



Cisco CCNA 200-301 PassFast

Cisco Certified Network Associate
(CCNA 200-301)

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CCNA Cisco Certified Network Associate (200-301)

Book Update Version 1.0

This book will dive into the latest practice questions needed before you take the Cisco CCNA exam 200-301.

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Chapter 1: Network Fundamentals

The objectives covered in this chapter:

20% 1.0 Network Fundamentals

1.1 Explain the role and function of network

components

1.1.a Routers

1.1.b L2 and L3 switches

1.1.c Next-generation firewalls and IPS

1.1.d Access points

1.1.e Controllers (Cisco DNA Center and WLC)

1.1.f Endpoints

1.1.g Servers

1.2 Describe characteristics of network topology architectures

1.2.a 2 tier

1.2.b 3 tier

1.2.c Spine-leaf

1.2.d WAN

1.2.e Small office/home office (SOHO)

1.2.f On-premises and cloud

1.3 Compare physical interface and cabling types

1.3.a Single-mode fiber, multimode fiber, copper

1.3.b Connections (Ethernet shared media and point-to-point)

1.3.c Concepts of PoE

1.4 Identify interface and cable issues (collisions, errors, mismatch duplex, and/or speed)

1.5 Compare TCP to UDP

1.6 Configure and verify IPv4 addressing and subnetting

1.7 Describe the need for private IPv4 addressing

1.8 Configure and verify IPv6 addressing and prefix

1.9 Compare IPv6 address types

1.9.a Global unicast

1.9.b Unique local

1.9.c Link local

1.9.d Anycast

1.9.e Multicast

1.9.f Modified EUI 64

1.10 Verify IP parameters for Client OS (Windows, Mac OS, Linux)

1.11 Describe wireless principles 1.11.a

Nonoverlapping Wi-Fi channels 1.11.b SSID

1.11.c RF 1.11.d Encryption

1.12 Explain virtualization fundamentals (virtual machines)

1.13 Describe switching concepts

1.13.a MAC learning and aging

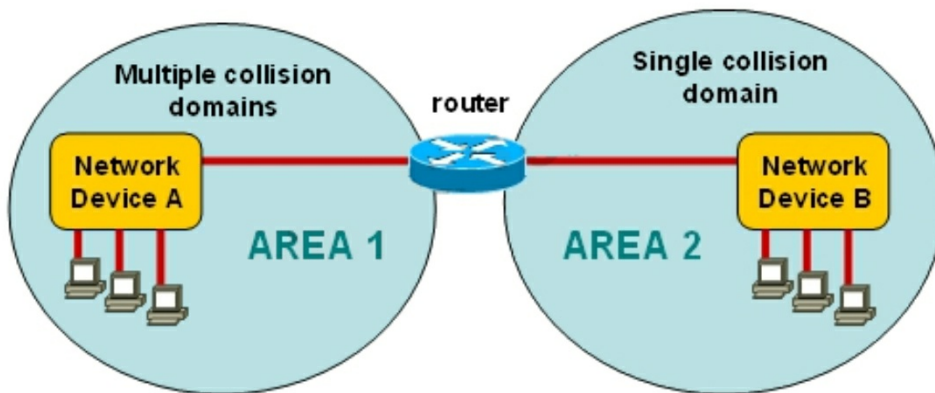
1.13.b Frame switching

1.13.c Frame flooding

1.13.d MAC address table

1. 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



2. 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.

3. At which layer of the OSI model is RSTP used to prevent loops?

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

4. 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

5. Which layer of the OSI model is responsible for segmenting data from a sending host that enables large files to be broken down into smaller segments to prevent transmission errors?

- A. Session
- B. Presentation
- C. Application
- D. Transport

6. 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

7. 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

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

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

9. What are two characteristics of segmenting a network with a router?
(Choose two).

- A. A router processes data more quickly than switches.
- B. Filtering can occur based on layer 3 information.
- C. A router decreases the number of collision domains.
- D. Adding a router to the network decreases latency.
- E. Broadcasts are not forwarded across the router.

10. A network administrator cannot connect to a remote router by using SSH. Part of the show interfaces command is shown.

```
router#show interfaces Serial0/1/0 is up, line protocol is down
```

At which OSI layer should the administrator begin troubleshooting?

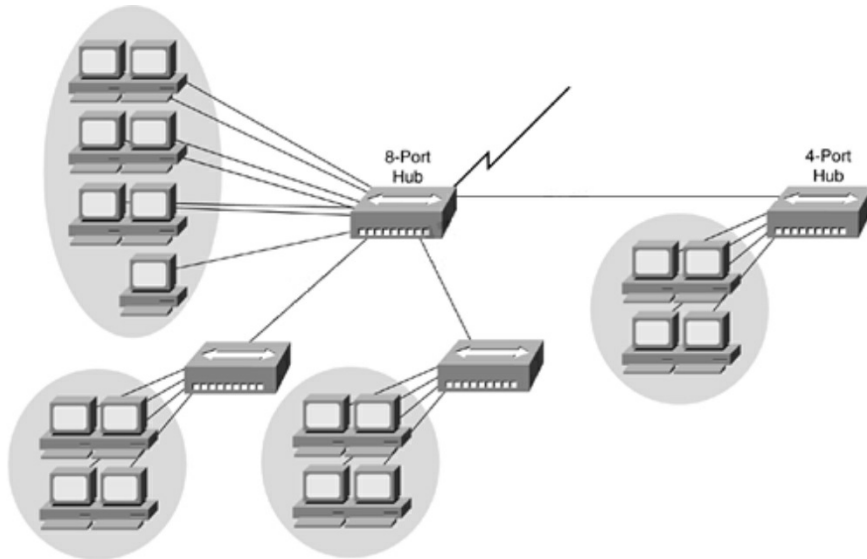
- A. physical
- B. data link
- C. network
- D. transport

11. What process is used to establish a connection-oriented virtual circuit between two communicating hosts?

- A. Flow control
- B. Sequencing
- C. Windowing
- D. Three-way handshake
- E. Duplexing

12. A receiving host computes the checksum on a frame and determines that the frame is damaged. The frame is then discarded. At which OSI layer did this happen?

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

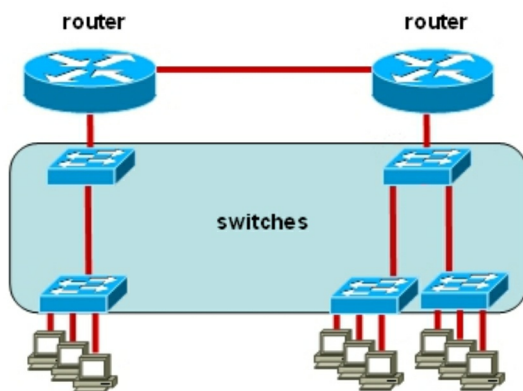


13. Refer to the exhibit.

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

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



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

15. 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

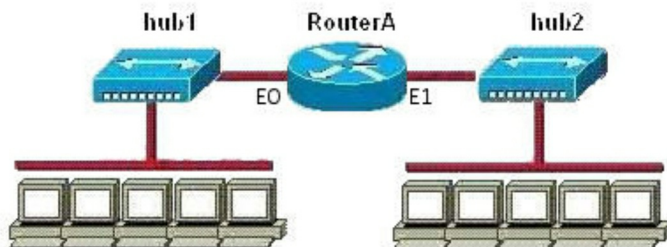
16. How does a switch differ from a hub?

- 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.

17. What is the purpose of flow control?

- A. To ensure data is retransmitted if an acknowledgement is not received.
- B. To reassemble segments in the correct order at the destination device.
- C. To provide a means for the receiver to govern the amount of data sent by the sender.
- D. To regulate the size of each segment.

18. Refer to the exhibit. How many collision domains are shown?



- A. One
- B. Two
- C. Three
- D. Four
- E. Six
- F. Twelve

19. What source and destination information can be found in the data link layer?

- A. URL
- B. IP address
- C. port number
- D. MAC address

20. When troubleshooting a LAN interface operating in full duplex mode, which error condition can be immediately ruled out?

- A. Giants
- B. No buffers
- C. Collisions
- D. Ignored
- E. Dribble condition

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

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

22. Refer to the exhibit. Which network device functions only at Layer 1 of the OSI model?

A) Bridge



B) Hub



C) NIC



D) Router



E) Switch



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

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

24. 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.

25. 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.

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

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

27. Which layer in the OSI reference model is responsible for determining the availability of the receiving program and checking to see if enough resources exist for that communication?

- A. Transport
- B. Network
- C. Presentation
- D. Session

E. Application

28. A network administrator is verifying the configuration of a newly installed host by establishing an FTP connection to a remote server. What is the highest layer of the protocol stack that the network administrator is using for this operation?

- A. Application
- B. Presentation
- C. Session
- D. Transport
- E. Internet
- F. Data link

29. What layer is responsible for combining bits into bytes, and bytes into frames?

- A. Application
- B. Presentation
- C. Transport
- D. Data Link

30. Which of the following correctly describe steps in the OSI data encapsulation process? (Choose two).

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

31. Which two Ethernet fiber-optic modes support distances of greater than 550 meters? (Choose two).

- A. 1000Base-LX
- B. 1000Base-FX
- C. 1000Base-SC

- D. 100Base-CX
- E. 1000Base-ZX

32. A network interface port has collision detection and carrier sensing enabled on a shared twisted pair network. From this statement, what is known about the network interface port?

- A. This is a 10Mbps switch port.
- B. This is a 100Mbps switch port.
- C. This is an Ethernet port operating at half duplex.
- D. This is an Ethernet port operating at full duplex.
- E. This is a port on a network interface card in a PC.

33. CSMA/CD is a protocol that helps devices do what?

- A. Increase bandwidth between all devices.
- B. Allows devices to transmit simultaneously.
- C. Share bandwidth evenly without having two devices transmit at the same time.
- D. Administers the bandwidth for the device that is currently transmitting.

34. Half-Duplex uses _____ with a digital signal running in both directions?

- A. One wire pair
- B. Two wire pairs
- C. Three wire pairs
- D. Four wire pairs

35. Identify the incorrect statement regarding Full-duplex.

- A. Uses CSMA/CD to avoid collisions.
- B. No collisions occur in full-duplex.
- C. A dedicated switchport is required for each full-duplex mode.
- D. The host NIC and Switchport must be full-duplex capable.

36. What is the first 24 bits in a MAC address called?

- A. NIC
- B. BIA
- C. OUI
- D. VAI

37. A MAC address is _____ bits long, and expressed in _____?

- A. 48, decimal
- B. 24, decimal

- C. 48, hexadecimal
- D. 32, hexadecimal

38. What is the decimal equivalent of 10010110?

- A. 140
- B. 170
- C. 120
- D. 150

39. What is the hexadecimal value of C?

- A. 0101
- B. 1100
- C. 1101
- D. 1110

40. What cable would you use between a Router and a Switch or Hub?

- A. Straight-Through
- B. Crossover
- C. Rolled
- D. Coax

41. What is the equivalent of 11001010.11110101.10000011.11101011 in hexadecimal?

- A. 0xE61A3D67
- B. 0xD8B2D356
- C. 0xCAF583EB
- D. 0xE81E3D36

42. The Cisco Hierarchical Model contains what three layers?

- A. Core Layer, Distribution Layer, Access Layer
- B. Backbone Layer, Production Layer, Access layer
- C. Border Gateway Layer, ISP Layer, Distribution Layer
- D. Regional Layer, Local Layer, User Layer

43. Which fields are contained within an IEEE Ethernet Frame? (Choose two).

- A. Source and destination MAC address.
- B. Source and destination network address.

- C. Source and destination port number.
- D. FCS Field.

44. 1000Base-T is which IEEE standard?

- A. 802.3F
- B. 802.3z
- C. 802.3ab
- D. 802.3ae

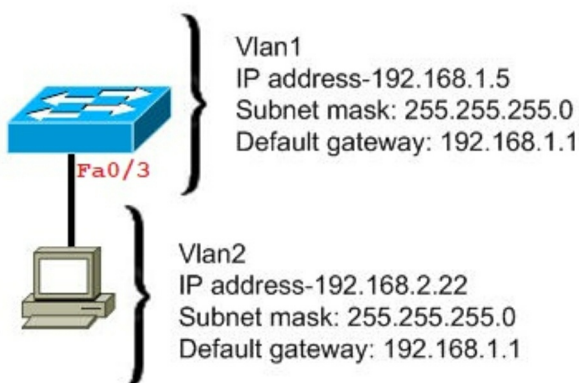
45. Data encapsulation follows what process?

