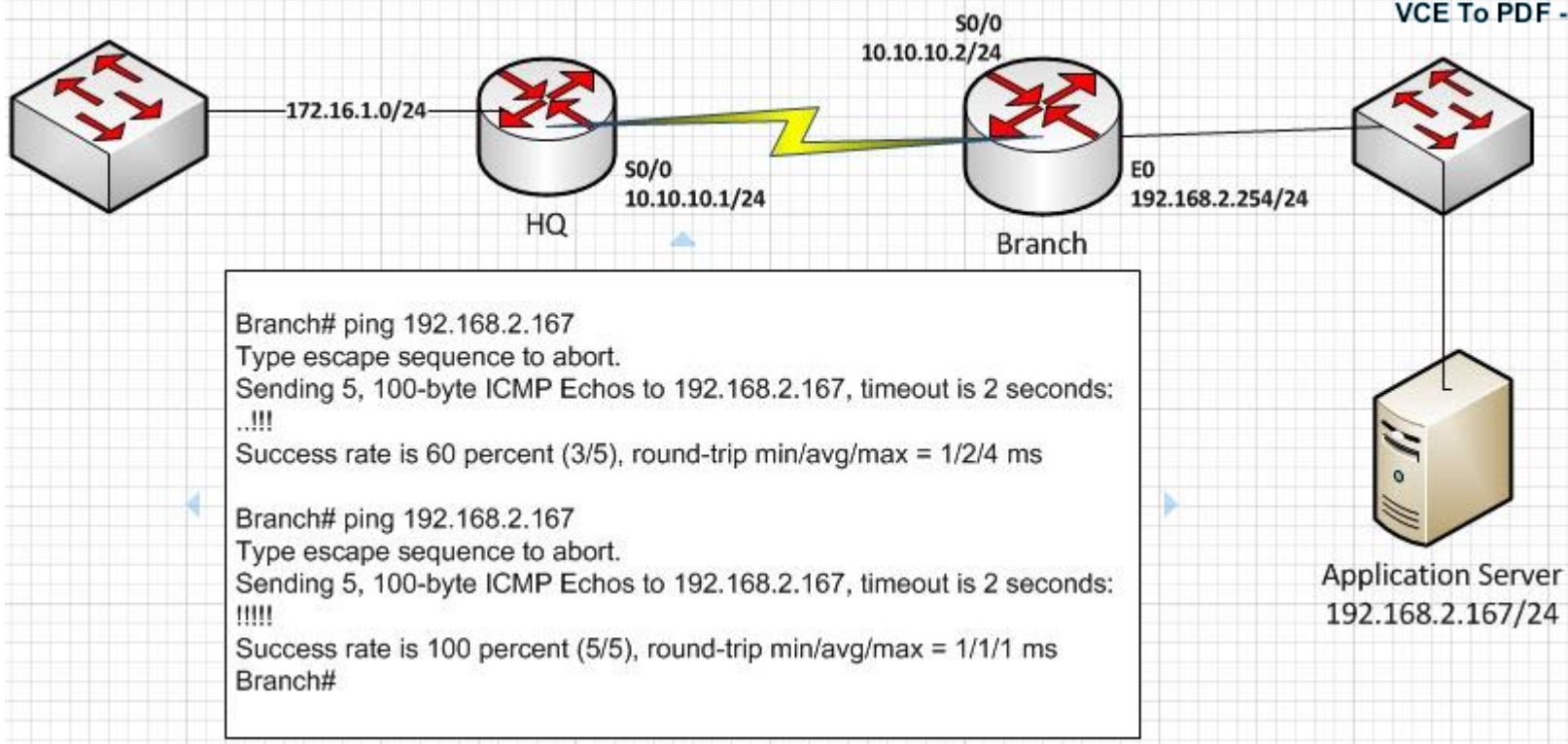
Now PC A wants to talk to PC B. It then sends a broadcast, say an Address Resolution Protocol (ARP) to find out where the location of PC B, the green arrow shows a broadcast frame sent by PC A.

When the switch A receives a broadcast frame, it forwards that frame to all ports except the port where it receives the request -> SwA forwards that ARP frame out of fa0/0 and fa0/1 ports.



#### QUESTION 6

**Refer to the exhibit.** The network administrator is testing connectivity from the branch router to the newly installed application server. What is the most likely reason for the first ping having a success rate of only 60 percent?



- A. The network is likely to be congested, with the result that packets are being intermittently dropped.
- B. The branch router had to resolve the application server MAC address.
- C. There is a short delay while NAT translates the server IP address.
- D. A routing table lookup delayed forwarding on the first two ping packets.
- E. The branch router LAN interface should be upgraded to FastEthernet.

**Correct Answer:** B

**Section:** Basic Cisco Networking

**Explanation**

**Explanation/Reference:**

Before a host can send ICMP (ping) packets to another device, it needs to learn the MAC address of the destination device so it first sends out an ARP Request.

In fact, the first ping packet is dropped because the router cannot create a complete packet without learning the destination MAC address.

**QUESTION 7**

An administrator is in the process of changing the configuration of a router. What command will allow the administrator to check the changes that have been made prior to saving the new configuration?

- A. Router# show startup-config
- B. Router# show current-config
- C. Router# show running-config
- D. Router# show memory
- E. Router# show flash
- F. Router# show processes

**Correct Answer:** C

**Section:** Basic Cisco Networking

**Explanation**

**Explanation/Reference:**

The “show running-config” command displays active configuration in memory.

**QUESTION 8**

Which IOS command is used to initiate a login into a VTY port on a remote router?

- A. router# login
- B. router# telnet
- C. router# trace
- D. router# ping
- E. router(config)# line vty 0 5
- F. router(config-line)# login

**Correct Answer:** B

**Section:** Basic Cisco Networking

**Explanation**

**Explanation/Reference:**

VTY ports on Cisco devices are used for remote access into the Device.

This is normally done through Telnet or SSH.

Among the options above we only see Telnet, since there is no selection for SSH the correct answer is Telnet.



**QUESTION 9**

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 pre-configured 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:** Basic Cisco Networking

**Explanation**

**Explanation/Reference:**

Full-duplex communication allows both sending and receiving of data simultaneously.

Switches provide full-duplex communication capability.

Half-duplex communication only allows data transmission in only one direction at a time (either sending or receiving).

**QUESTION 10**

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:** Basic Cisco Networking

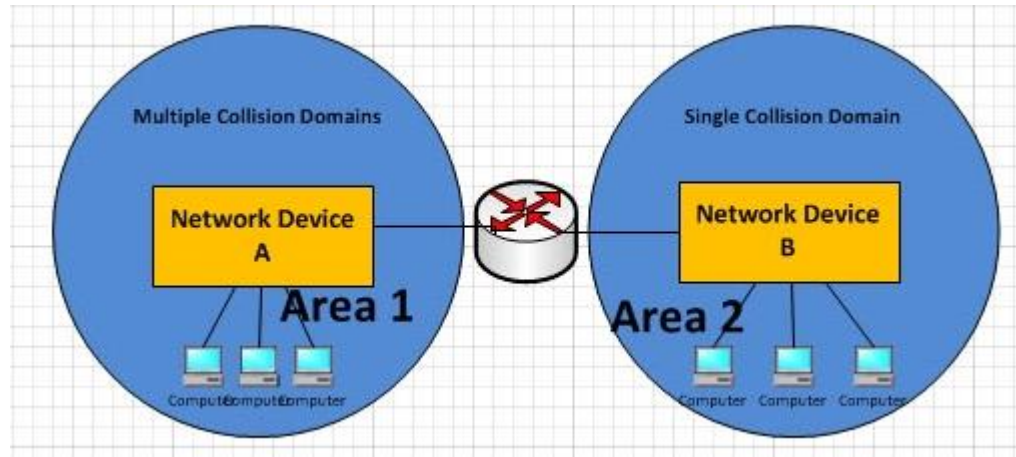
**Explanation**

**Explanation/Reference:**

Only a router or a Layer 3 switch can mitigate a broadcast storm because they separate broadcast domains -> B and D are correct.

**QUESTION 11**

**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:** Basic Cisco Networking

**Explanation**

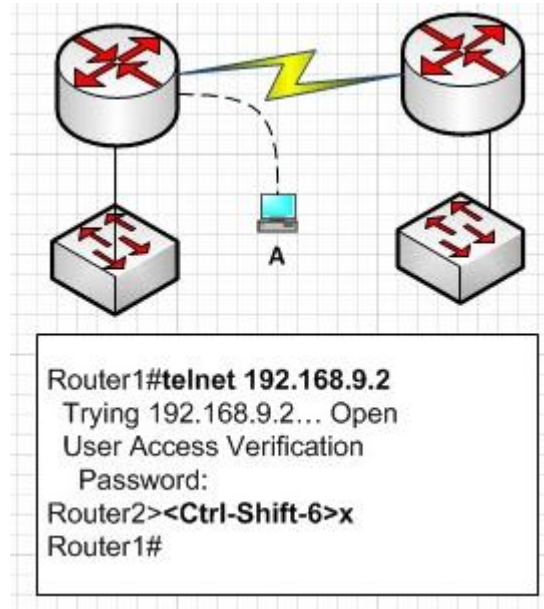
**Explanation/Reference:**

AREA 1 has "multiple collision domains" so Network Device A must be a device operating in Layer 2 or above (a router or switch) -> A & E are correct.

AREA 2 only has "single collision domain" so Network Device B must be a device operating in Layer 1 (a hub or repeater) -> D is correct

#### QUESTION 12

**Refer to the exhibit.** If the resume command is entered after the sequence that is shown in the exhibit, which router prompt will be displayed?



- A. Router1>
- B. Router1#
- C. Router2>
- D. Router2#

**Correct Answer: C**

**Section: Basic Cisco Networking**

**Explanation**

**Explanation/Reference:**

The "Ctrl-Shift-6" and "x" is used to suspend the telnet session. In this case, the telnet session from Router1 to Router2 will be suspended.

If we enter the keyword "resume", Router1 will try to resume the telnet session to Router2 (you will see the line [Resuming connection 1 to 192.168.9.2 ... ]) and we will get back the Router2> prompt.

### QUESTION 13

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

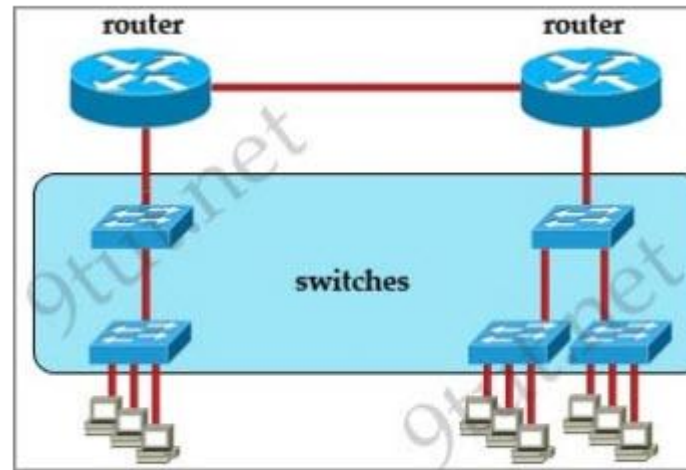


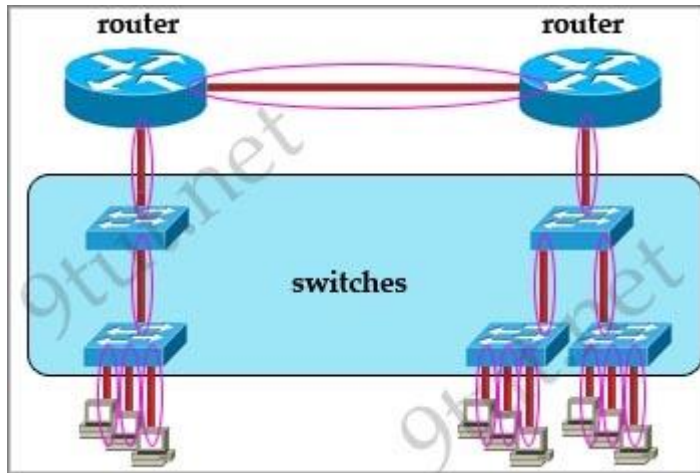
Image provided by [www.9tut.net](http://www.9tut.net)

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

**Correct Answer:** E  
**Section:** Basic Cisco Networking  
**Explanation**

**Explanation/Reference:**

In the topology above only routers and switches are used so for each link we have one collision domains. In the picture below each pink ellipse represents for one collision domain.



**QUESTION 14**

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: OSI Model**

**Explanation**

**Explanation/Reference:**

**Layer 3 – Network layer**

This layer provides logical addresses which routers will use to determine the path to the destination. In most cases, the logic addresses here means the IP addresses (including source & destination IP addresses).

9tut.net OSI [Tutorial](#)

**QUESTION 15**

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:** OSI Model

**Explanation**

**Explanation/Reference:**

CDP runs at Layer 2 (Data Link) of the OSI model -> E is correct

The Cisco Discovery Protocol (CDP) is a proprietary Data Link Layer protocol developed by Cisco Systems. It is used to share information about other directly connected Cisco equipment, such as the operating system version and IP address. CDP can also be used for On-Demand Routing, which is a method of including routing information in CDP announcements so that dynamic routing protocols do not need to be used in simple networks.

#### **QUESTION 16**

What are two common TCP applications? (Choose two)

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

**Correct Answer:** BD

**Section:** OSI Model

**Explanation**

**Explanation/Reference:**

SMTP stands for Simple Mail Transfer Protocol. It's a set of communication guidelines that allow software to transmit email over the Internet while File Transfer Protocol (FTP) is a standard network protocol used to transfer files from one host to another host over TCP-based network.

**Note:** Simple Network Management Protocol (SNMP) uses UDP as the transport protocol for passing data between managers and agents. SNMP uses UDP to help reduce the impact on your network's performance. Although SNMP can be configured to run on TCP but we should only do it in special situations. SNMP uses the UDP port 161 for sending and receiving requests, and port 162 for receiving traps from managed devices.

DNS work on both the TCP and UDP protocols. DNS uses TCP for zone exchanges between servers and UDP when a client is trying to resolve a hostname to an IP address. Therefore in most cases we say "DNS uses UDP".

**QUESTION 17**

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:** AB

**Section:** OSI Model

**Explanation**

**Explanation/Reference:**

The primary function of an access-layer is to provide network access to the end user.

Advances in routing protocols and campus hardware have made it viable to deploy a routing protocol in the access layer switches and utilize an L3 point-to-point routed link between the access and distribution layer switches.

The hardware and software attributes of the access layer that support high availability include security services for additional security against unauthorized access to the network through the use of tools such as 802.1x, port security, DHCP snooping, Dynamic ARP Inspection, and IP Source Guard.

**Reference:**

[Campus Network for High Availability Design Guide](#)

**QUESTION 18**

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

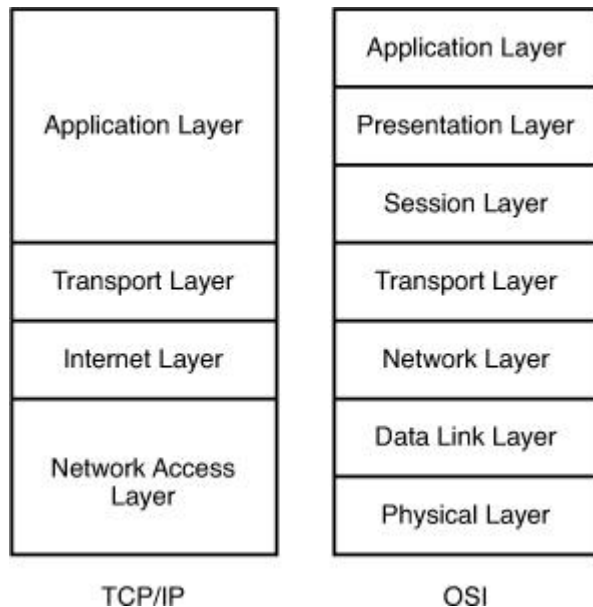
**Correct Answer:** D

**Section:** OSI Model

**Explanation**

**Explanation/Reference:**

The picture below compares the two TCP/IP and OSI models:



**QUESTION 19**

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:** D

**Section:** OSI Model

**Explanation**

**Explanation/Reference:**

**Transmission Control Protocol (TCP)** has all the features mentioned above and TCP resides in Transport Layer (Layer 4) of the OSI model.

**Flow control:** A methodology used to ensure that receiving units are not overwhelmed with data from sending devices when buffers at a receiving unit are full, a message is transmitted to the sending unit to temporarily halt transmissions until all the data in the receiving buffer has been processed and the buffer is again ready for action.






**Sequencing:** is used to number segments before sending so they can be put back together again in the correct order at the receiving side.



**Acknowledgment:** When the receiver gets the data, it sends a response telling the sender that the data have been safely arrived.

**QUESTION 20**

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

- A.  Bridge
- B.  Hub
- C.  NIC
- D.  Router
- E.  Switch

**Correct Answer:** B

**Section:** OSI Model

**Explanation**

**Explanation/Reference:**

In CCNA, the popular devices operate in Layer 1 are hub and repeater.

**QUESTION 21**

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:** Protocols & Services

**Explanation**

**Explanation/Reference:**

File Transfer Protocol (FTP) is a standard network protocol used to transfer files from one host to another host over TCP-based network, such as the Internet.

**QUESTION 22**

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: Protocols & Services**

**Explanation**

**Explanation/Reference:**

Cisco Discovery Protocol (CDP) is a proprietary protocol of Cisco so if you can see the VoIP phone via the “show cdp neighbors” command on a Cisco switch then that phone is from Cisco.

**QUESTION 23**

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: Protocols & Services**

**Explanation**

**Explanation/Reference:**

User Datagram Protocol (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.

UDP is typically used by programs that transmit small amounts of data at one time or have real-time requirements (voice, for example).

**QUESTION 24**

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:** Protocols & Services

**Explanation**

**Explanation/Reference:**

CDP is a device discovery protocol that runs over Layer 2. We can view the CDP information with the show cdp neighbors command (thus the provided information is at layer 2), notice this command only shows information about directly connected devices.

**The output of the show cdp neighbors command is shown below:**

R-CENTER# show cdp neighbors

Device ID	Local Interface	Holdtme	Capability	Platform	Port ID
Birmingham	Fas 0/0	151	R S	2514	E1
Relmap	Fas 0/1	150	R S	2621	Fa0/0
Boaz	Ser 0/0	137	R S	2501	S0
Atlanta	Ser 0/1	126	R S	2620	S0/1

**There are 3 columns you must pay attention to:**

- \* Local interface: type & ID of the local interface on which CDP information of the neighbor were received.
- \* Device platform: the neighboring device model.
- \* Port ID: the connected interface of the neighbor.

#### QUESTION 25

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:** Protocols & Services

**Explanation**

**Explanation/Reference:**

After resolving a browser URL to an IP address (via DNS server), the workstation must learn the MAC address of the server so that it can create a complete packet (a complete packet requires destination MAC and IP address, source MAC and IP address). Therefore the workstation must use ARP to find out the MAC address from the IP address.

**QUESTION 26**

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:** Protocols & Services

**Explanation**

**Explanation/Reference:**

Before two computers can communicate over TCP, they must synchronize their initial sequence numbers (ISN) -> B is correct.

TCP uses a sequence number to identify each byte of data. The sequence number identifies the order of the bytes sent from each computer so that the data can be reconstructed in order, regardless of any fragmentation, disordering, or packet loss that may occur during transmission -> D is correct

**QUESTION 27**

**Refer to the exhibit.** The two routers have had their startup configurations cleared and have been restarted. At a minimum, what must the administrator do to enable CDP to exchange information between R1 and R2?



- A. Configure the router with the cdp enable command.
- B. Enter no shutdown commands on the R1 and R2 fa0/1 interfaces.
- C. Configure IP addressing and no shutdown commands on both the R1 and R2 fa0/1 interfaces.
- D. Configure IP addressing and no shutdown commands on either of the R1 or R2 fa0/1 interfaces.

**Correct Answer:** B

**Section:** Protocols & Services

**Explanation**

**Explanation/Reference:**

By default CDP is enabled on Cisco routers -> A is not correct.

CDP runs at Layer 2 in the OSI model and it does not need an IP address to run -> C & D are not correct.

#### **QUESTION 28**

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:** Protocols & Services

**Explanation**

**Explanation/Reference:**

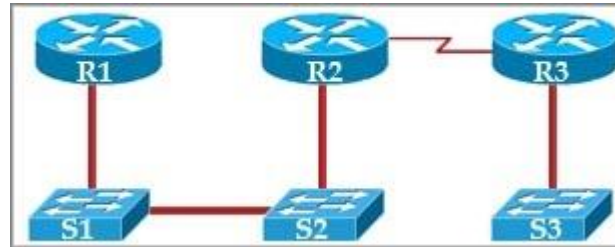
Tracert (or traceroute) is used to trace the path between the sender and the destination host. Traceroute works by sending packets with gradually increasing Time-to-Live (TTL) value, starting with TTL value = 1. The first router receives the packet, decrements the TTL value and drops the packet because it then has TTL value zero. The router sends an ICMP Time Exceeded message back to the source. The next set of packets are given a TTL value of 2, so the first router forwards the packets, but the second router drops them and replies with ICMP Time Exceeded. Proceeding in this way, traceroute uses the returned ICMP Time Exceeded messages to build a list of routers that packets traverse, until the destination is reached and returns an ICMP Echo Reply message -> C is correct.

ICMP is encapsulated in an IP packet. In particular, the ICMP message is encapsulated in the IP payload part of an IP datagram -> D is correct.

Note: The TRACERT command on Windows Operating System uses ICMP while MAC OS X and Linux TRACEROUTE use UDP.

#### **QUESTION 29**

**Refer to the exhibit.** If CDP is enabled on all devices and interfaces, which devices will appear in the output of a show cdp neighbors command issued from R2?



- A. R2 and R3
- B. R1 and R3
- C. R3 and S2
- D. R1, S1, S2, and R3
- E. R1, S1, S2, R3, and S3

**Correct Answer:** C

**Section:** Protocols & Services

**Explanation**

**Explanation/Reference:**

CDP runs at Layer 2 so it can recognize a switch (if that switch also runs CDP).

### QUESTION 30

Which two of these functions do routers perform on packets? (Choose two)

- A. examine the Layer 2 headers of inbound packets and use that information to determine the next hops for the packets
- B. update the Layer 2 headers of outbound packets with the MAC addresses of the next hops
- C. examine the Layer 3 headers of inbound packets and use that information to determine the next hops for the packets
- D. examine the Layer 3 headers of inbound packets and use that information to determine the complete paths along which the packets will be routed to their ultimate destinations
- E. update the Layer 3 headers of outbound packets so that the packets are properly directed to valid next hops
- F. update the Layer 3 headers of outbound packets so that the packets are properly directed to their ultimate destinations

**Correct Answer:** BC

**Section:** Router

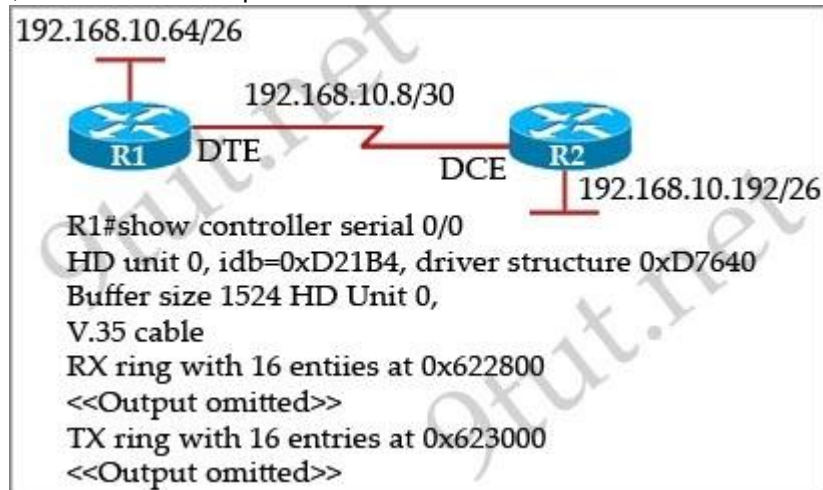
**Explanation**

**Explanation/Reference:**

When packets travel through many routers, the **source and destination IP addresses do not change** but the **source and destination MAC do change**

**QUESTION 31**

**Refer to the exhibit.** An administrator cannot connect from R1 to R2. To troubleshoot this problem, the administrator has entered the command shown in the exhibit. Based on the output shown, what could be the problem?



- A. The serial interface is configured for half duplex.
- B. The serial interface does not have a cable attached.
- C. The serial interface has the wrong type of cable attached.
- D. The serial interface is configured for the wrong frame size.
- E. The serial interface has a full buffer.

**Correct Answer:** C

**Section:** Router

**Explanation**

**Explanation/Reference:**

The output above is unclear. Normally when we use this command we can see the type of serial connection on this interface, for example "V.35 DCE cable. Below is an example of the same command as above:



```
RouterA#show controllers serial 0  
HD unit 0, idb = 0xECA4C, driver structure at 0xF1EC8  
buffer size 1524 HD unit 0, V.35 DTE cable  
cpb = 0x62, eda = 0x403C, cda = 0x4050  
RX ring with 16 entries at 0x624000  
00 bd_ptr=0x4000 pak=0x0F5704 ds=0x62FFB8 status=80 pak_size=22
```

Or

```
RouterB#show controllers serial 0  
buffer size 1524 HD unit 0, V.35 DCE cable, clockrate 64000  
cpb = 0x62, eda = 0x408C, cda = 0x40A0  
RX ring with 16 entries at 0x624000  
00 bd_ptr=0x4000 pak=0x0F2F04 ds=0x627908 status=80 pak_size=22
```

but in this case we only get "V.35 cable". So in fact we are not sure about the answer C. But the output above also does not have any information to confirm other answers are correct or not.

Just for your information, the V.35 male and V.35 female cable are shown below:



#### QUESTION 32



What two things does a router do when it forwards a packet? (Choose two)

- A. switches the packet to the appropriate outgoing interfaces
- B. computes the destination host address
- C. determines the next hop on the path
- D. updates the destination IP address
- E. forwards ARP requests

**Correct Answer:** AC

**Section:** Router

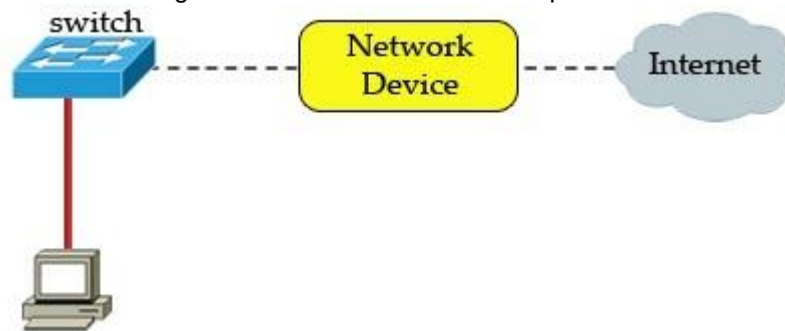
**Explanation**

**Explanation/Reference:**

When packets travel through many routers, the source and destination IP addresses do not change but the source and destination MAC do change.

### QUESTION 33

**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:** Router

**Explanation**

**Explanation/Reference:****QUESTION 34**

Which two commands will display the current IP address and basic Layer 1 and 2 status of an interface? (Choose two)

- A. Router#show version
- B. Router#show ip interface
- C. Router#show protocols
- D. Router#show controllers
- E. Router#show running-config

**Correct Answer:** BC

**Section:** Router

**Explanation**

**Explanation/Reference:**

The outputs of "show protocols" and "show ip interface" are shown below:

Global values:

Internet Protocol routing is enabled  
Serial0/0 is up, line protocol is down  
Internet address is 10.1.1.1/30  
Serial0/1 is up, line protocol is down  
Internet address is 209.65.200.225/30  
Serial0/2 is up, line protocol is down  
Serial0/3 is up, line protocol is down  
NV10 is up, line protocol is up  
Interface is unnumbered. Using address of NV10 (0.0.0.0)  
Loopback0 is up, line protocol is up  
Internet address is 10.1.10.1/32  
Loopback1 is up, line protocol is up  
Internet address is 10.1.2.1/27  
Loopback6 is up, line protocol is up

Serial0/0 is up, line protocol is down  
Internet address is 10.1.1.1/30  
Broadcast address is 255.255.255.255  
Address determined by non-volatile memory  
MTU is 1500 bytes  
Helper address is not set  
Directed broadcast forwarding is disabled  
Multicast reserved groups joined: 224.0.0.5  
Outgoing access list is not set  
Inbound access list is not set  
Proxy ARP is enabled  
Local Proxy ARP is disabled  
Security level is default  
Split horizon is disabled  
ICMP redirects are always sent  
ICMP unreachable are always sent  
ICMP mask replies are never sent  
IP fast switching is enabled  
IP fast switching on the same interface is enabled  
IP Flow switching is disabled  
IP CEF switching is disabled  
IP Feature Fast switching turbo vector  
IP multicast fast switching is enabled  
IP multicast distributed fast switching is disabled  
IP route-cache flags are Fast  
Route Discovery is disabled

**QUESTION 35**

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

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

**Correct Answer:** B

**Section:** Switch

**Explanation**

**Explanation/Reference:**

Each port on a switch is a collision domain while each VLAN is a broadcast domain because broadcast is only forwarded within that VLAN so we have 48 collision domains and 4 broadcast domains on this switch (if all ports are used).

**QUESTION 36**

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:** Switch

**Explanation**

**Explanation/Reference:**

How Switches Learn Addresses

A switch uses its bridge forwarding table (called a MAC table in Catalyst) address table when forwarding frames to devices. With an empty bridge forwarding table, the switch must flood frames to all ports other than the one it arrived on. This is the least-efficient way to transmit data. Initially, the switch MAC address table is empty. Then Station A with the MAC address sends a frame to station C. When the switch receives this frame, it does the following:

- Because the MAC table is empty, the switch must flood the frame to all other ports (except E0, the frame origin).
- The switch notes the source address of the originating device and associates it with port E0 in its MAC address table entry. Note that the table uses

the source address to populate the table, not the destination address.

The switch continues to learn addresses in this manner, continually updating the table. As the MAC table becomes more complete, the switching becomes more efficient, because frames are filtered to specific ports rather than being flooded out all ports.

#### **QUESTION 37**

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:** Switch

**Explanation**

#### **Explanation/Reference:**

When a switch receives a frame, it first checks for the destination MAC address and tries to find a matching entry in its MAC address table. If found, the switch then forwards that frame on the corresponding port associated with that MAC address. If no entry is found, the switch will flood that frame out of all (active) ports except the port that sent it.

#### **QUESTION 38**

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:** Switch

**Explanation**

#### **Explanation/Reference:**

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

#### **QUESTION 39**

What is the purpose of assigning an IP address to a switch?

- A. provides local hosts with a default gateway address
- B. allows remote management of the switch
- C. allows the switch to respond to ARP requests between two hosts
- D. ensures that hosts on the same LAN can communicate with each other

**Correct Answer:** B

**Section:** Switch

**Explanation**

**Explanation/Reference:**

On a router we configure the IP address on the physical interface, however on a switch the physical interfaces are running at Layer 2 and hence don't have IP addresses configured on them.

Even though a switch does not need an IP address to be able to switch packets, in order for you to connect to the switch via telnet or SSH you need to have a management IP address configured. Similarly, if you are connecting to the switch from a different subnet, the switch will require a default-gateway in order to have the packets routed back to you.

Since the IP address is not bound to any physical interface on the switch, we need to bind it to a logical interface. On a switch the logical interface is known as a 'vlan interface' (VLAN – Virtual LAN). This is similar to a loopback interface found on a Cisco router.