- A. Application, Segment, Network, Frame, Bits
- B. Segments, Packets, Frames, Bits
- C. Coax, Twisted pair, Fiber, Wireless
- D. Packets, Frames, Segments, Bits
- E. Bits, Packets, Segments, Application data

46. What term is used for the unwanted signal interference from adjacent pairs in a cable?

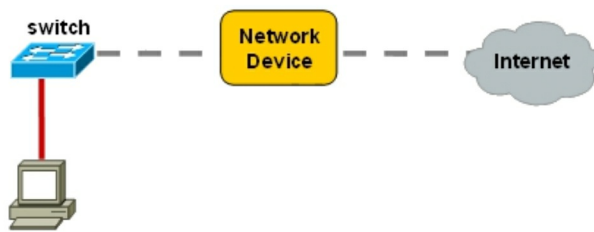
- A. EMI
- B. RFI
- C. Crosstalk
- D. Attenuation

47. Refer to the exhibit. A host is connected to switch port fa0/3. The host and switch have been fully configured for IP connectivity as shown. However, the indicator LED on switch port fa0/3 is not on, and the host cannot communicate with any other hosts including those connected to VLAN 2 on the same switch. Based on the given information, what is the problem?



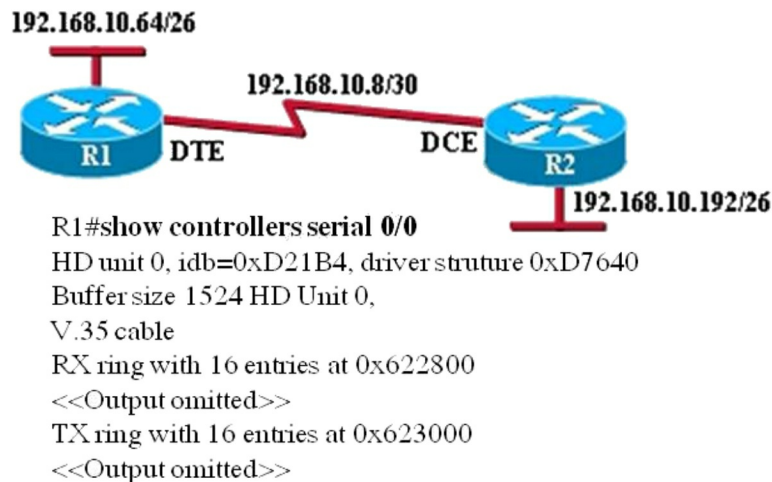
- A. Switch port fa0/3 is not configured as a trunk port.
- B. There is an incorrect cable type.
- C. The switch has been assigned an incorrect subnet mask.
- D. Switch port fa0/3 has been blocked by STP.
- E. The switch and the host must be in the same subnet.

48. 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.

49. 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.

50. 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.

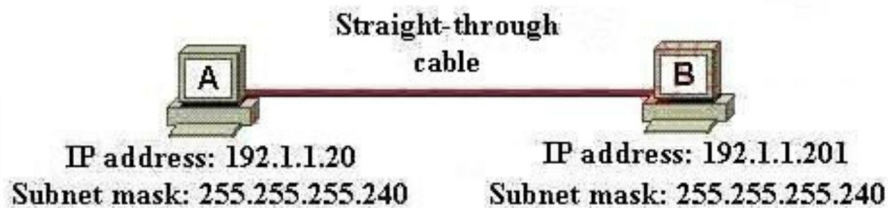
C. The use of hubs to enlarge the size of collision domains is one way to improve the operation of the CSMA/CD access method.

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.

51. Refer to the exhibit. A network administrator is connecting PC hosts A and B directly through their Ethernet interfaces as shown in the graphic. Ping attempts between the hosts are unsuccessful. What can be done to provide connectivity between the hosts? (Choose two).



A. A crossover cable should be used in place of the straight-through cable.

B. A rollover cable should be used in place of the straight-through cable.

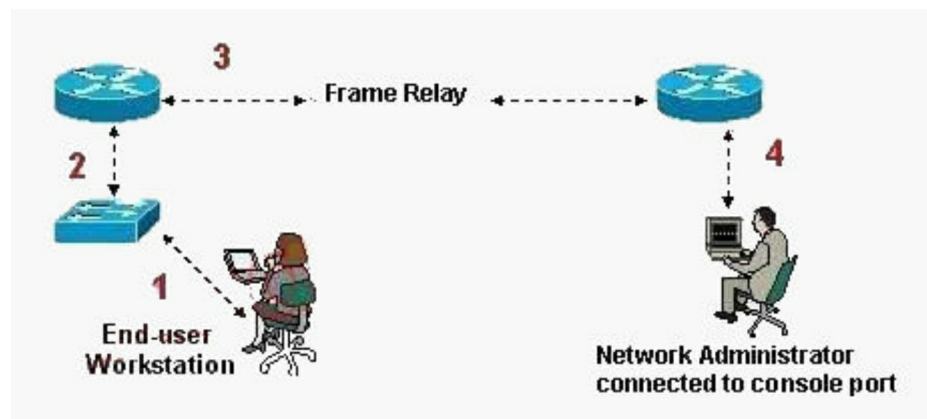
C. The subnet masks should be set to 255.255.255.192.

D. A default gateway needs to be set on each host.

E. The hosts must be reconfigured to use private IP addresses for direct connections of this type.

F. The subnet masks should be set to 255.255.255.0.

52. Refer to the exhibit. What kind of cable should be used to make each connection that is identified by the numbers shown?



- A. 1 - Ethernet Crossover cable 2 - Ethernet straight-through cable 3 - Fiber Optic cable 4 - Rollover cable.
- B. 1 - Ethernet straight-through cable 2 - Ethernet straight-through cable 3 - Serial cable 4 - Rollover cable.
- C. 1 - Ethernet rollover cable 2 - Ethernet crossover cable 3 - Serial cable 4 - Null-modem cable.
- D. 1 - Ethernet straight-through cable 2 - Ethernet Crossover cable 3 - Serial cable 4 - Rollover cable.
- E. 1 - Ethernet straight-through cable 2 - Ethernet Crossover cable 3 - Serial cable 4 - Ethernet Straight-through cable.

53. For what two purposes does the Ethernet protocol use physical addresses? (Choose two).

- A. To uniquely identify devices at Layer 2.
- B. To allow communication with devices on a different network.
- C. To differentiate a Layer 2 frame from a Layer 3 packet.
- D. To establish a priority system to determine which device gets to transmit first.
- E. To allow communication between different devices on the same network.
- F. To allow detection of a remote device when its physical address is

unknown.

54. In an Ethernet network, under what two scenarios can devices transmit?
(Choose two).

- A. When they receive a special token.
- B. When there is a carrier.
- C. When they detect no other devices are sending.
- D. When the medium is idle.
- E. When the server grants access.

55. If a router has four interfaces and each interface is connected to four switches, how many broadcast domains are present on the router?

- A. 1
- B. 2
- C. 4
- D. 8

56. The network administrator has asked you to check the status of the workstation's IP stack by pinging the loopback address. What address would you ping to perform this task?

- A. 10.1.1.1
- B. 192.168.0.1
- C. 127.0.0.1
- D. 239.1.1.1

57. Which IP address can be assigned to an internet interface?

- A. 9.255.255.10
- B. 10.180.48.224
- C. 192.168.20.223
- D. 172.16.200.18

58. What TCP message does a host send to establish a connection with a destination host?

- A. ISN
- B. Establish
- C. HELLO
- D. SYN
- E. Request open

f. ACK

59. The network administrator is using a Windows PC application that is called putty.exe for remote communication to a switch for network troubleshooting. Which two protocols could be used during this communication? (Choose two).

- A. SNMP
- B. HTTP
- C. Telnet
- D. RMON
- E. SSH

60. The corporate head office has a teleconferencing system that uses VOIP (voice over IP) technology. This system uses UDP as the transport for the data transmissions. If these UDP datagrams arrive at their destination out of sequence, what will happen?

- A. UDP will drop the datagrams.
- B. UDP will pass the information in the datagrams up to the next OSI layer in the order that they arrive.
- C. UDP will send an ICMP Information Request to the source host.
- D. UDP will use the sequence numbers in the datagram headers to reassemble the data in the correct order.

61. Which two benefits are provided by using a hierarchical addressing network addressing scheme? (Choose two).

- A. Ease of management and troubleshooting.
- B. Efficient utilization of MAC addresses.
- C. Dedicated communications between devices.
- D. Reduces routing table entries.
- E. Auto-negotiation of media rates.

62. Which of the following describes private IP addresses? (Choose two).

- A. Addresses that can be routed through the public internet.
- B. A scheme to conserve public addresses.
- C. Addresses licensed to enterprises or ISPs by an internet registry organization.
- D. Addresses chosen by a company to communicate with the internet.
- E. Addresses that cannot be routed through the public internet.

63. An administrator attempts a traceroute but receives a “Destination

Unreachable” message. Which protocol is responsible for that message?

- A. TCP
- B. SNMP
- C. RUDP
- D. RARP
- E. ICMP

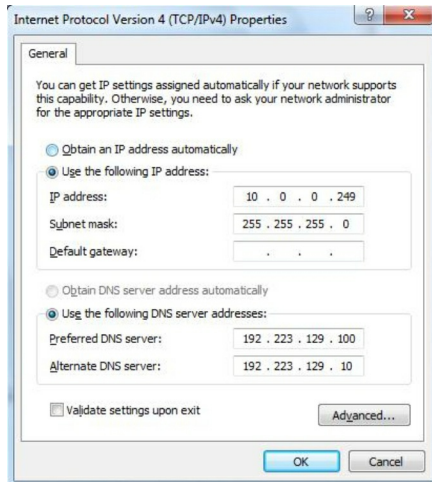
64. When two hosts are trying to communicate across a network, how does the host originating the communication determine the hardware address of the host that it wants to “talk” to?

- A. Show Network Address request
- B. ARP request
- C. RARP request
- D. Proxy ARP request
- E. Show Hardware Address request
- F. Ping request

65. Which of the following host addresses are members of networks that cannot be routed across the public internet? (Choose three).

- A. 10.172.13.65
- B. 198.234.12.95
- C. 172.16.223.125
- D. 172.64.12.29
- E. 212.193.48.254
- F. 192.168.23.252

66. Refer to the exhibit. Which option can be configured for the default gateway of the Local Area Connection?



- A. 192.223.129.0
- B. 10.0.0.0
- C. 192.223.129.254
- D. 10.0.0.254

67. Which command would you use on a Cisco router to verify the Layer 3 path to a host?

- A. tracert address
- B. traceroute address
- C. telnet address
- D. ssh address

68. Workstation A has been assigned an IP address of 192.0.2.24/28. Workstation B has been assigned an IP address of 192.0.2.100/28. The two workstations are connected with a straight-through cable. Attempts to ping between the hosts were unsuccessful. What two things can be done to allow communications between the hosts? (Choose two).

- A. Change the subnet mask of the hosts to /26.
- B. Change the address of Workstation A to 192.0.2.15.

- C. Change the subnet mask of the hosts to /25.
- D. Change the address of Workstation B to 192.0.2.111.
- E. Replace the straight-through cable with a crossover cable.

69. The network default gateway being applied to a host by DHCP is 192.168.5.33/28. Which of the following option is a valid IP address for that subnet?

- A. 192.168.5.14
- B. 192.168.5.47
- C. 192.168.5.40
- D. 192.168.5.55
- E. 192.168.5.32

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

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

71. An administrator issues the command ping 127.0.0.1 from the command line prompt on a PC. If a reply is received, what does this confirm?

- A. The PC has the TCP/IP protocol stack correctly installed.
- B. The PC has connectivity with a Layer 3 device.
- C. The PC has connectivity up to Layer 5 of the OSI model.
- D. The PC has connectivity with a local host.
- E. The PC has a default gateway correctly configured.

72. What will happen if a private IP address is assigned to a public interface connected to an ISP?

- A. Several automated methods will be necessary on the private network.
- B. The NAT process will be used to translate this address in a valid IP address.
- C. Only is ISP router will have the capability to access the public network.
- D. Addresses in a private range will be not routed on the internet backbone.
- E. A conflict of IP addresses happens, because other public routers can use the same range.

73. Where does routing occur within the DoD TCP/IP reference model?

- A. Transport
- B. Network
- C. Internet
- D. Application

74. On the network 131.1.123.0/27, what is the last IP address that can be assigned to a host?

- A. 131.1.123.32
- B. 131.1.123.31
- C. 131.1.123.30
- D. 131.1.123.33

75. A Layer 2 broadcast is also known as a hardware broadcast. Of the following, which two are binary and hexadecimal Layer 2 broadcasts? (Choose two).