#### **QUESTION 40**

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:** Switch

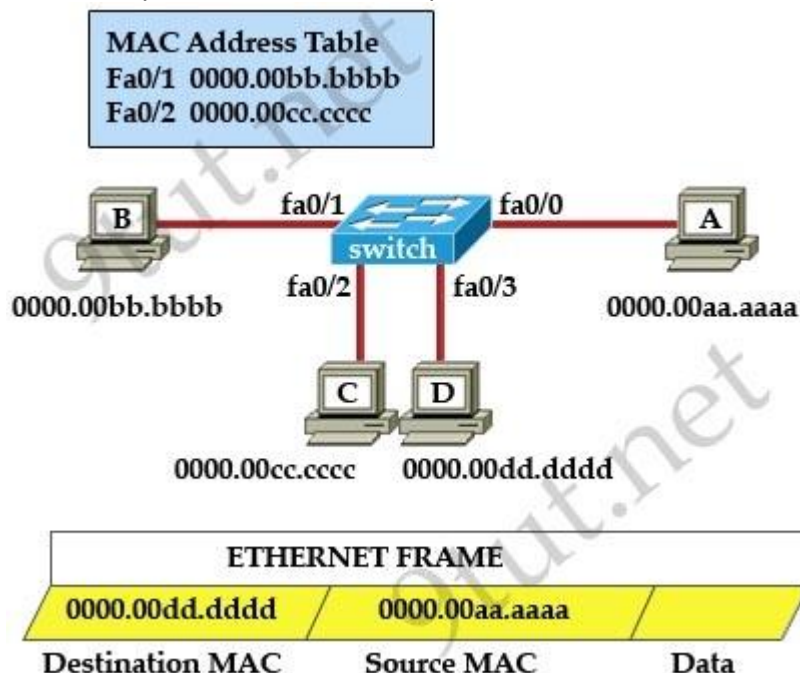
**Explanation**

**Explanation/Reference:**

A hub is not as "intelligent" as a switch because a hub does not try to remember anything passing to it. It just floods out all the ports (except the one that sent it) when it receives a frame.

**QUESTION 41**

**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 port fa0/3 only.
- D. The frame will be forwarded out fa0/1, fa0/2, and fa0/3.
- E. The frame will be forwarded out all the active ports.

**Correct Answer:** AD

**Section:** Switch

**Explanation**

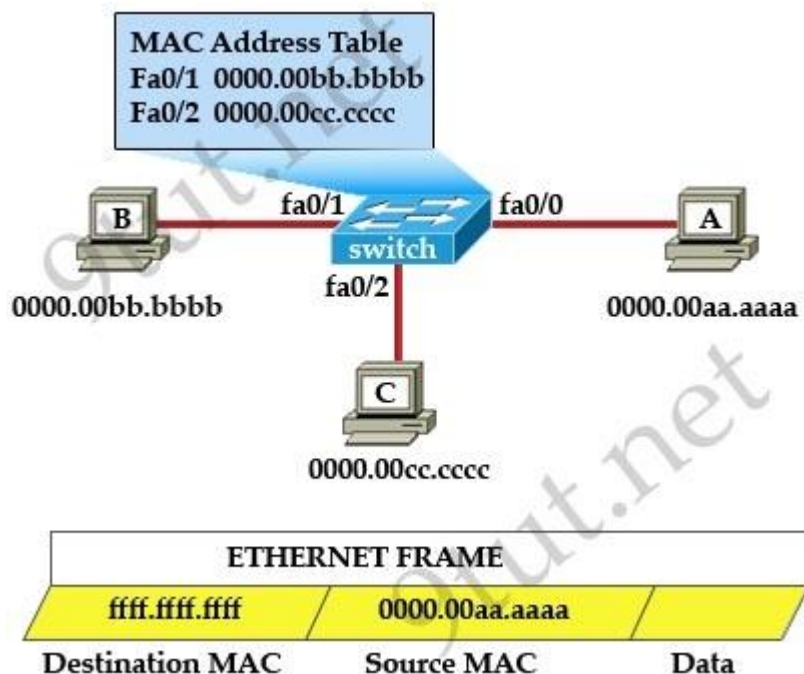
**Explanation/Reference:**

When a switch receives a frame, it first checks for the destination MAC address and tries to find a matching entry in its MAC address table. If found, the switch then forwards that frame on the corresponding port associated with that MAC address. If no entry is found, the switch will flood that frame out of all active ports except the port that sent it. In this case, the destination MAC address 0000.00dd.dddd has not been in the MAC address table so the switch will flood the frame out all of its ports except fa0/0 (the port that it received the frame) -> D is correct.

Also, the switch learns that the MAC address 0000.00aa.aaaa is received on fa0/0 -> the switch adds 0000.00aa.aaaa and its corresponding port fa0/0 to the MAC address table -> A is correct.

#### QUESTION 42

**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 fff.fff.fff will be added to the MAC address table.
- D. The frame will be forwarded out all active switch ports except for port fa0/0.
- E. The frame will be forwarded out fa0/0 and fa0/1 only.
- F. The frame will be forwarded out all the ports on the switch.

**Correct Answer:** BD

**Section:** Switch

**Explanation**

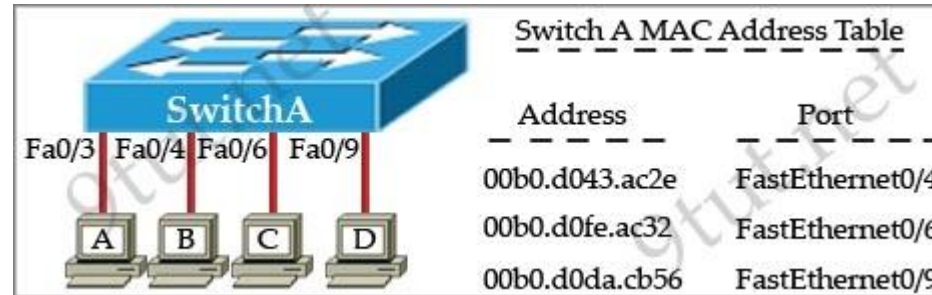


**Explanation/Reference:**

The destination MAC address is ffff.ffff.ffff so this is a broadcast frame so the switch will forward the frame out all active switch ports except for port fa0/0.

**QUESTION 43**

**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

**Correct Answer:** A

**Section:** Switch

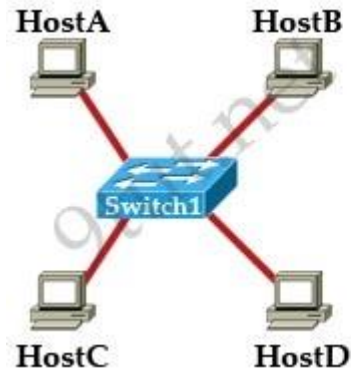
**Explanation**

**Explanation/Reference:**

In this case the destination MAC address has been learned so the switch just forwards the frame to the corresponding port. It also learn that the source MAC address of host A has not been existed in the MAC address table so it will add it (and port fa0/3) to its MAC address table.

**QUESTION 44**

**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?



Switch1 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	01-00-CD-22-03-14	0/2

- 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:** Switch

**Explanation**

**Explanation/Reference:**

#### QUESTION 45

Refer to the exhibit. 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?

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

- 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:** B

**Section:** Switch

**Explanation**

**Explanation/Reference:**

#### QUESTION 46

Which of the following describe the process identifier that is used to run OSPF on a router? (Choose two)

- A. It is locally significant.
- B. It is globally significant.
- C. It is needed to identify a unique instance of an OSPF database.
- D. It is an optional parameter required only if multiple OSPF processes are running on the router.
- E. All routers in the same OSPF area must have the same process ID if they are to exchange routing information.

**Correct Answer:** AC

**Section:** OSPF

**Explanation**

**Explanation/Reference:**

[OSPF tutorial](#)

#### **QUESTION 47**

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).

What is the default administrative distance of the OSPF routing protocol?

- A. 90
- B. 100
- C. 110
- D. 20
- E. 130
- F. 170

**Correct Answer:** C

**Section:** OSPF

**Explanation**

**Explanation/Reference:**

[OSPF tutorial](#)

#### **QUESTION 48**

Which statements describe the routing protocol OSPF? (Choose three)

- A. It supports VLSM.
- B. It is used to route between autonomous systems.
- C. It confines network instability to one area of the network.
- D. It increases routing overhead on the network.
- E. It allows extensive control of routing updates.
- F. It is simpler to configure than RIPv2.

**Correct Answer:** ACE

**Section:** OSPF

**Explanation**

**Explanation/Reference:**

Answer A and C are obviously correct. For answer E, it allows extensive control of routing updates via Link-State Advertisement (LSA). Administrators can filter these LSAs to meet their requirements easily.

[OSPF tutorial](#)

**QUESTION 49**

R1 is unable to establish an OSPF neighbor relationship with R3. What are possible reasons for this problem? (Choose two)



- A. All of the routers need to be configured for backbone Area 1.
- B. R1 and R2 are the DR and BDR, so OSPF will not establish neighbor adjacency with R3.
- C. A static route has been configured from R1 to R3 and prevents the neighbor adjacency from being established.
- D. The hello and dead interval timers are not set to the same values on R1 and R3.
- E. EIGRP is also configured on these routers with a lower administrative distance.
- F. R1 and R3 are configured in different areas.

**Correct Answer:** DF

**Section:** OSPF

**Explanation**

**Explanation/Reference:**

A is not correct because the backbone area of OSPF is always Area 0.

B is not correct because R1 or R3 must be the DR or BDR -> it has to establish neighbor adjacency with the other.

C is not correct because OSPF neighbor relationship is not established based on static routing. It uses multicast address 224.0.0.5 to establish OSPF neighbor relationship.

E is not correct because configure EIGRP on these routers (with a lower administrative distance) will force these routers to run EIGRP, not OSPF.

D and F are correct because these entries must match on neighboring routers:

- Hello and dead intervals
- Area ID (Area 0 in this case)
- Authentication password
- Stub area flag

**QUESTION 50**

Which address are OSPF hello packets addressed to on point-to-point networks?

- A. 224.0.0.5
- B. 172.16.0.1
- C. 192.168.0.5
- D. 223.0.0.1
- E. 254.255.255.255

**Correct Answer:** A

**Section:** OSPF

**Explanation**

**Explanation/Reference:**

[OSPF tutorial](#)

**QUESTION 51**

RouterD# show ip interface brief

Interface	IP-Address	OK?	Method	Status	Protocol
FastEthernet0/0	192.160.5.3	YES	manual	up	up
FastEthernet0/1	10.1.1.2	YES	manual	up	up
Loopback0	172.16.5.1	YES	NVRAM	up	up
Loopback1	10.154.154.1	YES	NVRAM	up	up

Given the output for this command, if the router ID has not been manually set, what router ID will OSPF use for this router?

- A. 10.1.1.2
- B. 10.154.154.1
- C. 172.16.5.1
- D. 192.168.5.3

**Correct Answer:**

**Section:** OSPF

### Explanation

#### Explanation/Reference:

The highest IP address of all loopback interfaces will be chosen -> Loopback 0 will be chosen as the router ID.

[OSPF tutorial](#)

### QUESTION 52

ROUTER# show ip route

```
192.168.12.0/24 is variably subnetted, 9 subnets, 3 masks
C 192.168.12.64 /28 is directly connected, Loopback1
C 192.168.12.32 /28 is directly connected, Ethernet0
C 192.168.12.48 /28 is directly connected, Loopback0
O 192.168.12.236 /30 [110/128] via 192.168.12.233, 00:35:36, Serial0
C 192.168.12.232 /30 is directly connected, Serial0
O 192.168.12.245 /30 [110/782] via 192.168.12.233, 00:35:36, Serial0
O 192.168.12.240 /30 [110/128] via 192.168.12.233, 00:35:36, Serial0
O 192.168.12.253 /30 [110/782] via 192.168.12.233, 00:35:37, Serial0
O 192.168.12.249/30 [110/782] via 192.168.12.233, 00:35:37, Serial0
O 192.168.12.240/30 [110/128] via 192.168.12.233, 00:35:36, Serial0
```

To what does the **128** refer to in the router output above?

- A. OSPF cost
- B. OSPF priority
- C. OSPF hop count 5
- D. OSPF ID number
- E. OSPF administrative distance

**Correct Answer:** A

**Section:** OSPF

### Explanation

#### Explanation/Reference:

OSPF uses a metric referred to as cost. The cost of the entire path is the sum of the costs of the outgoing interfaces along the path. Cisco uses a simple formula to calculate OSPF cost:

OSPF cost = 108 / Bandwidth (byte)

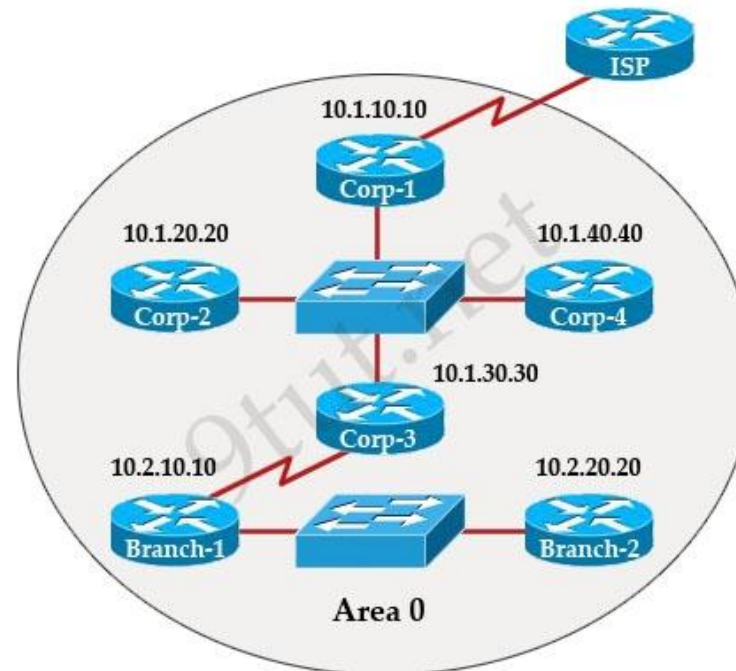
Therefore, a 100 Mbps FastEthernet interface will have the cost of 108 / 100,000,000 (bytes) = 1

Note: Cost for interfaces with bandwidth equal or larger than  $10^8$  bps is normalized to 1 so a 1Gbps interface will also have OSPF cost of 1.

For "O 192.168.12.240 /30 [110/128] via 192.168.12.233, 00:35:36, Serial0 line, 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 second number is the OSPF cost.

[OSPF tutorial](#)

### QUESTION 53



The inter-network infrastructure of company XYZ consists of a single OSPF area as shown in the graphic. There is concern that a lack of router resources is impeding inter-network 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. Corp-1
- B. Corp-2



- C. Corp-3
- D. Corp-4
- E. Branch-1
- F. Branch-2

**Correct Answer:** DF

**Section:** OSPF

**Explanation**

**Explanation/Reference:**

There are 2 segments on the topology above which are separated by Corp-3 router. Each segment will have a DR so we have 2 DRs.

To select which router will become DR they will compare their router-IDs. The router with highest (best) router-ID will become DR. The router-ID is chosen in the order below:

- + The highest IP address assigned to a loopback (logical) interface.
- + If a loopback interface is not defined, the highest IP address of all active router's physical interfaces will be chosen.

In this question, the IP addresses of loopback interfaces are not mentioned so we will consider IP addresses of all active router's physical interfaces. Router Corp-4 (10.1.40.40) & Branch-2 (10.2.20.20) have highest "active" IP addresses so they will become DRs.

[OSPF tutorial](#)

#### **QUESTION 54**

What information does a router running a link-state protocol use to build and maintain its topological database? (Choose two)

- A. hello packets
- B. SAP messages sent by other routers
- C. LSAs from other routers
- D. beacons received on point-to-point links
- E. routing tables received from other link-state routers
- F. TTL packets from designated routers

**Correct Answer:** AC

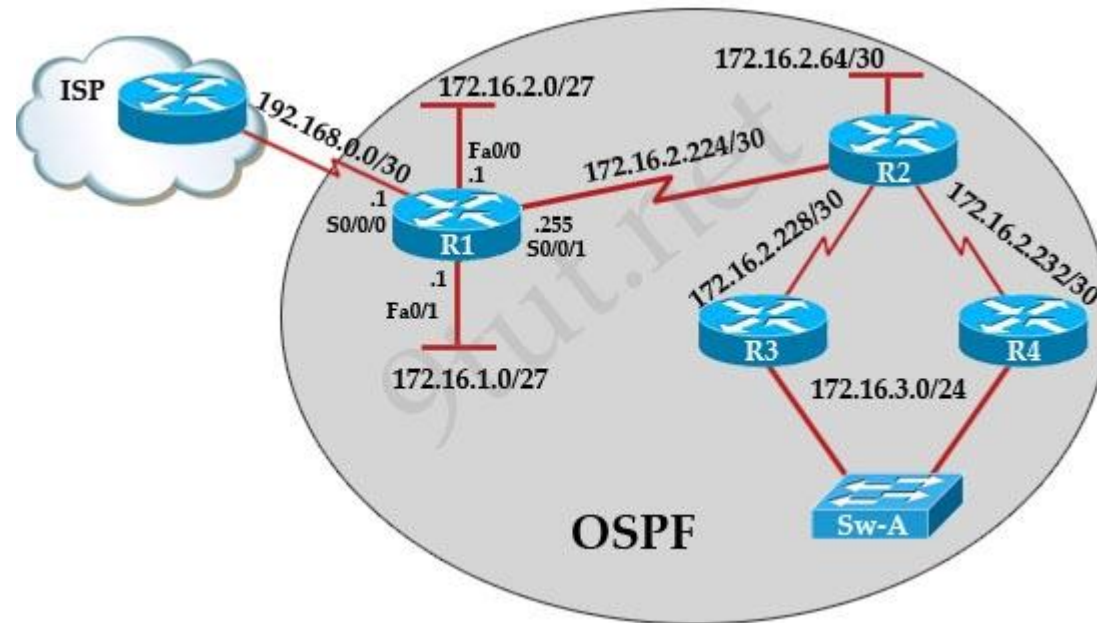
**Section:** OSPF

**Explanation**

**Explanation/Reference:**

[OSPF tutorial](#)

QUESTION 55



R1 is configured with the default configuration of OSPF.