- A. 11111111
- B. FF.FF.FF.FF.FF.FF
- C. 00000000
- D. 45.AC.24.E3.60.A5
- E. 255.255.255.255

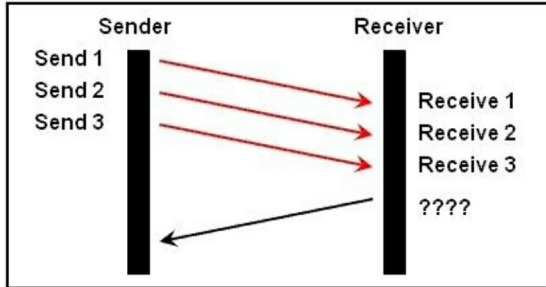
76. When is it necessary to use a public IP address on a routing interface?

- A. Connect a router on a local network.
- B. Allow distribution of routes between networks.
- C. Connect a network to the internet.
- D. Translate a private IP address.
- E. Connect a router to another router.

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

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

78. Refer to the exhibit. A TCP/IP Transfer is diagrammed in the exhibit. A window size of three has been negotiated for this transfer. Which message will be returned from the receiver to the sender as part of this TCP/IP transfer?



- A. send ACK 4-6
- B. send ACK 4
- C. send ACK 3
- D. send ACK 1-3
- E. send ACK 7
- F. send ACK 6

79. In addition to assigning an IP address, which of the following correctly describe regarding TCP/IP stack configuration features that DHCP can provide? (Choose three).

- A. DNS servers
- B. Subnet mask
- C. Helper address
- D. FTP server
- E. TFTP server
- F. Default gateway

80. 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

81. 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.

82. Which command can be used from a PC to verify the connectivity between hosts that connect through a switch in the same LAN?

- A. ping address
- B. tracert address
- C. traceroute address
- D. arp address

83. Which IP addresses are valid public Class A host addresses? Assume the default Class A subnet mask is in use. (Choose two).

- A. 10.154.16.87
- B. 11.22.33.44
- C. 68.95.255.100
- D. 127.0.0.1
- E. 128.16.89.72
- F. 131.241.78.3

84. A small company has a Class C network address and needs to create five subnets, each accommodating 25 hosts. Which subnet mask needs to be configured?

- A. 255.255.240.0
- B. 255.255.255.128
- C. 255.255.255.192
- D. 255.255.255.224
- E. 255.255.255.240
- F. 255.255.255.248

85. What is the maximum number of bits that can be borrowed to create subnets if a Class B network address is being used?

- A. 2
- B. 6
- C. 8
- D. 14

E. 16

86. 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

87. Given a subnet mask of 255.255.255.224, which of the following addresses can be assigned to network hosts? (Choose three).

- A. 201.45.116.159
- B. 15.234.118.63
- C. 217.63.12.192
- D. 92.11.178.93
- E. 134.178.18.56
- F. 192.168.16.87

88. 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

89. A new LAN segment is allocated the network number 172.16.0.0/25. What range of addresses are available for hosts on that network?

- A. 172.16.0.1 through 172.16.0.254
- B. 172.16.0.1 through 172.16.0.126
- C. 172.16.0.129 through 172.16.0.254
- D. 172.16.0.1 through 172.16.1.254
- E. 172.16.1.1 through 172.16.1.126
- F. 172.16.1.1 through 172.16.1.254

90. Which three network addresses are reserved for private network use?

(Choose three).

- A. 10.0.0.0
- B. 172.15.0.0
- C. 172.31.0.0
- D. 192.162.24.0
- E. 192.168.255.0
- F. 224.192.0.0

91. Which command will assign the last usable IP address from the 192.168.32.128/28 subnetwork to a router interface?

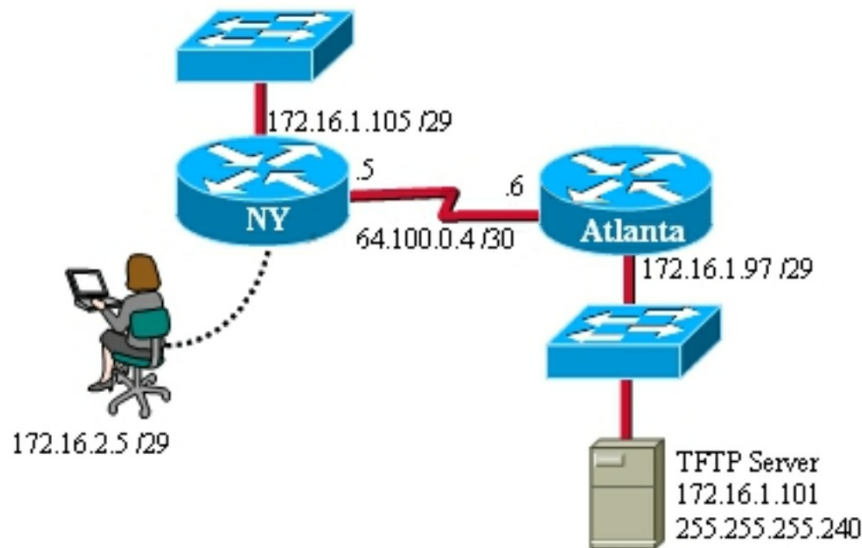
- A. Router(config-if)# ip address 192.168.32.142 255.255.255.240
- B. Router(config-if)# ip address 192.168.32.143 255.255.255.240
- C. Router(config-if)# ip address 192.168.32.158 255.255.255.240
- D. Router(config-if)# ip address 192.168.32.142 255.255.255.248
- E. Router(config-if)# ip address 192.168.32.144 255.255.255.224
- F. Router(config-if)# ip address 192.168.32.158 255.255.255.224

92. 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

93. Which of the following correctly pairs the dotted decimal subnet mask with the correct number of binary bits that represent the subnet mask?

- A. 255.255.255.192 and /25
- B. 255.255.255.248 and /28
- C. 255.255.255.224 and /26
- D. 255.255.255.248 and /27
- E. 255.255.255.240 and /28
- F. 255.255.255.240 and /16



94. 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.

95. A network engineer needs to configure a branch office for 82 hosts. What is the most efficient use of a subnet mask?

- A. 255.255.255.128
- B. 255.255.255.192
- C. 255.255.255.224
- D. 255.255.255.248

96. What starting binary pattern indicates an address range evenly split between network and host size?

- A. 01xxxxxx
- B. 0xxxxxxx
- C. 10xxxxxx
- D. 110xxxxx

97. 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

98. Your ISP has given you the address 223.5.14.7/29 to assign to your router's interface. They have also given you the default gateway address of 223.5.14.4. After you have configured the address, the router is unable to ping any remote devices. What is preventing the router from pinging remote devices?

- A. The IP address is an invalid class D multicast address.
- B. The default gateway is the broadcast address for this subnet.
- C. The IP address is the broadcast address for this subnet.
- D. The default gateway is not an address on the subnet.

99. A network administrator has been assigned an IP address space of 192.168.1.0/24 for a network with three segments. The first segment needs to support 60 hosts. The second segment needs to support 45 hosts. The third segment needs to support 30 hosts. Which two statements describe this choice? (Choose two).

- A. The assigned address will not provide enough IP address space for the required number of hosts.
- B. The assigned address represents private IP address space.
- C. User IP addresses must be translated to public IP addresses when accessing the Internet.
- D. User IP addresses must be translated to private IP addresses when communicating to hosts on other network segments.
- E. This assignment will compromise network security.

100. How many hosts are available for 192.168.1.1/28?

- A. 14

- B. 15
- C. 16
- D. 17
- E. 18

101. You need to configure 52 hosts for a computer lab. Which subnet mask is appropriate?

- A. 255.255.255.224
- B. 255.255.255.248
- C. 255.255.254.240
- D. 255.255.255.192

102. Which subnet mask provides the most efficient use of a Class C address space for a company that requires 10 subnets and 12 hosts per subnet?

- A. 255.255.255.192
- B. 255.255.255.248
- C. 255.255.255.0
- D. 255.255.255.224
- E. 255.255.255.252
- F. 255.255.255.240

103. What is the last usable address of the network 10.10.64.0
255.255.252.0?

- A. 10.10.64.254
- B. 10.10.67.254
- C. 10.10.66.254
- D. 10.10.65.254

104. What is the most efficient subnet mask for a small branch office with seven hosts?

- A. 255.255.255.0
- B. 255.255.255.248
- C. 255.255.255.240
- D. 255.255.255.224

105. 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.

106. Which IP address is a private address?

- A. 12.0.0.1
- B. 168.172.19.39
- C. 172.20.14.36
- D. 172.33.194.30
- E. 192.169.42.34

107. Which class of IP address will provide sufficient addresses for 66,000 or more hosts?

- A. Class A
- B. Class B
- C. Class C
- D. Class D
- E. Class E

108. From which IP address class can 15 bits be borrowed to create subnets?

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

109. 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.

110. 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

111. 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

112. If a host on a network has the address 172.16.45.14/30, what is the address of the subnetwork to which this host belongs?

A. 172.16.45.0

B. 172.16.45.4

C. 172.16.45.8

D. 172.16.45.12

E. 172.16.45.16

113. 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

114. What is the subnet address of 172.16.159.159/22?

A. 172.16.0.0

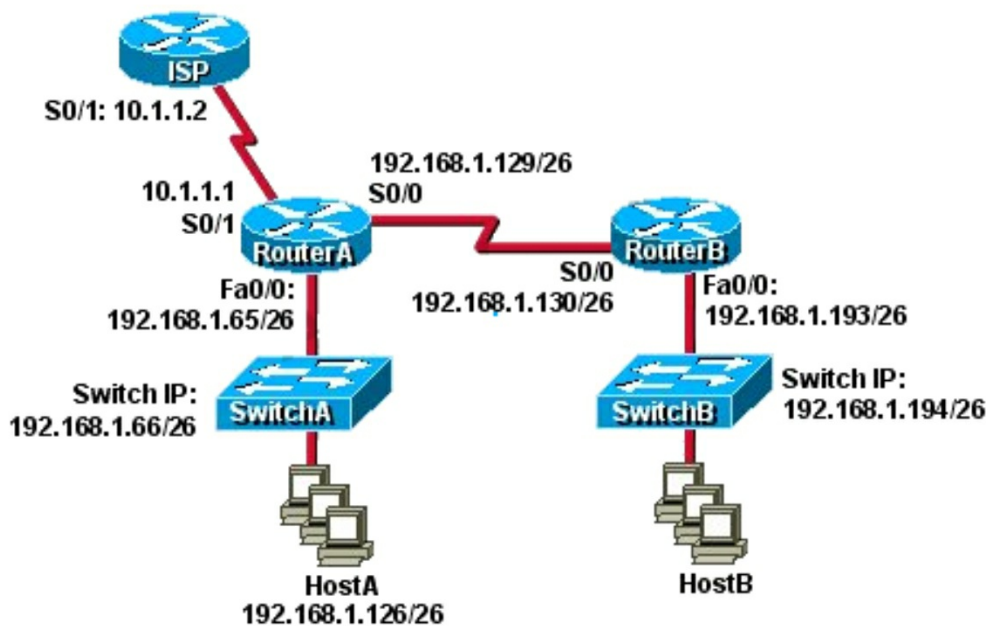
B. 172.16.128.0

C. 172.16.156.0

D. 172.16.159.0

E. 172.16.159.128

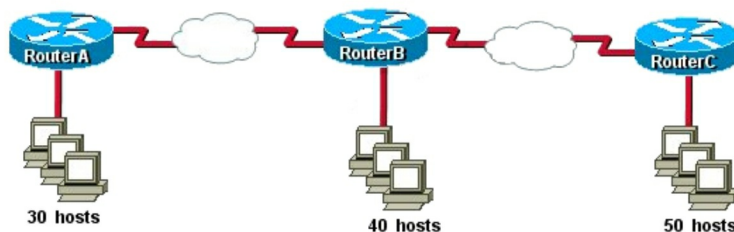
F. 172.16.192.0



115. 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

116. 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?



- A. 255.255.255.192
- B. 255.255.255.224
- C. 255.255.255.240
- D. 255.255.255.248
- E. 255.255.255.252

117. Which of the following describe Class A host addresses? (Choose three).

- A. The decimal value of the first octet can range from 1 to 126.
- B. The decimal value of the first octet can range from 1 to 192.
- C. The first octet represents the entire network portion of the address.
- D. The default subnet mask for a Class A network is 255.255.0.0.
- E. The value of the first binary place in the first octet must be 0.
- F. The first two binary bits of the address must be 00.

118. Refer to the exhibit. After configuring two interfaces on the HQ router, the network administrator notices an error message. What must be done to fix this error?

```
HQ#configure terminal
HQ(config)#interface fastethernet0/0
HQ(config-if)#ip address 192.168.1.17 255.255.255.0
HQ(config-if)#no shutdown
HQ(config-if)#interface serial0/0
HQ(config-if)#ip address 192.168.1.65 255.255.255.240
HQ(config-if)#no shutdown
% 192.168.1.0 overlaps with FastEthernet0/0
```

- A. The serial interface must be configured first.
- B. The serial interface must use the address 192.168.1.2.
- C. The subnet mask of the serial interface should be changed to 255.255.255.0.
- D. The subnet mask of the FastEthernet interface should be changed to 255.255.255.240.