From the following list of IP addresses configured on R1, which address will the OSPF process select as the router ID?

- A. 192.168.0.1
- B. 172.16.1.1
- C. 172.16.2.1
- D. 172.16.2.225

**Correct Answer:** A

**Section:** OSPF Hotspot LAB/SIM

**Explanation**

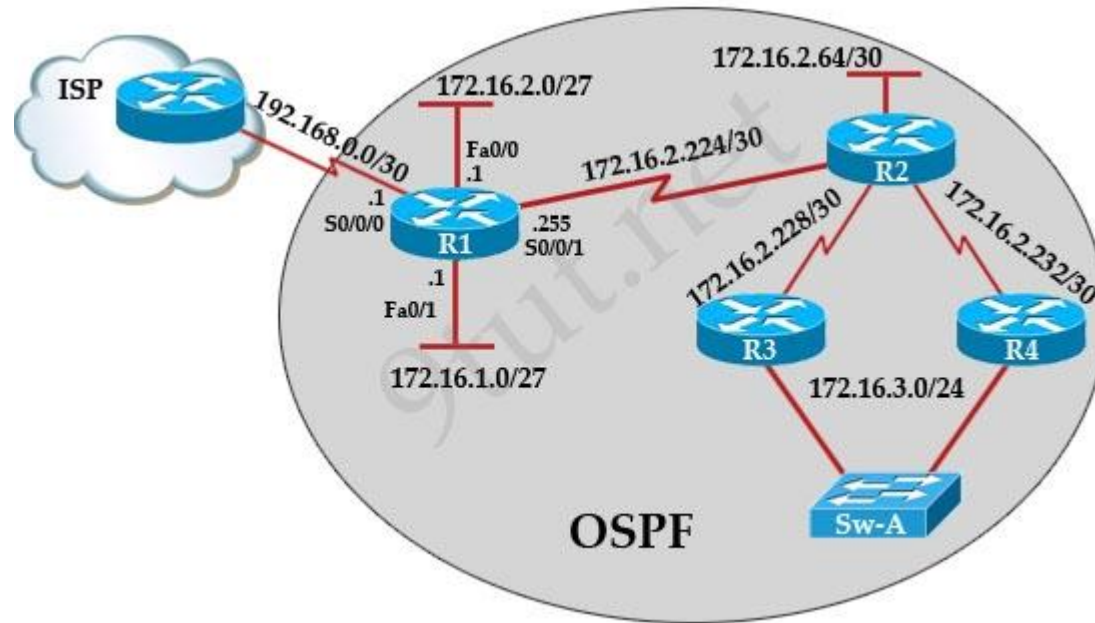
**Explanation/Reference:**

The Router ID (RID) is an IP address used to identify the router and is chosen using the following sequence:

- + The highest IP address assigned to a loopback (logical) interface.
- + If a loopback interface is not defined, the highest IP address of all active router's physical interfaces will be chosen.
- + The router ID can be manually assigned

In this case, because a loopback interface is not configured so the highest active IP address 192.168.0.1 is chosen as the router ID.

**QUESTION 56**



After the network has converged, what type of messaging, if any, occurs between R3 and R4?

- A. No messages are exchanged.
- B. Hellos are sent every 10 seconds.
- C. The full database from each router is sent every 30 seconds
- D. The routing table from each router is sent every 60 seconds.

**Correct Answer:** B

**Section:** OSPF Hotspot LAB/SIM

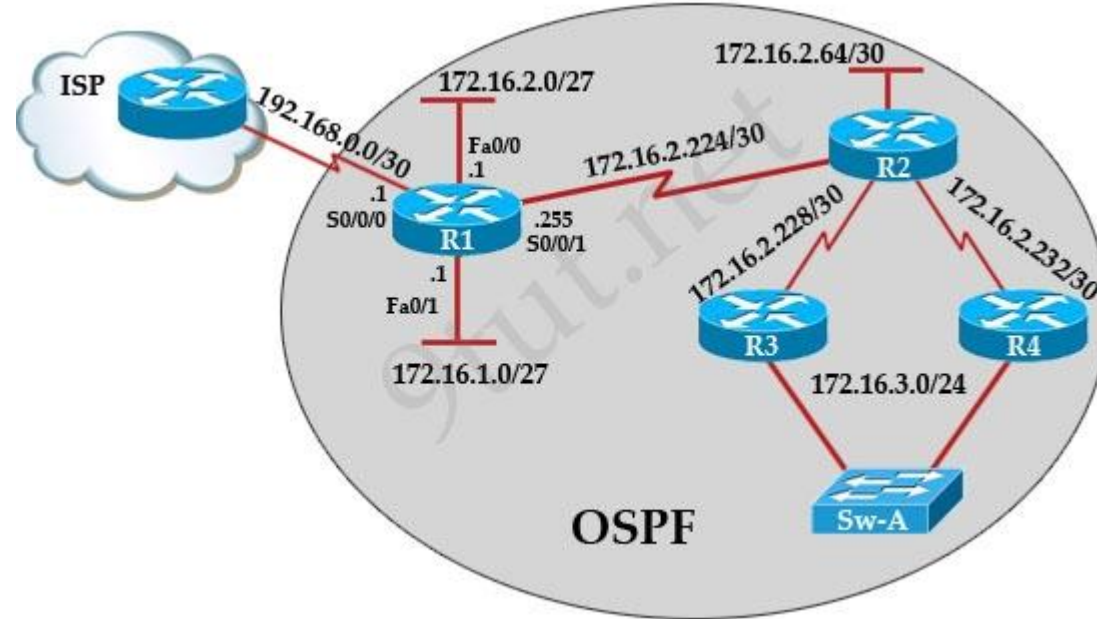
**Explanation**

**Explanation/Reference:**

HELLO messages are used to maintain adjacent neighbors so even when the network is converged, hellos are still exchanged. On broadcast and point-to-point links, the default is 10 seconds, on NBMA the default is 30 seconds.

Although OSPF is a link-state protocol but the full database from each router is sent every 30 minutes (not seconds) -> C and D are not correct.

QUESTION 57



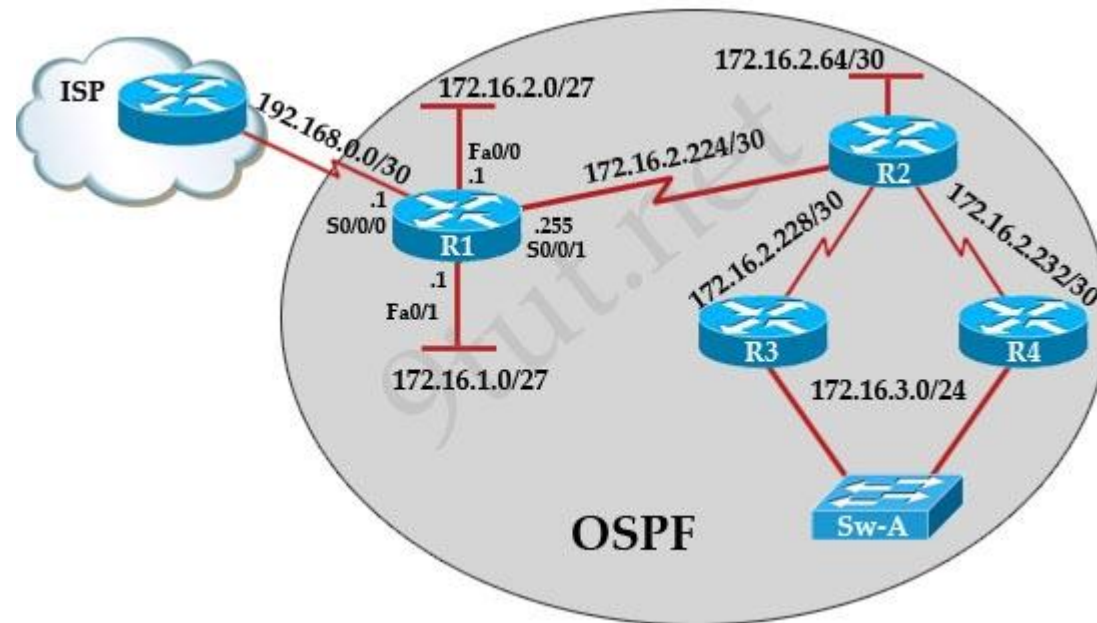
To allow or prevent load balancing to network 172.16.3.0/24, which of the following commands could be used in R2? (Choose two)

- A. R2(config-if)#clock rate
- B. R2(config-if)#bandwidth
- C. R2(config-if)#ip ospf cost
- D. R2(config-if)#ip ospf priority
- E. R2(config-router)#distance ospf

**Correct Answer:** BC  
**Section:** OSPF Hotspot LAB/SIM  
**Explanation**

**Explanation/Reference:**  
[OSPF Tutorial](#)

QUESTION 58



R1 is unable to establish an OSPF neighbor relationship with R3. What are possible reasons for this problem? (Choose two)

- A. All of the routers need to be configured for backbone Area 1
- B. R1 and R2 are the DR and BDR, so OSPF will not establish neighbor adjacency with R3
- C. A static route has been configured from R1 to R3 and prevents the neighbor adjacency from being established.
- D. The hello and dead interval timers are not set to the same values on R1 and R3
- E. EIGRP is also configured on these routers with a lower administrative distance
- F. R1 and R3 are configured in different areas

**Correct Answer:** DF

**Section:** OSPF Hotspot LAB/SIM

**Explanation**

**Explanation/Reference:**

A is not correct because the backbone area of OSPF is always Area 0.

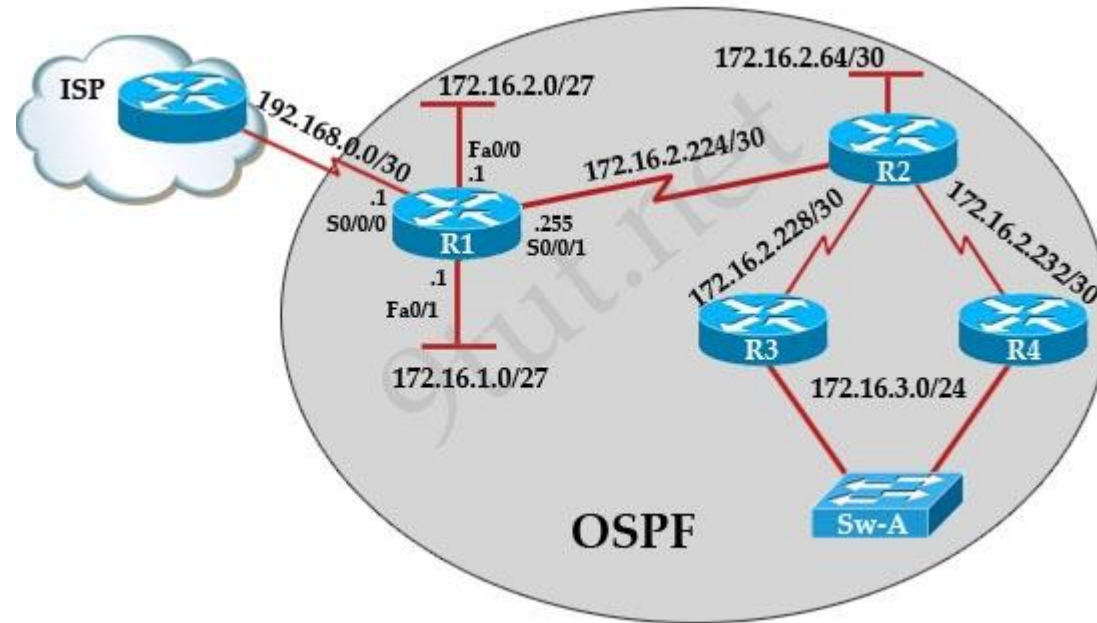
B is not correct because R1 or R3 must be the DR or BDR -> it has to establish neighbor adjacency with the other.

C is not correct because OSPF neighbor relationship is not established based on static routing. It uses multicast address 224.0.0.5 to establish OSPF neighbor relationship.

E is not correct because configure EIGRP on these routers (with a lower administrative distance) will force these routers to run EIGRP, not OSPF.

D and F are correct because these entries must match on neighboring routers:

**QUESTION 59**



OSPF is configured using default classful addressing. With all routers and interfaces operational, how many networks will be in the routing table of R1 that are indicated to be learned by OSPF?

- A. 2
- B. 3
- C. 4
- D. 5
- E. 6
- F. 7

**Correct Answer: C**

**Section: OSPF Hotspot LAB/SIM**

**Explanation**

**Explanation/Reference:**

Although OSPF is configured using default classful addressing but OSPF is a link-state routing protocol so it will always send the subnet mask of each network in their advertised routes. Therefore R1 will learn the the complete subnets. Four networks list below will be in the routing table of R1:

- + 172.16.2.64/30
- + 172.16.2.228/30
- + 172.16.2.232/30
- + 172.16.3.0/24

**Note:** Other networks will be learned as “Directly connected” networks (marked with letter “C”)

#### QUESTION 60

An administrator has connected devices to a switch and, for security reasons, wants the dynamically learned MAC addresses from the address table added to the running configuration. What must be done to accomplish this?

- A. Enable port security and use the keyword sticky
- B. Set the switchport mode to trunk and save the running configuration.
- C. Use the switchport protected command to have the MAC addresses added to the configuration.
- D. Use the no switchport port-security command to allow MAC addresses to be added to the configuration.

**Correct Answer:** A

**Section:** Security

**Explanation**

**Explanation/Reference:**

Explanation

This is the full command mentioned in answer A:

switchport port-security mac-address sticky [MAC]

If we don't specify the MAC address (like in this question) then the switch will dynamically learn the attached MAC Address and place it into your running-configuration.

#### QUESTION 61

The following commands are entered on the router:

```
Burbank(config)# enable secret fortress
Burbank(config)# line con 0
Burbank(config-line)# login
Burbank(config-line)# password n0way1n
Burbank(config-line)# exit
Burbank(config)# service password-encryption
```

What is the purpose of the last command entered?



- A. to require the user to enter an encrypted password during the login process
- B. to prevent the vty, console, and enable passwords from being displayed in plain text in the configuration files
- C. to encrypt the enable secret password
- D. to provide login encryption services between hosts attached to the router

**Correct Answer:** B

**Section:** Security

**Explanation**

**Explanation/Reference:**

Explanation

The “service password-encryption” command encrypts passwords used by “enable password” global configuration command, as well as the password line configuration command (VTY, console) that are saved in the router configuration file.

Note: The secret password (configured by the command “enable secret fortress”) is always encrypted even if the “service password-encryption” command is not used.

Also, the “service password-encryption” command encrypts both current and future passwords.

#### **QUESTION 62**

Why would a network administrator configure port security on a switch?

- A. to prevent unauthorized Telnet access to a switch port
- B. to prevent unauthorized hosts from accessing the LAN
- C. to limit the number of Layer 2 broadcasts on a particular switch port
- D. block unauthorized access to the switch management interfaces

**Correct Answer:** B

**Section:** Security

**Explanation**

**Explanation/Reference:**

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.

#### QUESTION 63

A company has placed a networked PC in a lobby so guests can have access to the corporate directory. A security concern is that someone will disconnect the directory PC and re-connect their laptop computer and have access to the corporate network. For the port servicing the lobby, which three configuration steps should be performed on the switch to prevent this? (Choose three)

- A. Enable port security.
- B. Create the port as a trunk port.
- C. Create the port as an access port
- D. Create the port as a protected port.
- E. Set the port security aging time to 0.
- F. Statically assign the MAC address to the address table
- G. Configure the switch to discover new MAC addresses after a set time of inactivity.

**Correct Answer:** ACF

**Section:** Security

**Explanation**

**Explanation/Reference:**

Explanation

By configuring the port connected with the directory PC as access port the network administrator will mitigate a lot of security issues because access port does not have as much privilege as a trunk port -> C is correct.

The port security feature can also help mitigate security issue because it can learn the MAC address of the directory PC. When another laptop is plugged into the port, the switch will automatically block or shut down that port (if suitable configuration is used) -> A is correct. But nowadays a hacker can fake the MAC address of the directory PC.

By statically assigning the MAC address to the address table, only that MAC address can access to the network -> F is correct.

#### QUESTION 64

What is the effect of using the service password-encryption command?

- A. Only the enable password will be encrypted.
- B. Only the enable secret password will be encrypted.
- C. Only passwords configured after the command has been entered will be encrypted.
- D. It will encrypt the secret password and remove the enable secret password from the configuration.

E. It will encrypt all current and future passwords.

**Correct Answer:** E

**Section:** Security

**Explanation**

**Explanation/Reference:**

Explanation

The “service password-encryption” command encrypts passwords used by “enable password” global configuration command, as well as the password line configuration command (VTY, console) that are saved in the router configuration file.

The “service password-encryption” command encrypts both current and future passwords.

#### **QUESTION 65**

How can you ensure that only the MAC address of a server is allowed by switch port Fa0/1?

- A. Configure port Fa0/1 to accept connections only from the static IP address of the server.
- B. Configure the server MAC address as a static entry of port security.
- C. Use a proprietary connector type on Fa0/1 that is incompatible with other host connectors.
- D. Bind the IP address of the server to its MAC address on the switch to prevent other hosts from spoofing the server IP address.

**Correct Answer:** B

**Section:** Security

**Explanation**

**Explanation/Reference:**

Explanation

The command to configure port security on a switch is (in interface configuration mode):

```
switchport port-security mac-address sticky [MAC]
```

In this case we will type the server MAC address. That MAC address will be stored in the address table, and added to the switch running configuration.

Note: If we don't specify the MAC address then the switch will dynamically learn the attached MAC Address and place it into your running-configuration

#### **QUESTION 66**

**Refer to the exhibit.** The network administrator made the entries that are shown and then saved the configuration. From a console connection, what password or password sequence is required for the administrator to access privileged mode on Router1?

Router# configure terminal

```
Router(config)# hostname Router1
Router1(config)# enable secret sanfran
Router1(config)# enable password cisco
Router1(config)# line vty 0 4
Router1(config-line)# password sanjose
Router1(config-line)#
```

- A. cisco
- B. sanfran
- C. sanjose
- D. either cisco or sanfran
- E. either cisco or sanjose
- F. sanjose and sanfran

**Correct Answer:** B

**Section:** Security

**Explanation**

**Explanation/Reference:**

**Explanation**

In the configuration above we have three passwords:

- + The "enable secret" password: sanfran
- + The "enable password" password: cisco
- + The VTY line password: sanjose

The two first "enable secret" and "enable password" are used to set password for entering privilege mode (an example of privilege mode: Router#). Both of them will be stored in the running configuration. But the password in "enable secret" command is always encrypted using MD5 hash while the password in "enable password" is in plain text.

Note: If you want to encrypt "enable password" you can use the command "service password-encryption" but it will be encrypted with a very basic form of encryption called vigenere cipher, which is very weak.

When you configure both an enable and a secret password, the secret password will be used -> B is correct.

#### **QUESTION 67**

What is the subnet address for the IP address 172.19.20.23/28?

- A. 172.19.20.0
- B. 172.19.20.15

- C. 172.19.20.16
- D. 172.19.20.20
- E. 172.19.20.32

**Correct Answer: C**  
**Section: Subnetting**  
**Explanation**

**Explanation/Reference:**  
Explanation

From the /28 we can find all information we need:

Increment: 16 (/28 = 11111111.11111111.11111111.11110000)  
Network address: 172.19.20.16 (because 16 < 23)  
Broadcast address: 172.16.20.31 (because 31 = 16 + 16 - 1)

In fact we don't need to find out the broadcast address because the question only asks about subnet address (network address).

#### **QUESTION 68**

What is the network address for the host with IP address 192.168.23.61/28?

- A. 192.168.23.0
- B. 192.168.23.32
- C. 192.168.23.48
- D. 192.168.23.56
- E. 192.168.23.60

**Correct Answer: D**  
**Section: Subnetting**  
**Explanation**

**Explanation/Reference:**  
Explanation

From the /28 we can find all information we need:

Increment: 16 (/28 = 11111111.11111111.11111111.11110000)  
Network address: 192.168.23.48 (because 48 = 16 \* 3 and 48 < 61)

#### **QUESTION 69**

Given an IP address of 192.168.1.42 255.255.255.248, what is the subnet address?

- A. 192.168.1.8/29
- B. 192.168.1.32/27
- C. 192.168.1.40/29
- D. 192.168.1.16/28
- E. 192.168.1.48/29

**Correct Answer:** C  
**Section:** Subnetting  
**Explanation**

**Explanation/Reference:**  
Explanation

From the subnet mask of 255.255.255.248 we learn:

Increment: 8 (248 = 11111111.11111111.11111111.11111000)  
Network address: 192.168.1.40 (because 40 = 8 \* 5 and 40 < 42)

#### **QUESTION 70**

Which IP addresses are valid for hosts belonging to the 10.1.160.0/20 subnet? (Choose three)

- A. 10.1.168.0
- B. 10.1.176.1
- C. 10.1.174.255
- D. 10.1.160.255
- E. 10.1.160.0
- F. 10.1.175.255

**Correct Answer:** ACD  
**Section:** Subnetting  
**Explanation**

**Explanation/Reference:**  
Explanation

From the /20 we can find all information we need:

Increment: 16 (/20 = 11111111.11111111.11110000.00000000). This is applied for the 3rd octet.

Network address: 10.1.160.0 (because  $160 = 16 * 10$  and  $160 = 160 \rightarrow$  the IP address above is also the network address.

Broadcast address: 10.1.175.255 (because  $175 = 160 + 16 - 1$ )

Therefore only 10.1.168.0, 10.1.174.255 and 10.1.160.255 are in this range. Please notice 10.1.174.255 is not a broadcast address and can be assigned to host.

#### QUESTION 71

Which one of the following IP addresses is the last valid host in the subnet using mask 255.255.255.224?

- A. 192.168.2.63
- B. 192.168.2.62
- C. 192.168.2.61
- D. 192.168.2.60
- E. 192.168.2.32

**Correct Answer:** B

**Section:** Subnetting

**Explanation**

**Explanation/Reference:**

Explanation

Increment: 32 ( $224 = 11111111.11111111.11111111.11110000$ )

Network address: x.x.x.(0;32;64;96;128;160;192;224)

Broadcast address: x.x.x.(31;63;95;127;159;191;223)

$\rightarrow$  Last valid host (reduced broadcast addresses by 1): x.x.x.(30;62;94;126;158;190;222)  $\rightarrow$  Only B is correct.

#### QUESTION 72

An administrator is working with the 192.168.4.0 network, which has been subnetted with a /26 mask. Which two addresses can be assigned to hosts within the same subnet? (Choose two)

- A. 192.168.4.61
- B. 192.168.4.63
- C. 192.168.4.67
- D. 192.168.4.125
- E. 192.168.4.128
- F. 192.168.4.132

**Correct Answer:** CD

**Section:** Subnetting

**Explanation**

**Explanation/Reference:****Explanation**

Increment: 64 (/26 = 11111111.11111111.11111111.11000000)

The IP 192.168.4.0 belongs to class C. The default subnet mask of class C is /24 and it has been subnetted with a /26 mask so we have  $2(26-24) = 22$  = 4 sub-networks:

1st subnet: 192.168.4.0 (to 192.168.4.63)

2nd subnet: 192.168.4.64 (to 192.168.4.127)

3rd subnet: 192.168.4.128 (to 192.168.4.191)

4th subnet: 192.168.4.192 (to 192.168.4.225)

In all the answers above, only answer C and D are in the same subnet.

Therefore only IPs in this range can be assigned to hosts.

**QUESTION 73**

An administrator must assign static IP addresses to the servers in a network. For network 192.168.20.24/29, the router is assigned the first usable host address while the sales server is given the last usable host address. Which of the following should be entered into the IP properties box for 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

**Correct Answer: C**

**Section: Subnetting**

**Explanation**

**Explanation/Reference:**

Explanation

With network 192.168.20.24/29 we have:

Increment: 8 (/29 = 255.255.255.248 = 11111000 for the last octet)

Network address: 192.168.20.24 (because  $24 = 8 * 3$ )

Broadcast address: 192.168.20.31 (because  $31 = 24 + 8 - 1$ )

Therefore the first usable IP address is 192.168.20.25 (assigned to the router) and the last usable IP address is 192.168.20.30 (assigned to the sales server). The IP address of the router is also the default gateway of the sales server.

**QUESTION 74**

Given a Class C IP address subnetted with a /30 subnet mask, how many valid host IP addresses are available on each of the subnets?

- A. 1
- B. 2
- C. 4
- D. 8
- E. 252
- F. 254

**Correct Answer: B**

**Section: Subnetting**

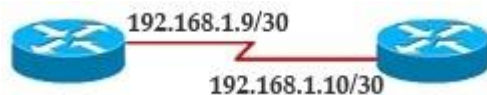
**Explanation**

**Explanation/Reference:**

Explanation

The number of valid host IP addresses depends on the number of bits 0 left in the subnet mask. With a /30 subnet mask, only two bits 0 left (/30 = 11111111.11111111.11111111.11111100) so the number of valid host IP addresses is  $2^2 - 2 = 2$ . Also please notice that the /30 subnet mask is a popular subnet mask used in the connection between two routers because we only need two IP addresses. The /30 subnet mask help save IP addresses for other connections.

**An example of the use of /30 subnet mask is shown below:**

**QUESTION 75**



Which two statements describe the IP address 10.16.3.65/23? (Choose two)

- A. The subnet address is 10.16.3.0 255.255.254.0.
- B. The lowest host address in the subnet is 10.16.2.1 255.255.254.0.
- C. The last valid host address in the subnet is 10.16.2.254 255.255.254.0
- D. The broadcast address of the subnet is 10.16.3.255 255.255.254.0.
- E. The network is not subnetted.

**Correct Answer:** BD

**Section:** Subnetting

**Explanation**

**Explanation/Reference:**

Explanation

Increment: 2 (/23 = 11111111.11111111.11111110.00000000 = 255.255.254.0)

Network address: 10.16.2.0 (because  $2 = 2 * 1$  and  $2 < 3$ )

Broadcast address: 10.16.3.255 (because  $2 + 2 - 1 = 3$  for the 3rd octet)

-> The lowest (first assignable) host address is 10.16.2.1 and the broadcast address of the subnet is 10.16.3.255 255.255.254.0

#### QUESTION 76

What is the subnet address of 172.16.159.159/22?

- A. 172.16.0.0
- B. 172.16.128.0
- C. 172.16.156.0
- D. 172.16.159.0
- E. 172.16.159.128
- F. 172.16.192.0

**Correct Answer:** C

**Section:** Subnetting

**Explanation**

**Explanation/Reference:**

Explanation

Increment: 4 (/22 = 11111111.11111111.11111100.00000000)

Network address: 172.16.156.0 (156 is multiple of 4 and  $156 < 159$ )

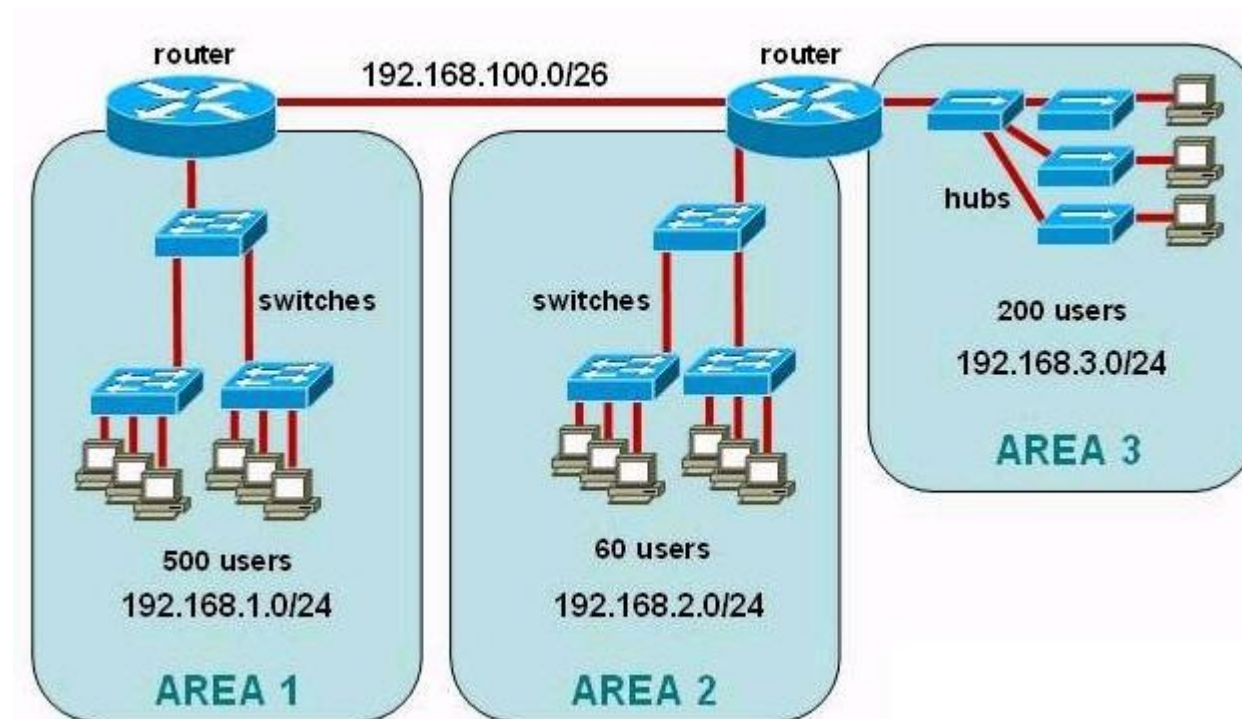
**QUESTION 77**

**Refer to the exhibit.** The junior network support staff 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

What are three problems with this design? (Choose three)



- A. The AREA 1 IP address space is inadequate for the number of users.
- 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 network address space that is provided requires a single network-wide mask.
- E. The router-to-router connection is wasting address space.

F. The broadcast domain in AREA 1 is too large for IP to function.

**Correct Answer:** ACE

**Section:** Subnetting

**Explanation**

**Explanation/Reference:**

AREA 1 has 500 users but it uses class C which only supports 254 users (from 192.168.1.1 to 192.168.1.254)-> A is correct.

AREA 3 also uses class C and as mentioned above it supports 254 users so it is enough for 200 users -> B is incorrect.

In AREA 2 there are only 60 users  $< 64 = 2^6$  so we can use a subnet mask which has 6 bits 0 -> /26. Of course we can use larger subnets (like /25) for future expansion -> C is correct.

A large network should never use a single network-wide mask. It should be some different subnet masks to make the network flexible and easy to be summarized -> D is incorrect.

For router-to-router connection we should use a subnet mask of /30 which supports 2 hosts per subnet. This subnet mask is ideal for router-to-router connection -> E is correct.

There is no limit for IP to function if we know how to organize our network -> F is incorrect.

#### **QUESTION 78**

**Refer to the exhibit.** The enterprise has decided to use the network address 172.16.0.0. The network administrator needs to design a classful addressing scheme to accommodate the three subnets, with 30, 40, and 50 hosts, as shown. What subnet mask would accommodate this network?

Net bits	Subnet mask	total-addresses per subnet
/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
/29	255.255.255.248	8
/30	255.255.255.252	4

- A. 255.255.255.192
- B. 255.255.255.224
- C. 255.255.255.240
- D. 55.255.255.248

**Correct Answer:** A  
**Section:** Subnetting  
**Explanation**

**Explanation/Reference:**  
Explanation

The maximum number of hosts in this question is 50 hosts so we have to use /26 subnet mask or above.

#### QUESTION 79

The network manager has requested a 300-workstation expansion of the network. The workstations are to be installed in a single broadcast domain, but each workstation must have its own collision domain. The expansion is to be as cost-effective as possible while still meeting the requirements. Which three items will adequately fulfill the request? (Choose three)

- A. one IP subnet with a mask of 255.255.254.0

- B. two IP subnets with a mask of 255.255.255.0
- C. seven 48-port hubs
- D. seven 48-port switches
- E. one router interface
- F. seven router interfaces

**Correct Answer:** ADE

**Section:** Subnetting

**Explanation**

**Explanation/Reference:**

Explanation

To support 300 workstations in a single broadcast domain, we need to use a subnet mask which supports 512 hosts = 29 -> /23 or 255.255.254.0 in decimal form -> A is correct.