E. The address of the FastEthernet interface should be changed to 192.168.1.66.

119. From where does a small network get its IP network address?

- A. Internet Assigned Numbers Authority (IANA)
- B. Internet Architecture Board (IAB)
- C. Internet Service Provider (ISP)
- D. Internet Domain Name Registry (IDNR)

120. A network administrator has subnetted the 172.16.0.0 network using a subnet mask of 255.255.255.192. A duplicate IP address of 172.16.2.120 has accidentally been configured on a workstation in the network. The technician must assign this workstation a new IP address within that same subnetwork. Which address should be assigned to the workstation?

- A. 172.16.1.80
- B. 172.16.2.80
- C. 172.16.1.64
- D. 172.16.2.64
- E. 172.16.2.127
- F. 172.16.2.128

121. If an Ethernet port on a router was assigned an IP address of 172.16.112.1/20, what is the maximum number of hosts allowed on this subnet?

- A. 1024
- B. 2046
- C. 4094
- D. 4096
- E. 8190

122. A host computer has the IP address 192.168.43.139 and netmask 255.255.255.240. On which logical IP network does this host reside?

- A. 192.168.0.0/26
- B. 192.168.0.0/28
- C. 192.168.43.0/28
- D. 192.168.43.64/28
- E. 192.168.43.112/28
- F. 192.168.43.128/28

```
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 4
password cisco
login
exit
```

123. 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?

- 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.

124. 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

125. You have been asked to come up with a subnet mask that will allow all three web servers to be on the same network while providing the maximum number of subnets. Which network address and subnet mask meet this

requirement?

- A. 192.168.252.0 255.255.255.252
- B. 192.168.252.8 255.255.255.248
- C. 192.168.252.8 255.255.255.252
- D. 192.168.252.16 255.255.255.240
- E. 192.168.252.16 255.255.255.252

126. Given an IP address 172.16.28.252 with a subnet mask of 255.255.240.0, what is the correct network address?

- A. 172.16.16.0
- B. 172.16.0.0
- C. 172.16.24.0
- D. 172.16.28.0

127. You are working in a data center environment and are assigned the address range 10.188.31.0/23. You are asked to develop an IP addressing plan to allow the maximum number of subnets with as many as 30 hosts each. Which IP address range meets these requirements?

- A. 10.188.31.0/26
- B. 10.188.31.0/25
- C. 10.188.31.0/28
- D. 10.188.31.0/27
- E. 10.188.31.0/29

128. 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

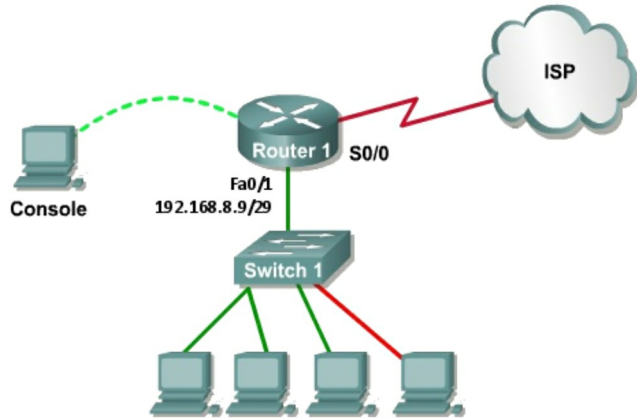
129. Which of the following IP addresses are valid Class B host addresses if a default Class B mask is in use? (Choose two).

- A. 10.6.8.35
- B. 133.6.5.4
- C. 192.168.5.9
- D. 127.0.0.1
- E. 190.6.5.4

130. What are two reasons that duplex mismatches can be difficult to diagnose? (Choose two).

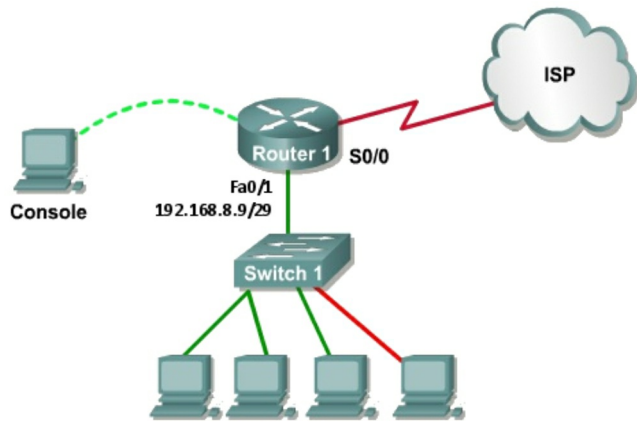
- A. The interface displays a connected (up/up) state even when the duplex settings are mismatched.
- B. The symptoms of a duplex mismatch may be intermittent.
- C. Autonegotiation is disabled.
- D. Full-duplex interfaces use CSMA/CD logic, so mismatches may be disguised by collisions.
- E. 1-Gbps interfaces are full-duplex by default.

131. Refer to the exhibit. What is the subnet broadcast address of the LAN connected to Router1?



- A. 192.168.8.15
- B. 192.168.8.31
- C. 192.168.8.63
- D. 192.168.8.127

132. Refer to the exhibit. Including the address on the Router1 Ethernet interface, how many hosts can have IP addresses on the LAN to which Router1 is connected?



A. 6

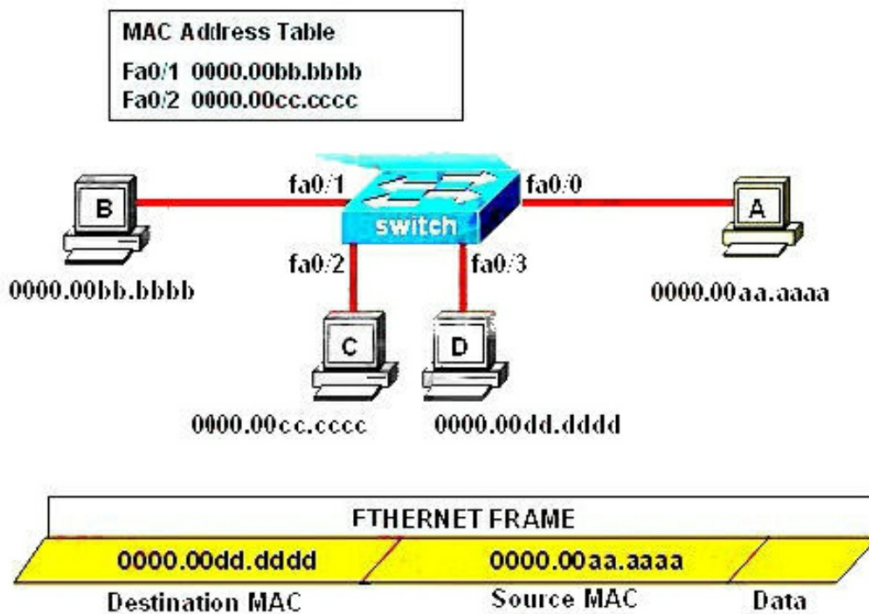
- B. 30
- C. 62
- D. 126

133. An Ethernet cable is attached to a PC NIC and then attached to a switch port. The PC power is turned on and the switch port link LED turns green. The link light indicates what two conditions? (Choose two).

- A. Layer 2 communication has been established between the PC and switch.
- B. The PC has received a DHCP address.
- C. Traffic is being sent from the switch to the PC.
- D. If flashing, the green LED indicates port speed of 100 Mb/s.
- E. The Layer 1 media is functioning between the PC and switch.
- F. The switch port is functioning as a half-duplex connection.

134. 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



135. 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

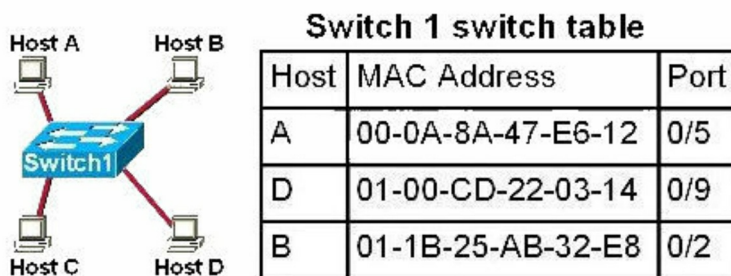
shown arrives at the switch. What two operations will the switch perform when it receives this frame? (Choose two).

- A. The MAC address of 0000.00dd.dddd will be added to the MAC address table.
- B. The MAC address of 0000.00aa.aaaa 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.

136. 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

137. 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?



Switch 1 switch table

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

- 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.

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

138. 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?

- 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.

139. 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

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

- A. The system is malfunctioning.
- B. The system is not powered up.
- C. The system is powered up and operational.
- D. The system is forwarding traffic.
- E. The system is sensing excessive collisions.

141. What are two effects on network performance of configuring a switch to store an entire frame before forwarding it to the destination? (Choose two).

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

142. Which command will set the default gateway to 192.168.12.1 on a Cisco switch?

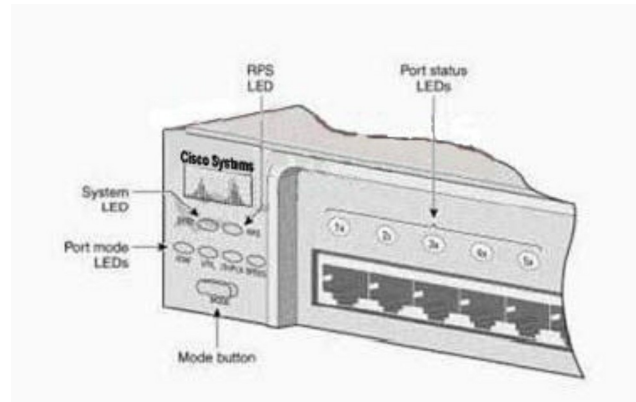
- A. Switch(config)# ip default-network 192.168.12.1
- B. Switch(config)# ip route-default 192.168.12.1
- C. Switch(config)# ip default-gateway 192.168.12.1
- D. Switch(config)# ip route 192.168.12.1 0.0.0.0

143. Refer to the exhibit. Switch-1 needs to send data to a host with a MAC address of 00b0.d056.efa4. What will Switch-1 do with this data?

```
Switch-1# show mac address-table
Dynamic Addresses Count:      3
Secure Addresses (User-defined) Count:  0
Static Addresses (User-defined) Count:  0
System Self Addresses Count:    41
Total Mac addresses:          50
Non-static Address Table:
Destination Address  Address Type  VLAN  Destination Port
-----
0010.0de0.e288      Dynamic      1     FastEthernet0/1
0010.7b00.1540      Dynamic      2     FastEthernet0/3
0010.7b00.1545      Dynamic      2     FastEthernet0/2
```

- A. Switch-1 will drop the data because it does not have an entry for that MAC address.
- B. Switch-1 will flood the data out all of its ports except the port from which the data originated.
- C. Switch-1 will send an ARP request out all its ports except the port from which the data originated.
- D. Switch-1 will forward the data to its default gateway.

144. Refer to the exhibit. After the power-on self-test (POST), the system LED of a Cisco 2950 switch turns amber. What is the status of the switch?



- A. The POST was successful.
- B. The switch has a problem with the internal power supply and needs an external power supply to be attached.
- C. POST failed and there is a problem that prevents the operating system of the switch from being loaded.
- D. The switch has experienced an internal problem but data can still be forwarded at a slower rate.
- E. The switch passed POST, but all the switch ports are busy.

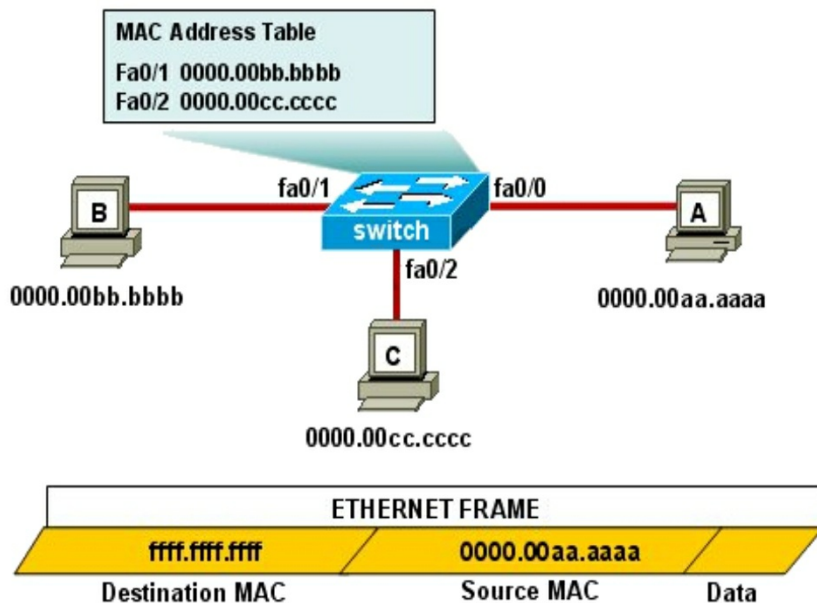
145. What are two advantages of Layer 2 Ethernet switches over hubs? (Choose two).

- A. decreasing the number of collision domains

- B. filtering frames based on MAC addresses
- C. allowing simultaneous frame transmissions
- D. increasing the size of broadcast domains
- E. increasing the maximum length of UTP cabling between devices

146. 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



147. Refer to the exhibit. The MAC address table is shown in its entirety. The Ethernet frame that is shown arrives at the switch. What two operations will the switch perform when it receives this frame? (Choose two).

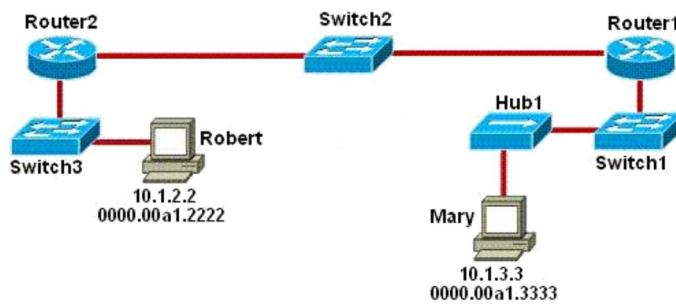
- A. The switch will not forward a frame with this destination MAC address.

- B. The MAC address of 0000.00aa.aaaa will be added to the MAC Address Table.
- C. The MAC address of ffff.ffff.ffff will be added to the MAC address table.
- D. The frame will be forwarded out 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.

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

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

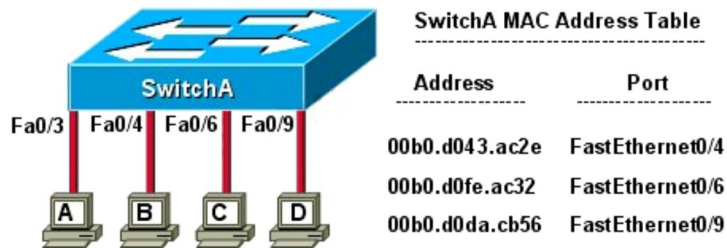
149. Refer to the exhibit. As packets travel from Mary to Robert, which three devices will use the destination MAC address of the packet to determine a forwarding path? (Choose three).



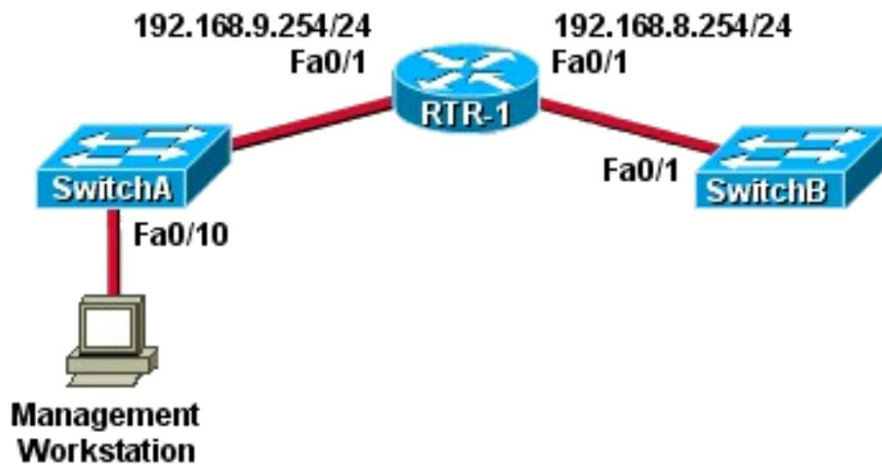
- A. Hub1
- B. Switch1
- C. Router1
- D. Switch2
- E. Router2

F. Switch3

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



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



151. Refer to the exhibit. A technician has installed SwitchB and needs to configure it for remote access from the management workstation connected to SwitchA. Which set of commands is required to accomplish this task?

A. SwitchB(config)#interface FastEthernet 0/1
SwitchB(config-if)#ip address 192.168.8.252 255.255.255.0
SwitchB(config-if)#no shutdown

B. SwitchB(config)#interface vlan 1
SwitchB(config-if)#ip address 192.168.8.252 255.255.255.0
SwitchB(config-if)#ip default-gateway 192.168.8.254 255.255.255.0
SwitchB(config-if)# no shutdown

C. SwitchB(config)#ip default-gateway 192.168.8.254
SwitchB(config)# interface vlan 1
SwitchB(config-if)#ip address 192.168.8.252 255.255.255.0
SwitchB(config-if)#no shutdown

```

D. SwitchB(config)#ip default-network 192.168.8.254
SwitchB(config)#interface vlan 1
SwitchB(config-if)#ip address 192.168.8.252 255.255.255.0
SwitchB(config-if)#no shutdown

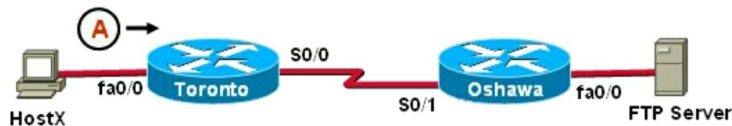
```

```

E. SwitchB(config)#ip route 192.168.8.254 255.255.255.0
SwitchB(config)#interface FastEthernet 0/1
SwitchB(config-if)#ip address 192.168.8.252 255.255.255.0
SwitchB(config-if)#no shutdown

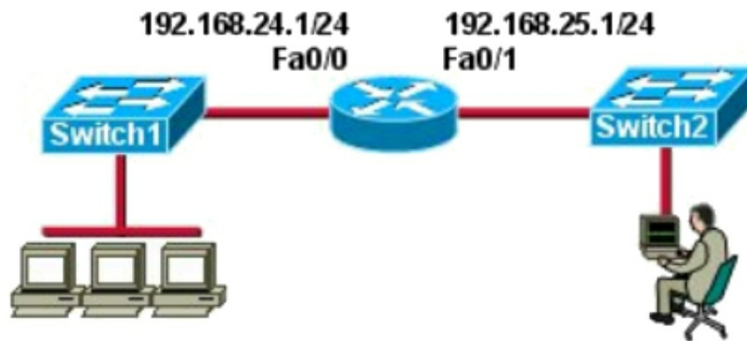
```

152. 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?



	IP Address	MAC Address
HostA	192.168.1.5	abcd.1123.0045
fa0/0 (Toronto)	192.168.1.1	abcd.2246.0035
fa0/0 (Oshawa)	192.168.7.1	aabb.7777.3333
FTP Server	192.168.7.17	aabb.5555.2222

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



```

Switch1# show running-config
!
hostname Switch1
!
enable secret 5 $1$8V43$Wm12DE8klwUjf8EcZnFT7/
enable password guess
!
<output omitted>
!
interface Vlan1
 ip address 192.168.24.2 255.255.255.0
 no ip route-cache
!
ip http server
!
line con 0
line vty 0 4
 password cisco
 login
!
end

```

153. The network administrator cannot connect to Switch1 over a Telnet session, although the hosts attached to Switch1 can ping the interface Fa0/0 of the router. Given the information in the graphic and assuming that the router and Switch2 are configured properly, which of the following commands should be issued on Switch1 to correct this problem?

A. Switch1(config)#line con 0
Switch1(config-line)#password cisco

Switch1(config-line)#login

B. Switch1(config)#interface fa0/1

Switch1(config-if)#ip address 192.168.24.3 255.255.255.0

C. Switch1(config)#ip default-gateway 192.168.24.1

D. Switch1(config)#interface fa0/1

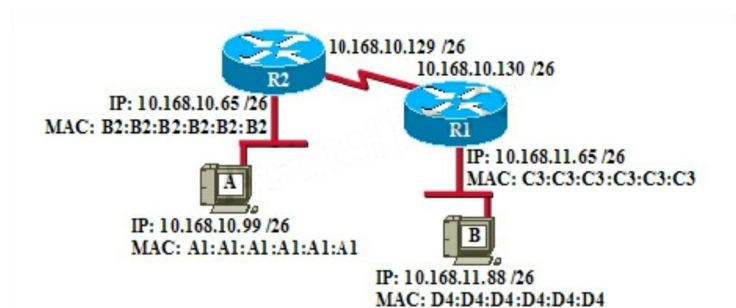
Switch1(config-if)#duplex full

Switch1(config-if)#speed 100

E. Switch1(config)#interface fa0/1

Switch1(config-if)#switchport mode trunk

154. 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

155. Which name describes an IPv6 host-enabled tunneling technique that uses IPv4 UDP, does not require dedicated gateway tunnels, and, can pass through existing IPv4 NAT gateways?

A. Dual stack

- B. Teredo
- C. Manual 6to4
- D. Dynamic

156. Which of these represents an IPv6 link-local address?

- A. FE08:
- B. 2001::
- C. 2002::
- D. FE80::
- E. FF02::

157. Which option is a valid IPv6 address?

- A. 2004:1:25A4:886F::1
- B. 2002:7654:A1AD:61:81AF:CCC1
- C. 2001:0000:130F::099a::12a
- D. FEC0:ABCD:WXYZ:0067::2A4

158. Which statement about IPv6 is true?

- A. Addresses are not hierarchical and are assigned at random.
- B. Only one IPv6 address can exist on a given interface.
- C. There are 2.7 billion addresses available.
- D. Broadcasts have been eliminated and replaced with multicasts.

159. Which IPv6 address is the all-router multicast group?

224.0.0.2.

- A. FF02::2
- B. FF02::1
- C. FF02::4
- D. FF02::3

160. Which three are characteristics of an IPv6 anycast address? (Choose three).

- A. The same address for multiple devices in the group.
- B. Delivery of packets to the group interface that is closest to the sending device.
- C. any-to-many communication model.
- D. one-to-many communication model.
- E. A unique IPv6 address for each device in the group.
- F. one-to-nearest communication model.

161. Which address is the IPv6 all-RIP-routers multicast group address that is used by RIPng as the destination address for RIP updates?

- A. FF02::6
- B. FF05::101
- C. FF02::9
- D. FF02::A

162. Which IPv6 address is the equivalent of the IPv4 interface loopback address 127.0.0.1?

- A. ::1
- B. 0::/10
- C. 2000::/3
- D. ::

163. What are three IPv6 transition mechanisms? (Choose three).

- A. VPN tunneling
- B. Teredo tunneling
- C. ISATAP tunneling
- D. GRE tunneling
- E. 6to4 tunneling

164. Which two statements describe characteristics of IPv6 unicast addressing? (Choose two).

- A. Link-local addresses start with FF00:/10.
- B. If a global address is assigned to an interface, then that is the only allowable address for the interface.
- C. Link-local addresses start with FE00:/12.
- D. There is only one loopback address and it is ::1.
- E. Global addresses start with 2000:/3.

165. How is an EUI-64 format interface ID created from a 48-bit MAC address?

- A. By prefixing the MAC address with 0xFF and appending 0xFF to it.
- B. By inserting 0xFFFE between the upper three bytes and the lower three bytes of the MAC address.
- C. By prefixing the MAC address with 0xFFEE.
- D. By prefixing the MAC address with 0xF and inserting 0xF after each of its first three bytes.
- E. By appending 0xFF to the MAC address.

166. What is known as “one-to-nearest” addressing in IPv6?

- A. Multicast
- B. Anycast
- C. Unspecified address
- D. Global unicast

167. Which two of these statements are true of IPv6 address representation? (Choose two).

- A. Every IPv6 interface contains at least one loopback address.
- B. There are four types of IPv6 addresses: unicast, multicast, anycast, and broadcast.
- C. The first 64 bits represent the dynamically created interface ID.
- D. Leading zero's in an IPv6 16 bit hexadecimal field are mandatory.
- E. A single interface may be assigned multiple IPv6 addresses of any type.

168. The network administrator has been asked to give a reason for moving from an IPv4 network to an IPv6 network. What are two reasons for adopting IPv6 over IPv4? (Choose two).

- A. Change of destination address in the IPv6 header.
- B. NAT.
- C. Change of source address in the IPv6 header.
- D. No broadcast.
- E. Telnet does not require a password.
- F. autoconfiguration.

169. In which integration method is an IPv6 packet encapsulated within an IPv4 protocol?

- A. dual-stack
- B. tunneling
- C. dot1q
- D. proxy

170. Which two statements about IPv6 router advertisement messages are true? (Choose two).

- A. They use ICMPv6 type 134.
- B. The advertised prefix length must be 64 bits.
- C. The advertised prefix length must be 48 bits.
- D. They are sourced from the configured IPv6 interface address.
- E. Their destination is always the link-local address of the neighboring node.