If we use 48-port switches we need  $300/48 = 6.25$  -> seven 48-port switches are enough because we also need trunking between them -> D is correct.

We only need one router interface and it is connected with one of seven switches -> E is correct.

#### **QUESTION 80**

Which router command will configure an interface with the IP address 10.10.80.1/19?

- A. router(config-if)# ip address 10.10.80.1/19
- B. router(config-if)# ip address 10.10.80.1 255.255.0.0
- C. router(config-if)# ip address 10.10.80.1 255.255.255.0
- D. router(config-if)# ip address 10.10.80.1 255.255.224.0
- E. router(config-if)# ip address 10.10.80.1 255.255.240.0
- F. router(config-if)# ip address 10.10.80.1 255.255.255.240

**Correct Answer:** D

**Section:** Subnetting

**Explanation**

**Explanation/Reference:**

Explanation

/19 = 255.255.224.0. The fast way to find out this subnet mask is to remember /16 = 255.255.0.0 and we need 3 more bits 1 for 3rd octet: 1110 0000 which is 224.

**QUESTION 81**

What is the best practice when assigning IP addresses in a small office of six hosts?

- A. Use a DHCP server that is located at the headquarters.
- B. Use a DHCP server that is located at the branch office.
- C. Assign the addresses by using the local CDP protocol.
- D. Assign the addresses statically on each node.

**Correct Answer: D**

**Section: IP Routing**

**Explanation**

**Explanation/Reference:**

**QUESTION 82**

The ip helper-address command does what?

- A. assigns an IP address to a host
- B. resolves an IP address from a DNS server
- C. relays a DHCP request across networks
- D. resolves an IP address overlapping issue

**Correct Answer: C**

**Section: IP Routing**

**Explanation**

**Explanation/Reference:**

Explanation

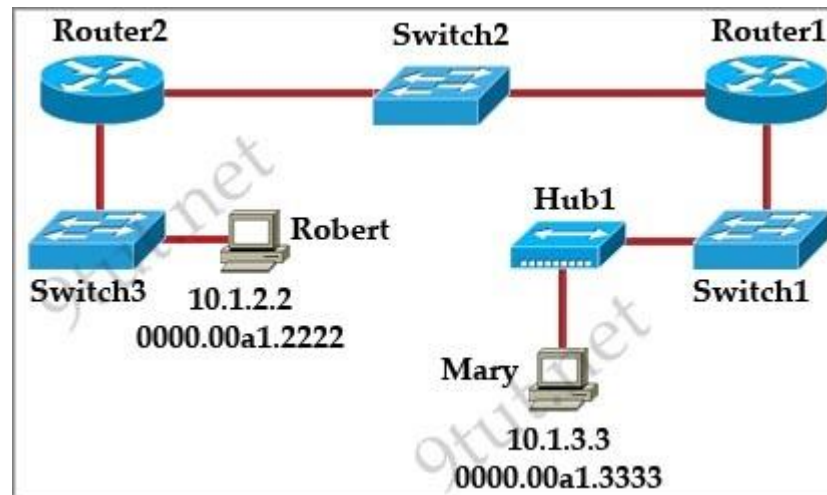
By default, Cisco routers do not forward broadcast address. So what will happen if your PC does not in the same LAN with DHCP Server? Your PC (also a DHCP Client) will broadcast a packet but it is dropped by the router -> Your PC cannot get the IP from DHCP Server. So the "ip helper-address" command enables the DHCP broadcast to be forwarded to the DHCP server. For example, the IP address of your DHCP Server is 10.10.10.254 then we can type in the interface connecting with the DHCP Client (fa0/0 in this case) this command: "ip helper-address 10.10.10.254 .



**Note:** When a client boots up for the first time, it transmits a DHCPDISCOVER message on its local physical subnet. Because the client has no way of knowing the subnet to which it belongs, the DHCPDISCOVER is an all-subnets broadcast (destination IP address of 255.255.255.255, which is a layer 3 broadcast address). The client does not have a configured IP address, so the source IP address of 0.0.0.0 is used

**QUESTION 83**

**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. Hub 1
- B. Switch 1
- C. Router 1
- D. Switch 2
- E. Router 2
- F. Switch 3

**Correct Answer:** BDF

**Section:** IP Routing

**Explanation**

**Explanation/Reference:**

**Explanation**

Routers do not look to the destination MAC address to forward packet. It will find the next destination MAC address itself to replace the old destination

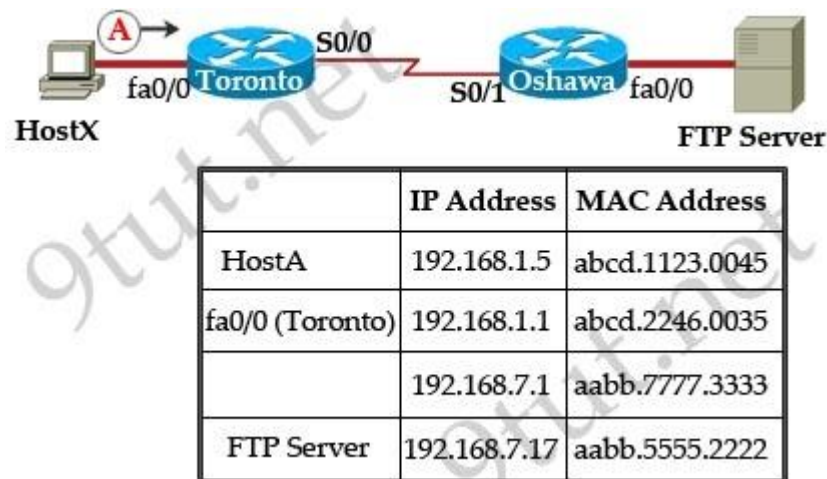
MAC address of the received packet.

Hubs do not care about MAC addresses, it just flood the frames out of all its port except the port that sent it.

Therefore only three switches in the exhibit above use destination MAC address to determine the next hops.

#### QUESTION 84

**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:** IP Routing  
**Explanation**

**Explanation/Reference:**  
**Explanation**

The destination MAC address at point A must be the MAC address of the interface fa0/0 of Toronto router -> E is correct.



**QUESTION 85**

The command `ip route 192.168.100.160 255.255.255.224 192.168.10.2` was issued on a router. No routing protocols or other static routes are configured on the router. Which statement is true about this command?

- A. The interface with IP address 192.168.10.2 is on this router.
- B. The command sets a gateway of last resort for the router.
- C. Packets that are destined for host 192.168.100.160 will be sent to 192.168.10.2.
- D. The command creates a static route for all IP traffic with the source address 192.168.100.160.

**Correct Answer: C**

**Section: IP Routing**

**Explanation**

**Explanation/Reference:**

**Explanation**

The simple syntax of static route:

```
ip route destination-network-address subnet-mask {next-hop-IP-address | exit-interface}
+ destination-network-address: destination network address of the remote network
+ subnet mask: subnet mask of the destination network
+ next-hop-IP-address: the IP address of the receiving interface on the next-hop router
+ exit-interface: the local interface of this router where the packets will go out
```

Therefore the purpose of this command is to send any packets with destination IP address in the range of 192.168.100.160/27 subnet to 192.168.10.2. In fact, answer C is a bit weird when saying "host 192.168.100.160" because 192.168.100.160 is the network address in this case and it cannot be assigned to a host. But answer C is the most suitable answer for this question.

**QUESTION 86**

What does administrative distance refer to?

- A. the cost of a link between two neighboring routers
- B. the advertised cost to reach a network
- C. the cost to reach a network that is administratively set
- D. a measure of the trustworthiness of a routing information source

**Correct Answer: D**

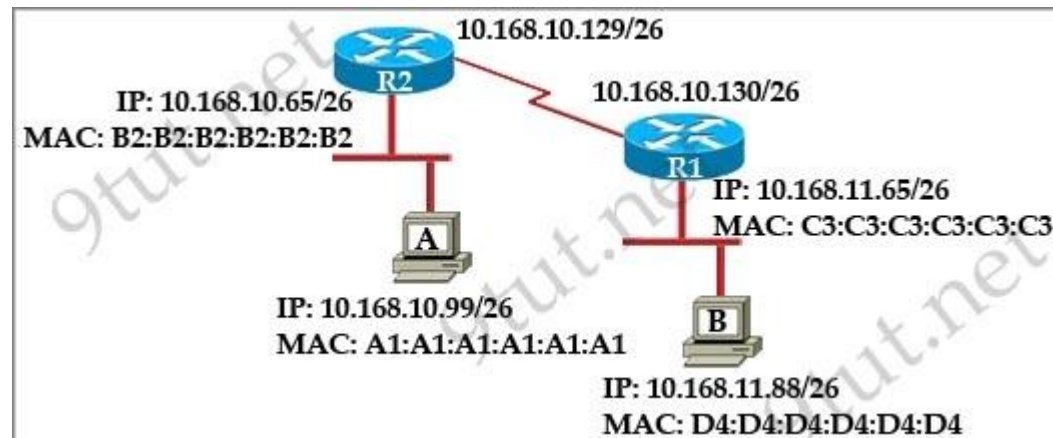
**Section: IP Routing**

**Explanation**

**Explanation/Reference:**

**QUESTION 87**

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: IP Routing**

**Explanation**

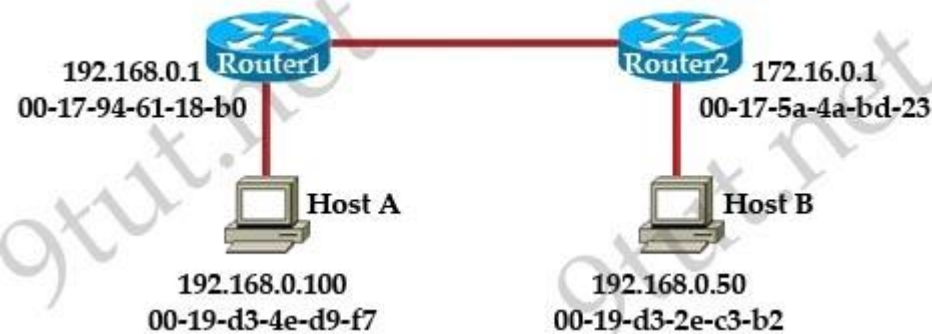
**Explanation/Reference:**

**Explanation**

After receiving a packet, the router will keep the source and destination IP addresses while change the source MAC address (to the MAC address of its outgoing interface) and the destination MAC address (to the MAC address of the next-hop interface). Therefore when the packet reaches host B, the source MAC address must be the MAC address of the outgoing interface of R1.

**QUESTION 88**

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

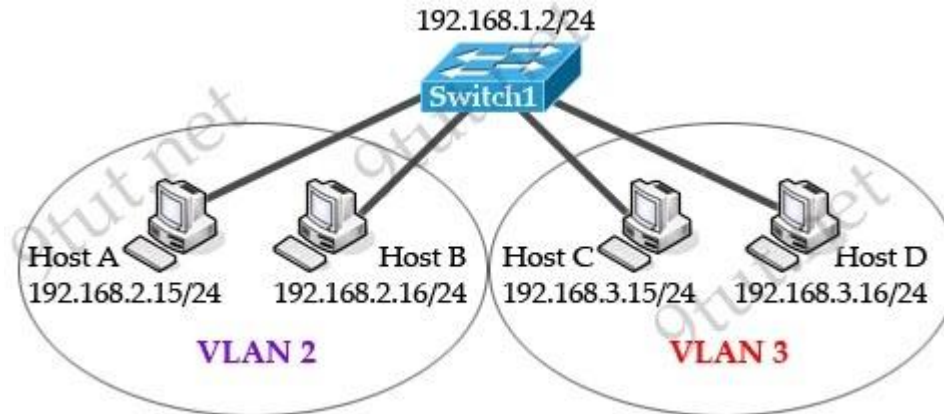
**Correct Answer:** E  
**Section:** IP Routing  
**Explanation**

**Explanation/Reference:**  
**Explanation**

Host A knows the IP address of Host B but it does not know the MAC address of host B, so it have to create an ARP Request (which is a broadcast frame) to ask for the MAC address of host B. When Router1 receives this ARP Request, it answers with its own MAC address.

#### **QUESTION 89**

Refer to the exhibit. Host A can communicate with Host B but not with Host C or D. How can the network administrator solve this problem?



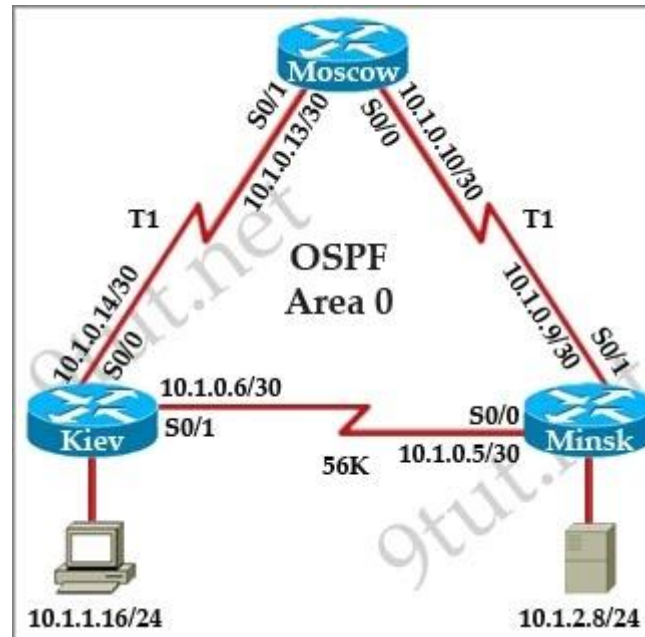
- A. Configure Hosts C and D with IP addresses in the 192.168.2.0 network.
- B. Install a router and configure a route to route between VLANs 2 and 3.
- C. Install a second switch and put Hosts C and D on that switch while Hosts A and B remain on the original switch
- D. Enable the VLAN trunking protocol on the switch.

**Correct Answer:** B  
**Section:** IP Routing  
**Explanation**

**Explanation/Reference:**

#### QUESTION 90

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

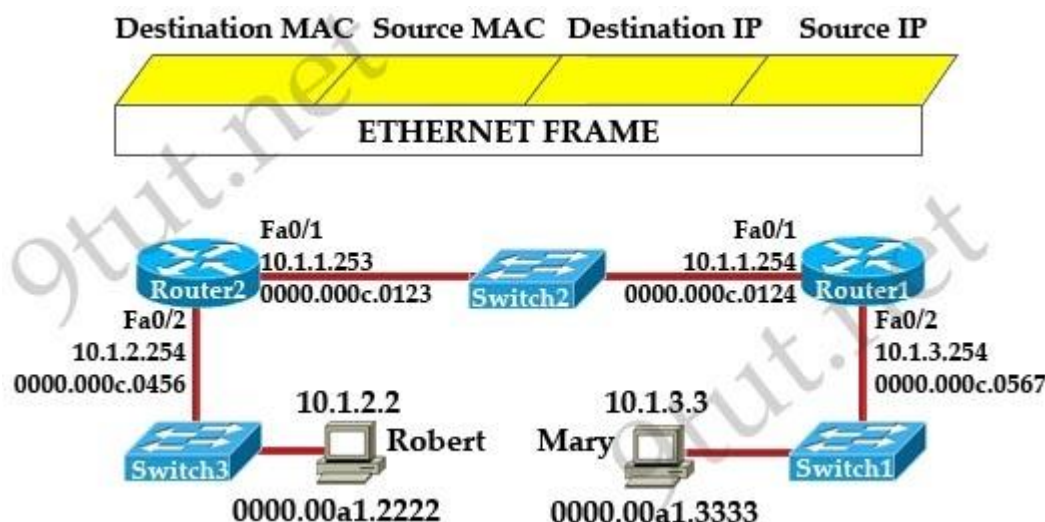
**Correct Answer:** E  
**Section:** IP Routing  
**Explanation**

**Explanation/Reference:**  
**Explanation**

Along the routing path, the source and destination IP address will not change so the source IP will always be 10.1.1.16.

#### QUESTION 91

**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
0000.000c.0123	0000.000c.0124	10.1.2.2	10.1.3.3
- B. 

Destination MAC	Source MAC	Destination IP	Source IP
0000.000c.0123	0000.000c.0124	10.1.1.253	10.1.1.254
- C. 