171. Which statement about IPv6 is true?

- A. An IPv6 address is 64 bits long and is represented as hexadecimal characters.
- B. An IPv6 address is 128 bits long and is represented as decimal digits.
- C. An IPv6 address is 32 bits long and is represented as decimal digits.
- D. An IPv6 address is 128 bits long and is represented as hexadecimal characters.

172. Which command can you use to manually assign a static IPv6 address to a router interface?

- A. ipv6 autoconfig 2001:db8:2222:7272::72/64
- B. ipv6 autoconfig
- C. ipv6 address PREFIX_1::1/64
- D. ipv6 address 2001:db8:2222:7272::72/64

173. What are three features of the IPv6 protocol? (Choose three).

- A. Optional IPsec
- B. Autoconfiguration
- C. No broadcasts
- D. Complicated header
- E. Plug-and-play
- F. Checksums

174. Which two are features of IPv6? (Choose two).

- A. anycast.
- B. broadcast.
- C. multicast.
- D. podcast.
- E. allcast.

175. What is the alternative notation for the IPv6 address

B514:82C3:0000:0000:0029:EC7A:0000:EC72?

- A. B514:82C3:0029:EC7A:EC72
- B. B514:82C3::0029:EC7A:EC72
- C. B514:82C3:0029::EC7A:0000:EC72
- D. B514:82C3::0029:EC7A:0:EC72

176. How many bits are contained in each field of an IPv6 address?

- A. 24
- B. 4

- C. 8
- D. 16

177. Which IPv6 address is valid?

- A. 2001:0db8:0000:130F:0000:0000:08GC:140B
- B. 2001:0db8:0:130H::87C:140B
- C. 2031::130F::9C0:876A:130B
- D. 2031:0:130F::9C0:876A:130B

178. Which statements are TRUE regarding Internet Protocol version 6 (IPv6) addresses? (Choose three).

- A. An IPv6 address is divided into eight 16-bit groups.
- B. A double colon (::) can only be used once in a single IPv6 address.
- C. IPv6 addresses are 196 bits in length.
- D. Leading zeros cannot be omitted in an IPv6 address.
- E. Groups with a value of 0 can be represented with a single 0 in IPv6 address.

179. Identify the four valid IPv6 addresses. (Choose four).

- A. ::
- B. ::192:168:0:1
- C. 2000::
- D. 2001:3452:4952:2837::
- E. 2002:c0a8:101::42
- F. 2003:dead:beef:4dad:23:46:bb:101

180. Which of the following describes the process of encapsulating IPv6 packets inside IPv4 packets?

- A. Routing
- B. Tunneling
- C. Hashing
- D. NAT
- E. PAT

181. Which of these represents an IPv6 link-local address?

- A. FE80::380e:611a:e14f:3d69
- B. FE81::280f:512b:e14f:3d69
- C. FEFE:0345:5f1b::e14d:3d69
- D. FE08::280e:611:a:f14f:3d69

182. The network administrator has been asked to give reasons for moving from IPv4 to IPv6. What are two valid reasons for adopting IPv6 over IPv4? (Choose two).

- A. No broadcast.
- B. Change of source address in the IPv6 header.
- C. Change of destination address in the IPv6 header.
- D. Telnet access does not require a password.
- E. autoconfig
- F. NAT

183. Which IPv6 header field is equivalent to the TTL?

- A. Hop Limit
- B. Flow Label
- C. TTD
- D. Hop Count
- E. Scan Timer

184. Which two statements about the tunnel mode ipv6ip command are true? (Choose two).

- A. It enables the transmission of IPv6 packets within the configured tunnel.
- B. It specifies IPv4 as the encapsulation protocol.
- C. It specifies IPv6 as the encapsulation protocol.
- D. It specifies IPv6 as the transport protocol.
- E. It specifies that the tunnel is a Teredo tunnel.

185. In which three ways is an IPv6 header simpler than an IPv4 header? (Choose three).

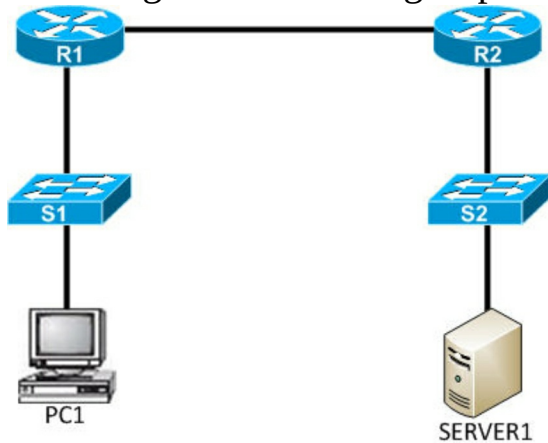
- A. Unlike IPv4 headers, IPv6 headers have a fixed length.
- B. IPv6 uses an extension header instead of the IPv4 Fragmentation field.
- C. IPv6 headers eliminate the IPv4 Checksum field.
- D. IPv6 headers use the Fragment Offset field in place of the IPv4 Fragmentation field.
- E. IPv6 headers use a smaller Option field size than IPv4 headers.
- F. IPv6 headers use a 4-bit TTL field, and IPv4 headers use an 8-bit TTL field.

186. Which two features can dynamically assign IPv6 addresses? (Choose two).

- A. IPv6 stateless autoconfiguration

- B. DHCP
- C. NHRP
- D. IPv6 stateful autoconfiguration
- E. ISATAP tunneling

187. Refer to the exhibit. PC1 is trying to login into SERVER1. Which of the following troubleshooting steps is incorrect?



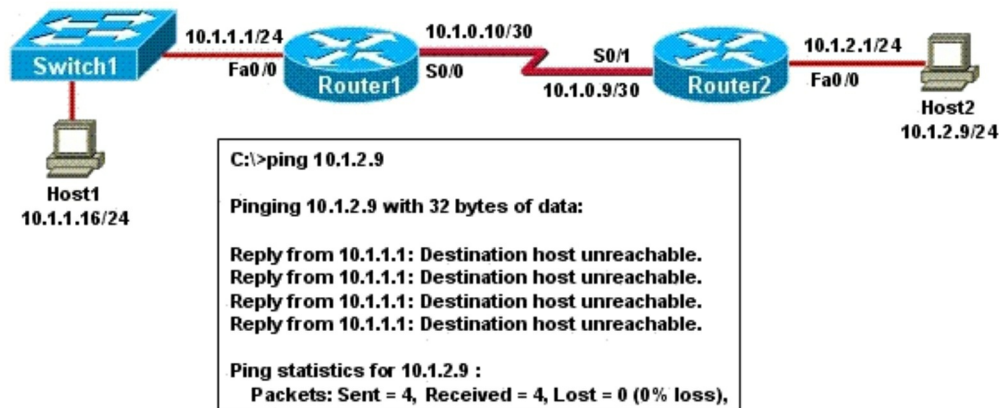
- A. Test the local IP stack is working by pinging the loopback address.
- B. Test that the local IP stack is talking to the Data Link layer (LAN driver) by pinging the local IP address.
- C. Test that the host is working on the LAN by pinging the default gateway.
- D. Ping the remote server to verify local LAN connectivity.

188. Refer to the exhibit. Which of these statements correctly describes the state of the switch once the boot process has been completed?

```
00:00:39: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to down
00:00:40: %SPANTRIE-5-EXTENDED_SYSID: Extended Sysid enabled for type vlan
00:00:42: %SYS-5-CONFIG_I: Configured from memory by console
00:00:42: %SYS-5-RESTART: System restarted --
Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 12.2(25)SEE2, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2006 by Cisco Systems, Inc.
Compiled Fri 28-Jul-06 11:57 by yenanh
00:00:44: %LINK-5-CHANGED: Interface Vlan1, changed state to administratively down
00:00:44: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
00:00:44: %LINK-3-UPDOWN: Interface FastEthernet0/2, changed state to up
00:00:44: %LINK-3-UPDOWN: Interface FastEthernet0/11, changed state to up
00:00:45: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
00:00:45: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
00:00:45: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/11, changed state to up
00:00:48: %LINK-3-UPDOWN: Interface FastEthernet0/12, changed state to up
00:00:49: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/12, changed state to up
```

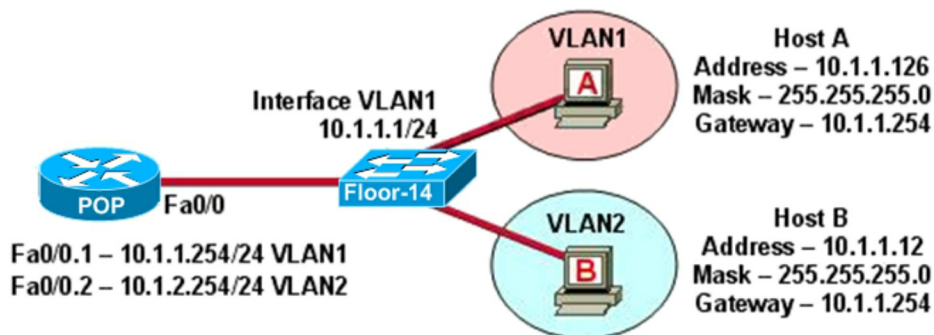
- A. As FastEthernet0/12 will be the last to come up, it will be blocked by STP.
- B. Remote access management of this switch will not be possible without configuration change.
- C. More VLANs will need to be created for this switch.
- D. The switch will need a different IOS code in order to support VLANs and STP.

189. Refer to the exhibit. A network administrator attempts to ping Host2 from Host1 and receives the results that are shown. What is the problem?



- A. The link between Host1 and Switch1 is down.
- B. TCP/IP is not functioning on Host1
- C. The link between Router1 and Router2 is down.
- D. The default gateway on Host1 is incorrect.
- E. Interface Fa0/0 on Router1 is shutdown.
- F. The link between Switch1 and Router1 is down.

190. Refer to the exhibit. The network shown in the diagram is experiencing connectivity problems. Which of the following will correct the problems? (Choose two).



- A. Configure the gateway on Host A as 10.1.1.1.
- B. Configure the gateway on Host B as 10.1.2.254.
- C. Configure the IP address of Host A as 10.1.2.2.
- D. Configure the IP address of Host B as 10.1.2.2.
- E. Configure the masks on both hosts to be 255.255.255.224.
- F. Configure the masks on both hosts to be 255.255.255.240.

191. A user is unable to connect to the internet. Based on the layered approach to troubleshooting starting at the lowest layer, what is the correct troubleshooting order?

- 1. Verify NIC operation
- 2. Verify ethernet cable connection
- 3. Verify URL
- 4. Verify IP configuration

- A. 3412
- B. 2143
- C. 4213
- D. 1243

192. The network administrator is using a Windows PC application that is called putty.exe for remote communication to a switch for network troubleshooting. Which two protocols could be used during this communication? (Choose two).

- A. SNMP
- B. HTTP
- C. Telnet
- D. RMON
- E. SSH

193. Refer to the exhibit. A user cannot reach any web sites on the Internet, but others in the department are not having a problem. What is the most likely cause of the problem?

Windows IP Configuration

```
Host Name . . . . . : home-PC
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No
```

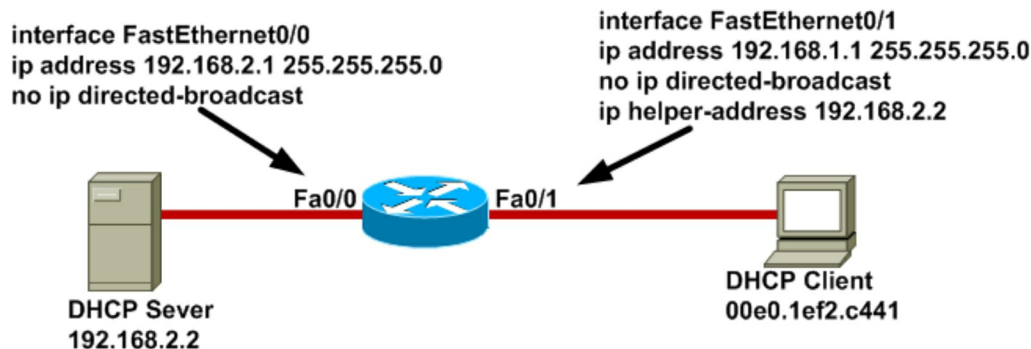
Ethernet adapter Local Area Connection:

```
Connection-specific DNS Suffix . :
Description . . . . . : Wired Network Connection
Physical Address. . . . . : 00-13-CE-9B-33-93
DHCP Enabled. . . . . : No
IP Address. . . . . : 10.10.10.2
Subnet Mask . . . . . : 255.255.255.0
Deafult Gateway . . . . . : 10.10.10.1
```

C:\

- A. IP routing is not enabled.
- B. The default gateway is not in the same subnet.
- C. A DNS server address is not reachable by the PC.
- D. A DHCP server address is not reachable by the PC.
- E. NAT has not been configured on the router that connects to the Internet.

194. Refer to the exhibit. The DHCP settings have recently been changed on the DHCP server and the client is no longer able to reach network resources. What should be done to correct this situation?



- A. Verify that the DNS server address is correct in the DHCP pool.
- B. Ping the default gateway to populate the ARP cache.
- C. Use the tracert command on the DHCP client to first determine where the problem is located.
- D. Clear all DHCP leases on the router to prevent address conflicts.
- E. Issue the ipconfig command with the /release and /renew options in a command window.

Chapter 1 Answers:

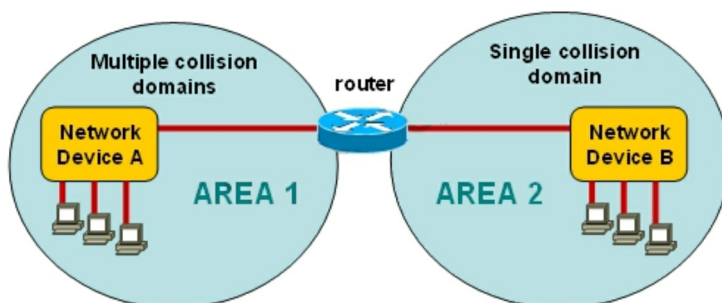
1. Which OSI layer header contains the address of a destination host that is on another network?

D. Network

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

2. 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.**
- D. Network Device B is a hub.**
- E. Area 1 contains a Layer 2 device.**

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

3. At which layer of the OSI model is RSTP used to prevent loops?

B. Data link

RSTP and STP operate on switches and are based on the exchange of Bridge Protocol Data Units (BPDUs) between switches. One of the most important fields in BPDUs is the Bridge Priority in which the MAC address is used to elect the Root Bridge. RSTP operates at Layer 2 – Data Link layer.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

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

- B. A router**
- D. A Layer 3 switch**

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

5. Which layer of the OSI model is responsible for segmenting data from a sending host that enables large files to be broken down into smaller segments to prevent transmission errors?

D. Transport

The Transport layer provides for the segmentation of data and the control necessary to reassemble these pieces into the various communication streams.

Its primary responsibilities are tracking the individual communication between applications on the source and destination hosts, segmenting data and managing each piece, reassembling the segments into streams of application data, and identifying the different applications.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

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

C. Transport

The Transport layer is responsible for end-to-end communication over a network. It provides logical communication between application processes running on different hosts within a layered architecture of protocols and other network components. It is responsible for the management of error correction, providing quality and reliability to the end user. This layer enables the host to send and receive error corrected data, packets or messages over a network and is the network component that allows multiplexing.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

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

E. data link

CDP is a device discovery protocol that runs over Layer 2 (the data link layer) on all Cisco manufactured devices and allows network management applications to discover Cisco devices that are neighbors of already known devices. With CDP, network management applications can learn the device type and the Simple Network Management Protocol (SNMP) agent address of neighboring devices running lower-layer, transparent protocols. CDP allows devices to share basic configuration information without even configuring any protocol specific information.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

8. A switch has 48 ports and 4 VLANs. How many collision and broadcast

domains exist on the switch (collision, broadcast)?

B. 48, 4

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

9. What are two characteristics of segmenting a network with a router?
(Choose two).

B. Filtering can occur based on layer 3 information.

E. Broadcasts are not forwarded across the router.

By default, routers breakup broadcast domains, and do not traverse the network. Routers can also filter traffic with the use of packet filtering using Access Control Lists.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

10. A network administrator cannot connect to a remote router by using SSH. Part of the show interfaces command is shown.

```
router#show interfaces Serial0/1/0 is up, line protocol is down
```

At which OSI layer should the administrator begin troubleshooting?

B. data link

In the router output "Serial0/1/0 is up, line protocol is down", the first output (Serial0/1/0 is up,) refers to the physical layer. In this instance, it indicates the physical connection is up, or alive. The second output (line protocol is down) refers to the data link layer (line protocol). Common causes a mismatched data link layer encapsulation (HDLC vs PPP), or clocking (DCE to DTE).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

11. What process is used to establish a connection-oriented virtual circuit between two communicating hosts?

D. Three-way handshake

The TCP/IP transport protocol is a connection-oriented protocol meaning that before any data can be transmitted, a reliable connection must be obtained and acknowledged. A three-way handshake in the Transmission Control Protocol where three messages handshake to negotiate and start a TCP session between two computers. The TCP handshaking mechanism is designed so that two computers attempting to communicate can negotiate the parameters of the network TCP socket connection before transmitting data such as SSH and HTTP web browser requests.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 1

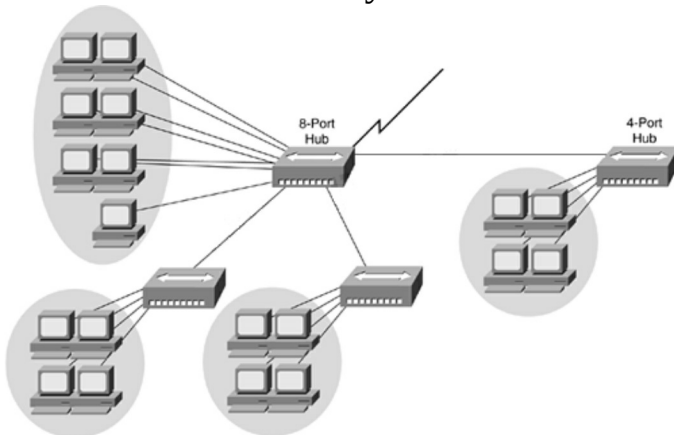
12. A receiving host computes the checksum on a frame and determines that the frame is damaged. The frame is then discarded. At which OSI layer did this happen?

D. Data link

The Data Link layer provides the physical transmission of the data and handles error notification, network topology, and flow control. The Data Link layer formats the message into pieces, each called a data frame, and adds a customized header containing the hardware destination and source address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 1

13. Refer to the exhibit. If the hubs in the graphic were replaced by switches, what would be virtually eliminated?

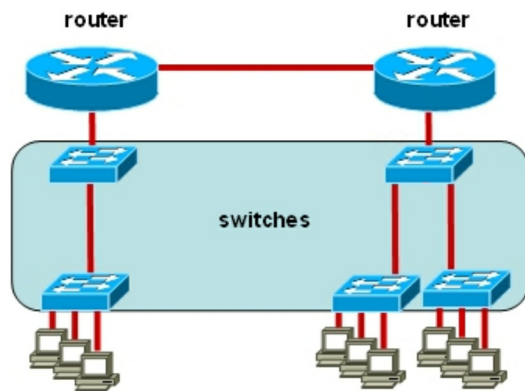


C. Ethernet collisions

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

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



E. 15

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

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

D. Network access layer

The Internet Protocol Suite, TCP/IP, is a suite of protocols used for communication over the internet. The foundation of the Internet was built using the TCP/IP suite and through the spread of the World Wide Web and Internet, TCP/IP has been preferred. A project researched by the Department of Defense (DOD) consisted of creating the TCP/IP protocols. The DOD's goal was to bring international standards which could not be met by the OSI model. Since the DOD was the largest software consumer and they preferred the TCP/IP suite, most vendors used this model rather than the OSI.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

16. How does a switch differ from a hub?

B. A switch tracks MAC addresses of directly-connected devices.

A switch is essentially a fast, multi-port bridge, which can contain dozens of ports. Each port on a Switch creates its own collision domain. In a network of twenty nodes, twenty collision domains exist. A switch dynamically builds and maintains a Content Addressable Memory (CAM) table, holding all of the necessary MAC information for each port. Hubs only create one collision domain, and normally run at half-duplex.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

17. What is the purpose of flow control?

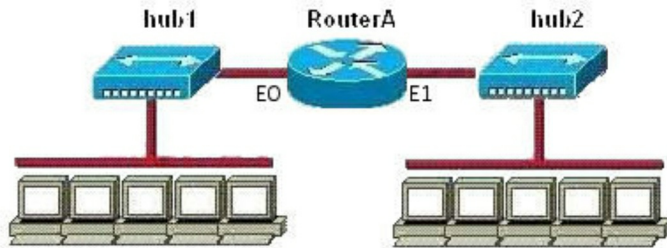
C. To provide a means for the receiver to govern the amount of data sent by the sender.

Flow control is the management of data flow between computers or devices or between nodes in a network so that the data can be handled at an efficient pace. Too much data arriving before a device can handle it causes data overflow, meaning the data is either lost or must be retransmitted.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301

Chapter 1

18. Refer to the exhibit. How many collision domains are shown?



B. Two

Hubs create single collision and broadcast domains, so in this case there will be a single collision domain for each of the two hubs.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

19. What source and destination information can be found in the data link layer?

D. MAC address

Data packets are framed and addressed by the data link layer. It is used to encode, decode and logical organization of data bits. The data link layer has two sublayers. The media access control (MAC) layer used for source and destination addresses, and provides the best data transmission vehicle and manage data flow control. The second sublayer is the logical link control which manages error checking and data flow.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

20. When troubleshooting a LAN interface operating in full duplex mode, which error condition can be immediately ruled out?

C. Collisions

Collisions occur in a half-duplex network environment. When a collision occurs, network devices stop transmitting until the medium is available.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 1






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

C. FTP

TCP is an example of a connection-oriented protocol. It requires a logical connection to be established between the two processes before data is exchanged. The connection must be maintained during the entire time that communication is taking place, then released afterwards.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 1

22. Refer to the exhibit. Which network device functions only at Layer 1 of the OSI model?

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

B. Option B

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

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

E. UDP

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

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

D. A TCP connection must be established between the workstation and the web server.

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

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

B. TCP provides synchronized communication.

D. TCP provides sequence numbering of packets.

TCP is a connection-oriented protocol responsible for ensuring the transfer of a datagram from the source to destination machine (end-to-end communications), TCP must receive communications messages from the

destination machine to acknowledge receipt of the datagram. UDP is used primarily for establishing low-latency and loss-tolerating connections between applications on the internet. Where UDP enables process-to-process communication, TCP supports host-to-host communication. TCP sends individual packets and is considered a reliable transport medium; UDP sends messages, called datagrams, and is considered a best-effort mode of communications.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

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

B. SMTP

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

27. Which layer in the OSI reference model is responsible for determining the availability of the receiving program and checking to see if enough resources exist for that communication?

E. Application

The Application layer is responsible for identifying and establishing the availability of the intended communication partner and determining whether sufficient resources for the intended communication exist.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 1

28. A network administrator is verifying the configuration of a newly installed host by establishing an FTP connection to a remote server. What is the highest layer of the protocol stack that the network administrator is using for this operation?

A. Application

FTP belongs to Application layer and it is also the highest layer of the OSI model.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301

Chapter 1

29. What layer is responsible for combining bits into bytes, and bytes into frames?

D. Data Link

The Data Link Layer is responsible for combining bits into bytes, and bytes into frames. Frames are used at the Data Link Layer to encapsulate packets handed down from the Network Layer for transmission onto media access. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 1

30. Which of the following correctly describe steps in the OSI data encapsulation process? (Choose two).

A. The transport layer divides a data stream into segments and may add reliability and flow control information.

D. Packets are created when the network layer adds Layer 3 addresses and control information to a segment.

The Transport layer segments data into smaller pieces for transport. Each segment is assigned a sequence number, so that the receiving device can reassemble the data on arrival. The transport layer also uses flow control to maximize the transfer rate while minimizing the requirements to retransmit. This layer controls the logical addressing of devices, and the network layer determines the best path to a particular destination network, and routes the data appropriately.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 1

31. Which two Ethernet fiber-optic modes support distances of greater than 550 meters? (Choose two).

A. 1000Base-LX

E. 1000Base-ZX

1000BASE-LX is used with Single-mode or Multi-mode fiber with a range of 3-10Km. 1000Base-ZX is single mode fiber with a range of 43-75Km.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301

Chapter 2

32. A network interface port has collision detection and carrier sensing enabled on a shared twisted pair network. From this statement, what is known about the network interface port?

C. This is an Ethernet port operating at half duplex.

Modern Ethernet networks built with switches and full-duplex connections no longer utilize CSMA/CD. CSMA/CD is only used in obsolete shared media Ethernet (which uses repeater or hub and runs at half-duplex).