Destination MAC	Source MAC	Destination IP	Source IP
0000.00a1.2222	0000.00a1.3333	10.1.1.253	10.1.1.254
- D. 

Destination MAC	Source MAC	Destination IP	Source IP
0000.000c.0456	0000.000c.0567	10.1.2.2	10.1.3.3

**Correct Answer:** A  
**Section:** IP Routing  
**Explanation**

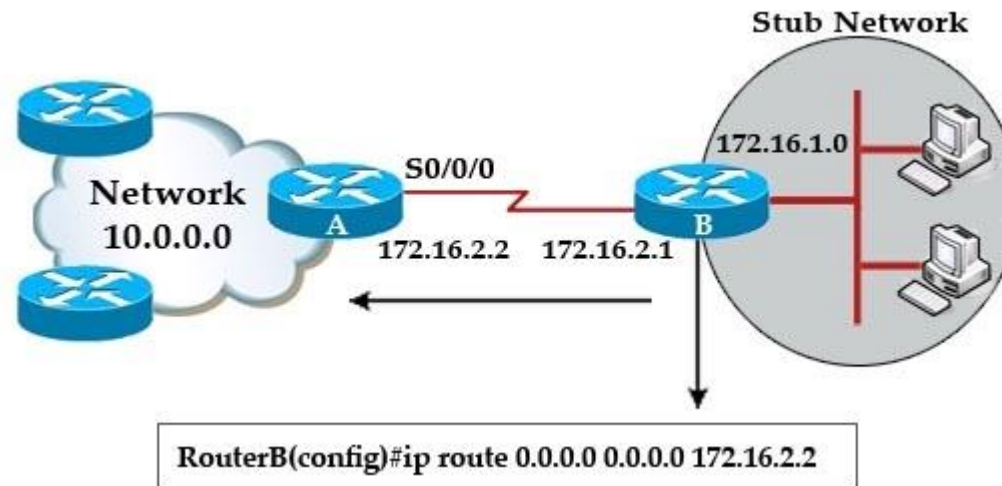
**Explanation/Reference:**

### Explanation

After receiving a packet, the router will keep the source and destination IP addresses (10.1.3.3 and 10.1.2.2, respectively) while change the source MAC address (to the MAC address of its outgoing interface) and the destination MAC address (to the MAC address of the next-hop interface). Therefore when the packet leaves Router1, the source MAC address must be the MAC address of the outgoing interface of Router1 (0000.000c.0124) and the destination MAC address must be the MAC of fa0/1 of R2 (0000.000c.0123).

### QUESTION 92

Refer to the exhibit. Which two statements are correct? (Choose two)



- A. This is a default route
- B. Adding the subnet mask is optional for the ip route command.
- C. This will allow any host on the 172.16.1.0 network to reach all known destinations beyond RouterA.
- D. This command is incorrect, it needs to specify the interface, such as s0/0/0 rather than an IP address.
- E. The same command needs to be entered on RouterA so that hosts on the 172.16.1.0 network can reach network 10.0.0.0.

**Correct Answer:** AC

**Section:** IP Routing

**Explanation**

**Explanation/Reference:**

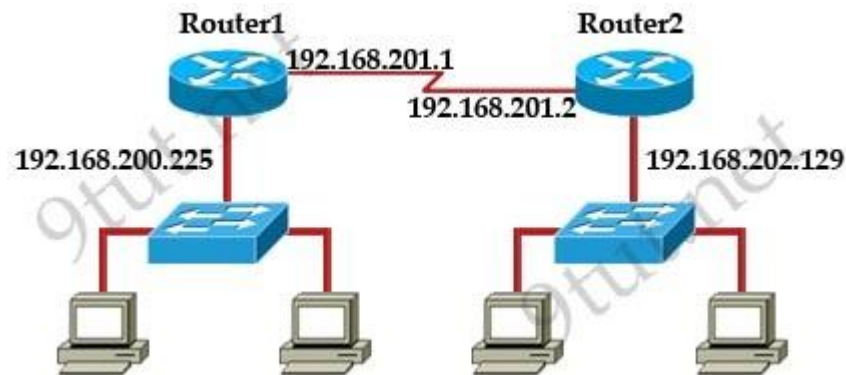
**Explanation**

A static route with 0.0.0.0 0.0.0.0 will become a default route. The default route means: "send all traffic to this IP address". So the default route "ip route 0.0.0.0 0.0.0.0 172.16.2.2" will send all traffic to 172.16.2.2.



**QUESTION 93**

**Refer to the exhibit.** Which command would you use to configure a static route on Router1 to network 192.168.202.0/24 with a nondefault administrative distance?



- A. router1(config)#ip route 1 192.168.201.1 255.255.255.0 192.168.201.2
- B. router1(config)#ip route 192.168.202.0 255.255.255.0 192.168.201.2 1
- C. router1(config)#ip route 5 192.168.202.0 255.255.255.0 192.168.201.2
- D. router1(config)#ip route 192.168.202.0 255.255.255.0 192.168.201.2 5

**Correct Answer:** D

**Section:** IP Routing

**Explanation**

**Explanation/Reference:**

**Explanation**

The Administrative Distance (AD) parameter must be put at the end of the "ip route" command. The default AD is 1.

**QUESTION 94**

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



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#

- 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:** IP Routing

**Explanation**

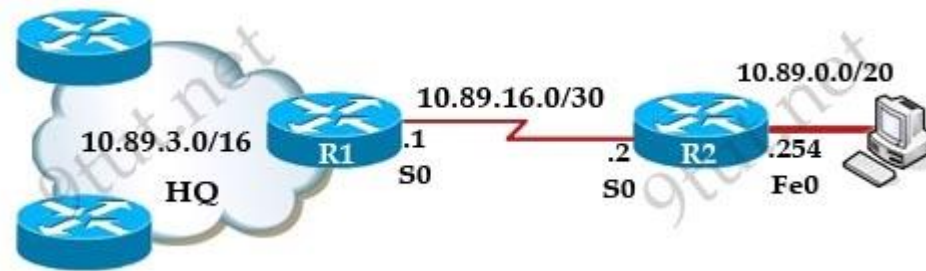
**Explanation/Reference:**

**Explanation**

This router only have directly connected networks (symbolized by letter "C") and one default route out of Serial0/0. Maybe this is a stub router with only one connection to the Headquarter or to the Internet.

#### QUESTION 95

**Refer to the exhibit.** What is the simplest way to configure routing between the regional office network 10.89.0.0/20 and the corporate network?



- A. router1(config)#ip route 10.89.0.0 255.255.240.0 10.89.16.2
- B. router2(config)#ip route 10.89.3.0 255.255.0.0 10.89.16.2
- C. router1(config)#ip route 10.89.0.0 255.255.240.0 10.89.16.1
- D. router2(config)#ip route 0.0.0.0 0.0.0.0 10.89.16.1

**Correct Answer: D**  
**Section: IP Routing**  
**Explanation**

**Explanation/Reference:**  
**Explanation**

In this topology, R2 is a stub router with only one connection to the HQ network so the best way to configure routing is to set a static route (default route) to R1.

#### QUESTION 96

**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: IP Routing**

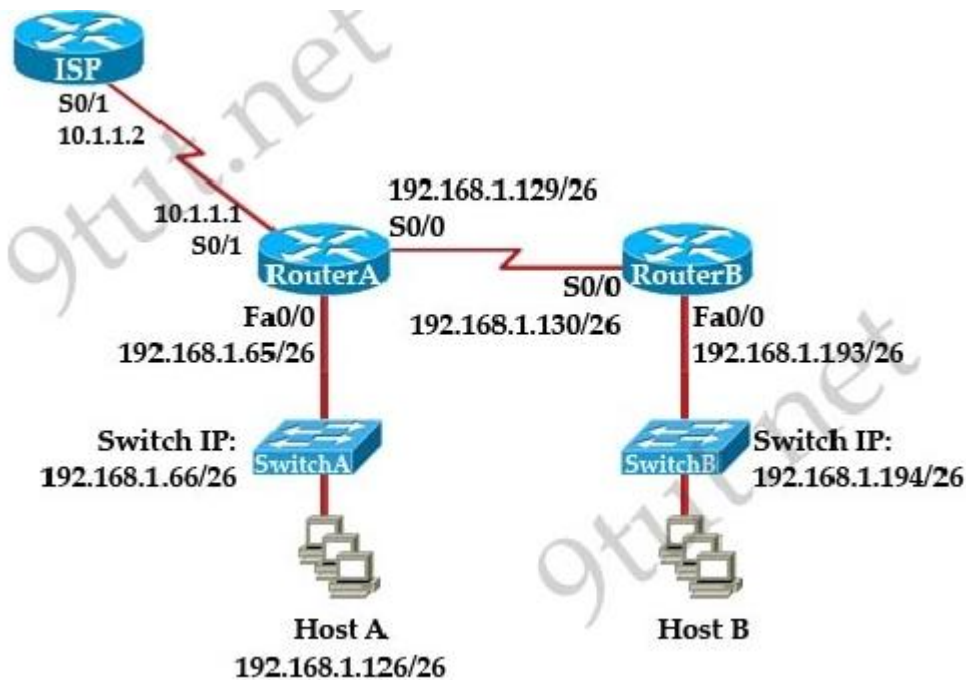
**Explanation**

**Explanation/Reference:**  
**Explanation**

Host A is in a different subnet of SW-A so SW-A does not know how to send data to host A so it needs to be assigned with a default gateway. The command to assign a default gateway to a switch is "ip default-gateway ". Please notice this command only has effect when "ip routing" is disabled on SW-A.

**QUESTION 97**

**Refer to the exhibit.** Which default gateway address should be assigned to HostA?



- A. 192.168.1.1
- B. 192.168.1.65
- C. 192.168.1.66
- D. 192.168.1.129
- E. 10.1.1.1
- F. 10.1.1.2

**Correct Answer:** B  
**Section:** IP Routing  
**Explanation**

**Explanation/Reference:**  
**Explanation**

The default gateway of Host A should be the connected interface of the router, except host A is connected with a Layer 3 switch. In this case, Switch A is a pure Layer 2 switch and Switch A IP address is just for management purpose.

#### **QUESTION 98**

What happens when computers on a private network attempt to connect to the Internet through a Cisco router running PAT?

- A. The router uses the same IP address but a different TCP source port number for each connection.
- B. An IP address is assigned based on the priority of the computer requesting the connection.
- C. The router selects an address from a pool of one-to-one address mappings held in the lookup table.
- D. The router assigns a unique IP address from a pool of legally registered addresses for the duration of the connection.

**Correct Answer:** A  
**Section:** NAT/PAT  
**Explanation**

**Explanation/Reference:**  
**Explanation**

Port Address Translation (PAT) can support thousands of users connect to the Internet using only one real global IP address. With PAT, each computer will be assigned a separate port number so that the router can identify which computer should receive the return traffic.

#### **QUESTION 99**

In the configuration of NAT, what does the keyword overload signify?

- A. When bandwidth is insufficient, some hosts will not be allowed to access network translation.
- B. The pool of IP addresses has been exhausted.
- C. Multiple internal hosts will use one IP address to access external network resources.
- D. If the number of available IP addresses is exceeded, excess traffic will use the specified address pool.

**Correct Answer:** C  
**Section:** NAT/PAT  
**Explanation**

**Explanation/Reference:**  
**Explanation**

The keyword “overload” specifies we are using NAT Overload (PAT) in which multiple internal hosts will use only one IP address to access external network resources.

**QUESTION 100**

When configuring NAT, the Internet interface is considered to be what?

- A. local
- B. inside
- C. global
- D. outside

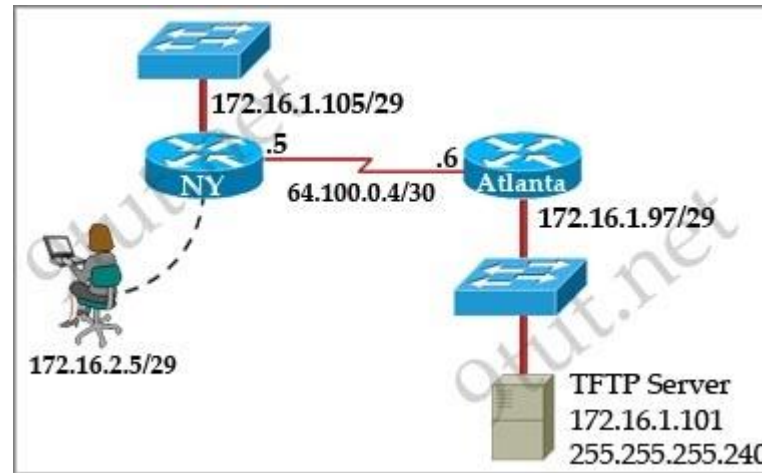
**Correct Answer: D**  
**Section: NAT/PAT**  
**Explanation**

**Explanation/Reference:**  
**Explanation**

On the interface connecting to the Internet of the router we have to use the command “ip nat outside” for NAT to work. It identifies that interface as the outside interface

**QUESTION 101**

**Refer to the exhibit.** A TFTP server has recently been installed in the Atlanta office. The network administrator is located in the NY office and has made a console connection to the NY router. After establishing the connection they are unable to backup the configuration file and IOS of the NY router to the TFTP server. What is the cause of this problem?



- A. The NY router has an incorrect subnet mask
- B. The TFTP server has an incorrect IP address.
- C. The TFTP server has an incorrect subnet mask.
- D. . The network administrator computer has an incorrect IP address.

**Correct Answer: C**

**Section: Troubleshooting**

**Explanation**

**Explanation/Reference:**

#### **QUESTION 102**

**Refer to the exhibit.** A network administrator has configured a Catalyst 2950 switch for remote management by pasting into the console the configuration commands that are shown in the exhibit. However, a Telnet session cannot be successfully established from a remote host. What should be done to fix this problem?

```
interface vlan 1
ip address 192.168.17.253 255.255.255.240
no shutdown
exit
ip default-gateway 192.168.17.1
line vty 0 15
password cisco
login
exit
```

- A. Change the first line to interface fastethernet 0/1
- B. Change the first line to interface vlan 0/1
- C. Change the fifth line to ip default-gateway 192.168.17.241
- D. Change the fifth line to ip route 0.0.0.0 0.0.0.0 192.168.17.1
- E. Change the sixth line to line con 0

**Correct Answer:** C

**Section:** Troubleshooting

**Explanation**

**Explanation/Reference:**

**Change the fifth line to ip default-gateway 192.168.17.241**

**is correct** because if you break the mask down it comes out to 192.168.17.241 – 192.168.17.254 which is decided by the .240 mask

### QUESTION 103

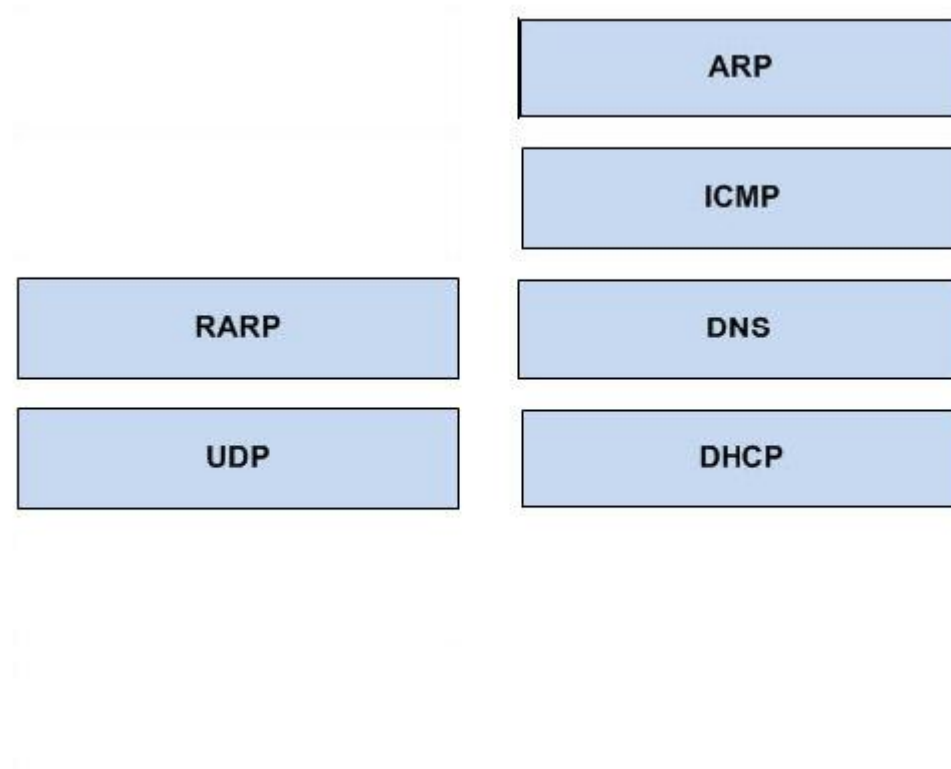
Various protocols are listed on the left On the right are applications for the use of those protocols. Drag the protocol on the left to an associated function for that protocol on the right (Not all options are used)

**Select and Place:**

ICMP	A PC sends packets to the default gateway IP address the first time since the PC turned on.
DHCP	The network administrator is checking basic IP connectivity from a workstation to a server.
RARP	The TCP/IP protocol stack must find an IP address for packets destined for a URL.
UDP	A network device will automatically assign IP addresses to workstations.
DNS	
ARP	

**Correct Answer:**





**Section: Drag and Drop**  
**Explanation**

**Explanation/Reference:**

- + ARP: A PC sends packets to the default gateway IP address the first time since the PC turned on.
- + ICMP: The network administrator is checking basic IP connectivity from a workstation to a server.
- + DNS: The TCP/IP protocol stack must find an IP address for packets destined for a URL.
- + DHCP: A network device will automatically assign IP addresses to workstations.

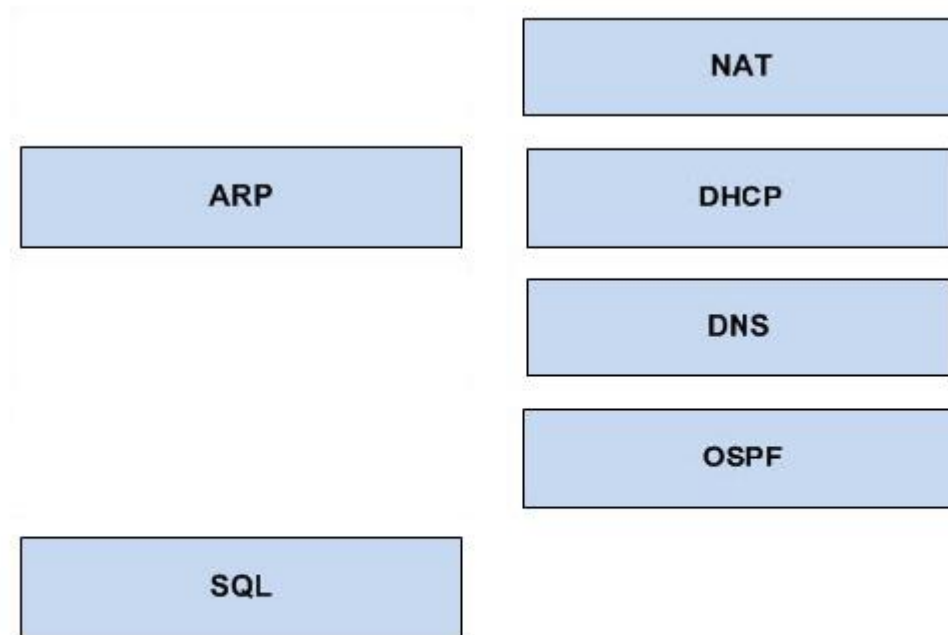
**QUESTION 104**

Move the protocol or service on the left to a situation on the right where it would be used. (Not all options are used)

**Select and Place:**

OSPF	A PC with address 10.1.5.10 must access devices on the Internet.
ARP	Only routers and servers require static IP addresses. Easy IP administration is required.
NAT	A PC only knows a server as MediaServer. IP needs to send data to that server.
DNS	A protocol is needed to replace current static routes with automatic route updates.
SQL	
DHCP	

**Correct Answer:**



**Section: Drag and Drop**  
**Explanation**

**Explanation/Reference:**

- + NAT: A PC with address 10.1.5.10 must access devices on the Internet.
- + DHCP: Only routers and servers require static IP addresses. Easy IP administration is required.
- + DNS: A PC only knows a server as MediaServer. IP needs to send data to that server.
- + OSPF: A protocol is needed to replace current static routes with automatic route updates.

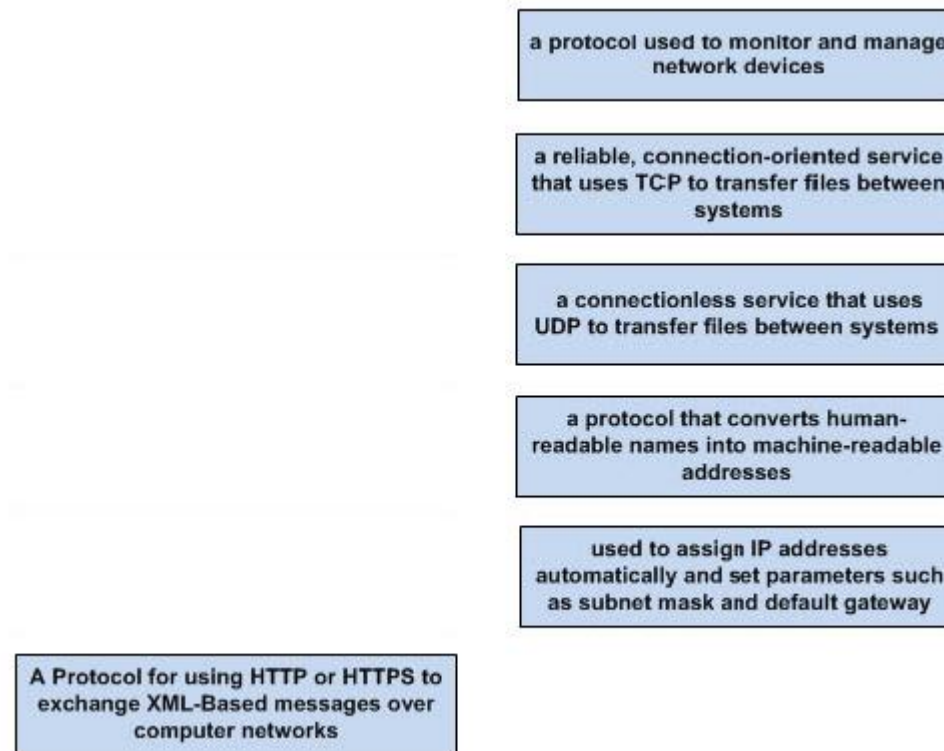
**QUESTION 105**

Drag the definition on the left to the correct term on the right. Not all definitions on the left will be used.

**Select and Place:**

a protocol used to monitor and manage network devices	SNMP
a reliable, connection-oriented service that uses TCP to transfer files between systems	FTP
a connectionless service that uses UDP to transfer files between systems	TFTP
a protocol that converts human-readable names into machine-readable addresses	DNS
used to assign IP addresses automatically and set parameters such as subnet mask and default gateway	DHCP
A Protocol for using HTTP or HTTPS to exchange XML-Based messages over computer networks	

**Correct Answer:**



**Section: Drag and Drop**  
**Explanation**

**Explanation/Reference:**

- + SNMP: a protocol used to monitor and manage network devices
- + FTP: a reliable, connection-oriented service that uses TCP to transfer files between systems
- + TFTP: a connectionless service that uses UDP to transfer files between systems
- + DNS: a protocol that converts human-readable names into machine-readable addresses
- + DHCP: used to assign IP addresses automatically and set parameters such as subnet mask and default gateway

**QUESTION 106**

Drag the appropriate command on the left to the configuration task it accomplishes (not all options are used)

**Select and Place:**

Lone console 0 password friendS0nly

Encrypt all clear text passwords

Enable password uwi11NeverNo

Protect access to the user mode  
prompt

Service password-encryption

Set privileged mode clear text  
password

Login Password cantCome1n

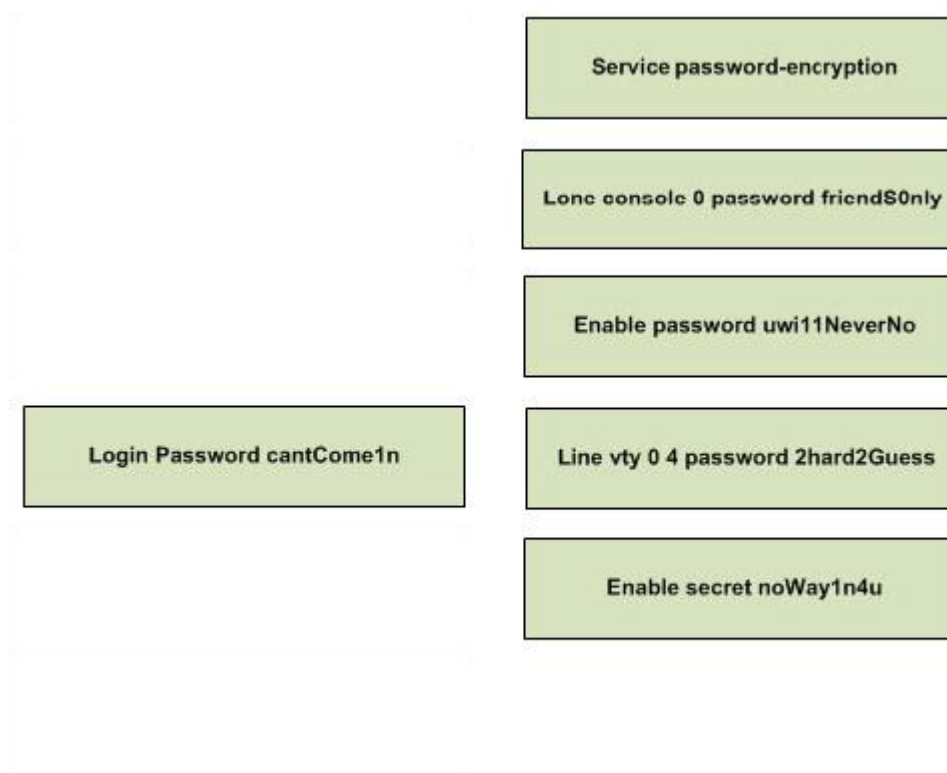
Set password to allow Telnet  
connections

Enable secret noWay1n4u

Set privileged mode encrypted  
password

Line vty 0 4 password 2hard2Guess

**Correct Answer:**



**Section: Drag and Drop**  
**Explanation**

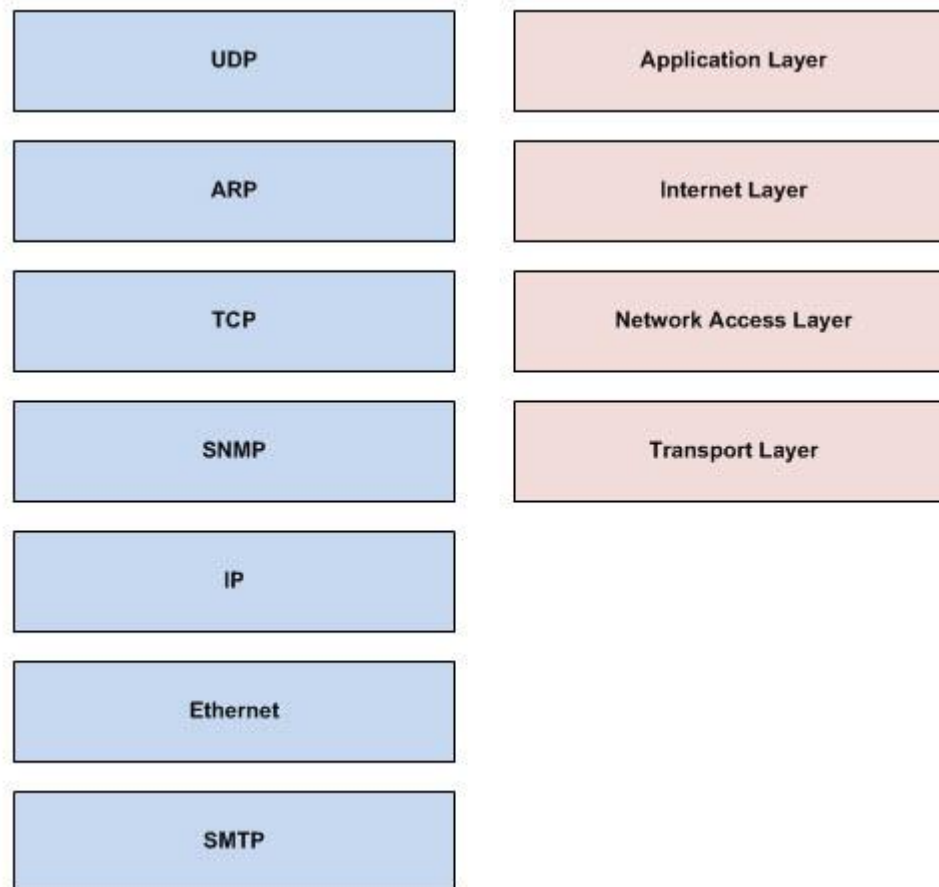
**Explanation/Reference:**

service password-encryption	encrypt all clear text passwords
line console 0 password friend\$0nly	protect access to the user mode prompt
enable secret noWay1n4u	set privileged mode encrypted password
line vty 0 4 password 2hard2Guess	set password to allow Telnet connections
enable password uwi11NeverNo	set privileged mode clear text password

**QUESTION 107**

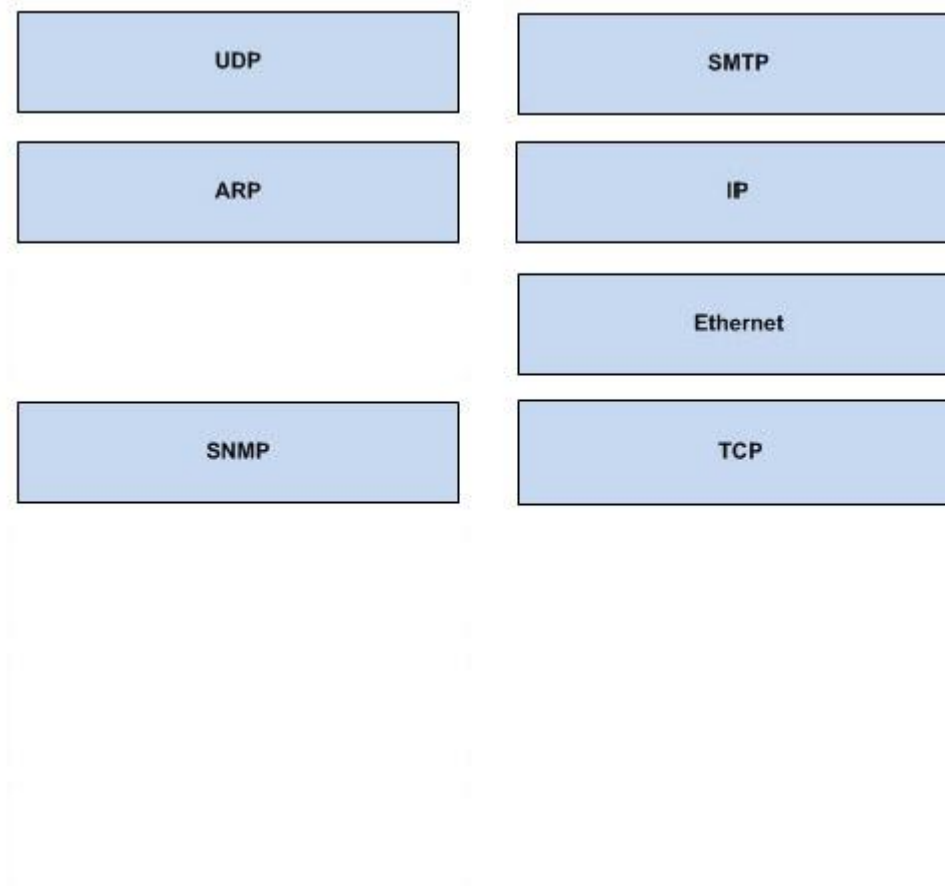
On the left are various network protocols. On the right are the layers of the TCP/IP model. Assuming a reliable connection is required, move the protocols on the left to the TCP/IP layers on the right to show the proper encapsulation for an email message sent by a host on a LAN. (Not all options are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

**Select and Place:**



**Correct Answer:**





**Section: Drag and Drop**  
**Explanation**

**Explanation/Reference:**  
+ application layer: SMTP  
+ transport layer: TCP  
+ internet layer: IP  
+ network access layer: Ethernet