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

33. CSMA/CD is a protocol that helps devices do what?

C. Share bandwidth evenly without having two devices transmit at the same time.

CSMA/CD is a MAC (media access control) protocol. It defines how network devices respond when two devices attempt to use a data channel simultaneously and encounter a data collision. The CSMA/CD rules define how long the device should wait if a collision occurs. The medium is often used by multiple data nodes, so each data node receives transmissions from each of the other nodes on the medium.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

34. Half-Duplex uses _____ with a digital signal running in both directions?

A. One wire pair

A half-duplex system can transmit data in both directions, but only in one direction at a time.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

35. Identify the incorrect statement regarding Full-duplex.

A. Uses CSMA/CD to avoid collisions.

In a half-duplex network, one wire pair is used in the ethernet cable. During transmission, a device will listen to the wire to begin transmission of data. To avoid data collisions, CSMA/CD was created to mitigate any collisions during data transmission.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

36. What is the first 24 bits in a MAC address called?

C. OUI

Organizational Unique Identifier (OUI) is the first 24 bits of a MAC address for a network device, which indicates the specific vendor for that device as assigned by the Institute of Electrical and Electronics Engineers, Incorporated (IEEE).

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

37. A MAC address is _____ bits long, and expressed in _____?

C. 48, hexadecimal

The MAC address is a unique value associated with a network adapter. MAC addresses are also known as hardware addresses or physical addresses. They uniquely identify an adapter on a LAN. MAC addresses are 12-digit hexadecimal numbers (48 bits in length).

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

38. What is the decimal equivalent of 10010110?

D. 150

Each binary digit is equivalent to a decimal value in an IP address. The IP address consists of 4 octets, 8 binary bits each. To convert binary to decimal, multiply the binary value to the corresponding value of 2 - $1 \times 2(7) + 0 \times 2(6) + 0 \times 2(5) + 1 \times 2(4) + 0 \times 2(3) + 1 \times 2(2) + 1 \times 2(1) + 0 \times 2(0)$. Add the sums together - $1 \times 128 + 0 \times 64 + 0 \times 32 + 1 \times 16 + 0 \times 8 + 1 \times 4 + 1 \times 2 + 0 \times 1 = 128 + 0 + 0 + 16 + 0 + 4 + 2 + 0$ which equals 150.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301

Chapter 2

39. What is the hexadecimal value of C?

B. 1100

The hexadecimal value of C is 12. In binary, it is represented as 1100. Values in a nibble are 8-4-2-1. We have 1 in the 8 position, 1 in the 4 position, 0 in the 2, 0 in the position.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

40. What cable would you use between a Router and a Switch or Hub?

A. Straight-Through

In general, when you connect two similar devices i.e., switch to switch, router to router, workstation to workstation, you will use a cross-over cable, for all others – use a straight through cable.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

41. What is the equivalent of 11001010.11110101.10000011.11101011 in hexadecimal?

C. 0xCAF583EB

0x denotes that this is a hexadecimal value. To convert this to hexadecimal, break up each octet into 2 nibble of 4 bits each. The correct answer is C - 0xCAF583EB.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

42. The Cisco Hierarchical Model contains what three layers?

A. Core Layer, Distribution Layer, Access Layer

The core layer is responsible for fast and reliable transportation of data across a network. The distribution layer is responsible for routing. The access layer contains devices that allow workgroups and users to use the services provided by the distribution and core layers.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301

Chapter 2

43. Which fields are contained within an IEEE Ethernet Frame? (Choose two).

- A. Source and destination MAC address.**
- D. FCS Field.**

An Ethernet frame has source and destination MAC addresses, an Ether-Type field to identify the Network layer protocol, the data, and the FCS field that holds the answer to the CRC.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

44. 1000Base-T is which IEEE standard?

- C. 802.3ab**

1000BASE-T, or IEEE 802.3ab, is a Gigabit Ethernet wiring standard for Local Area Networks (LAN) that uses copper-based networking hardware as its medium.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

45. Data encapsulation follows what process?

- B. Segments, Packets, Frames, Bits**

Data flow from one device to another device flows through the network via the OSI model. Data flow starts at the Application layer. When assembled, it reaches the Transport layer called a segment. The segment is handed to the Network Layer for IP addressing and packaged as a packet. The packet is then handed to the Data Link Layer where Frames are created. The Frames are then handed to the physical layer and for digital conversion into bits, then placed onto the medium for transmission.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

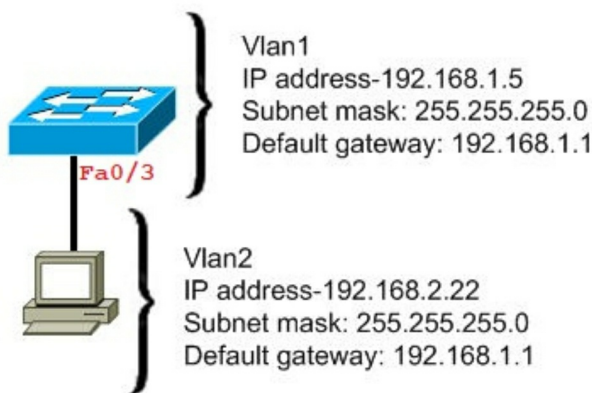
46. What term is used for the unwanted signal interference from adjacent pairs in a cable?

C. Crosstalk

In structured cabling, crosstalk refers to electromagnetic interference from one unshielded twisted pair to another twisted pair, normally running in parallel. Signals traveling through adjacent pairs of wire interfere with each other.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301 Chapter 2

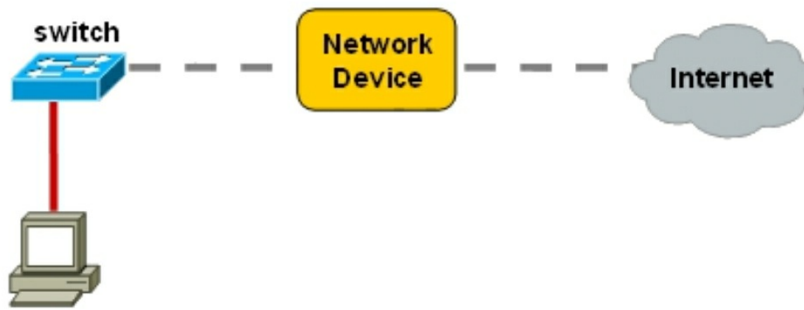
47. Refer to the exhibit. A host is connected to switch port fa0/3. The host and switch have been fully configured for IP connectivity as shown. However, the indicator LED on switch port fa0/3 is not on, and the host cannot communicate with any other hosts including those connected to VLAN 2 on the same switch. Based on the given information, what is the problem?



B. There is an incorrect cable type.

When selecting to use a straight-through cable versus a crossover cable, connecting like devices use a crossover cable, unlike devices use a straight-through cable. A straight-through cable is needed here.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301 Chapter 2



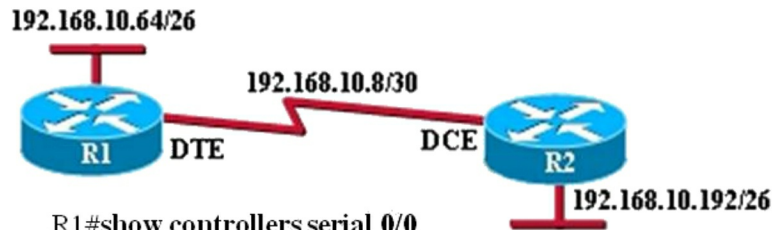
48. Refer to the exhibit. A network device needs to be installed in the place of the icon labeled Network Device to accommodate a leased line attachment to the Internet. Which network device and interface configuration meets the minimum requirements for this installation?

C. A router with one Ethernet and one serial interface.

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

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

49. 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?



```
R1#show controllers serial 0/0
HD unit 0, idb=0xD21B4, driver structure 0xD7640
Buffer size 1524 HD Unit 0,
V.35 cable
RX ring with 16 entries at 0x622800
<<Output omitted>>
TX ring with 16 entries at 0x623000
<<Output omitted>>
```

C. The serial interface has the wrong type of cable attached.

Since the output is not forthcoming it shows that the type of cable attached is wrong, though the cable is connected since it shows the cable type. According to the figure, the DTE cable should connect to R1 on interface, but while examining the show controllers serial 0/0 command, it is showing that a DCE is connected so the wrong type of cable is being used.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

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

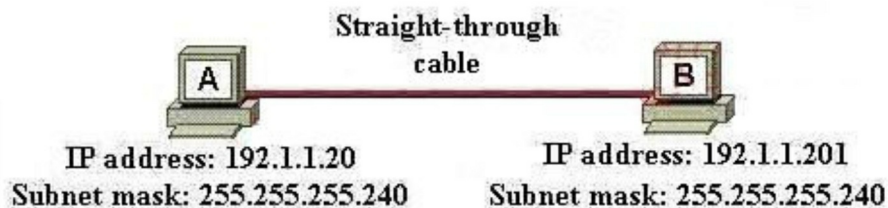
B. In a CSMA/CD collision domain, stations must wait until the media is not in use before transmitting.

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.

Ethernet networking uses Carrier Sense Multiple Access with Collision Detect (CSMA/CD), a protocol that helps devices share the bandwidth evenly without having two devices transmit at the same time on the network medium. CSMA/CD was created to overcome the problem of those collisions that occur when packets are transmitted simultaneously from different nodes. Back of algorithms determine when the colliding stations can retransmit. If collisions keep occurring after 15 tries, the nodes attempting to transmit will then time out.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

51. Refer to the exhibit. A network administrator is connecting PC hosts A and B directly through their Ethernet interfaces as shown in the graphic. Ping attempts between the hosts are unsuccessful. What can be done to provide connectivity between the hosts? (Choose two).



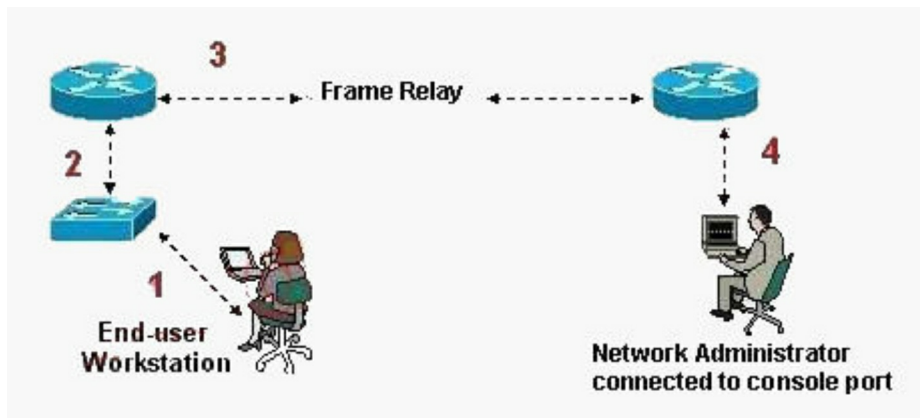
A. A crossover cable should be used in place of the straight-through cable.

F. The subnet masks should be set to 255.255.255.0.

If you need to connect two computers but you don't have access to a network, and can't set up an ad hoc network, you can use an Ethernet crossover cable to create a direct cable connection. Both devices need to be on the same subnet, and since one PC is using 192.1.1.20 and the other is using 192.1.1.201, the subnet mask should be changed to 255.255.255.0.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

52. Refer to the exhibit. What kind of cable should be used to make each connection that is identified by the numbers shown?



B. 1 - Ethernet straight-through cable. 2 - Ethernet straight-through cable. 3 - Serial cable. 4 - Rollover cable.

When connecting a PC to a switch, a standard Ethernet straight through cable should be used. This same cable should also be used for switch to router connections. Crossover cables are only needed when connecting two like devices (PC-PC, switch-switch, router-router, etc). Routers connect to frame relay and other WAN networks using serial cables. Rollover cables are special cables used for connecting to the console ports of Cisco devices. Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301 Chapter 2

53. For what two purposes does the Ethernet protocol use physical addresses? (Choose two).

- A. To uniquely identify devices at Layer 2.**
- E. To allow communication between different devices on the same network.**

Physical addresses or MAC addresses are used to identify devices at layer 2. MAC addresses are only used to communicate on the same network. To communicate on a different network, we have to use Layer 3 addresses (IP addresses).

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

54. In an Ethernet network, under what two scenarios can devices transmit? (Choose two).

C. When they detect no other devices are sending.

D. When the medium is idle.

Ethernet network is a shared environment. All devices have the right to access to the medium. If more than one device transmits simultaneously, the signals collide and cannot reach the destination. If a device detects another device is sending, it will wait for a specified amount of time before attempting to transmit. When there is no traffic detected, a device will transmit its message. While this transmission is occurring, the device continues to listen for traffic or collisions on the LAN. After the message is sent, the device returns to its default listening mode.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

55. If a router has four interfaces and each interface is connected to four switches, how many broadcast domains are present on the router?

C. 4

Routers, by default, break up broadcast domains. Each interface on a router would therefore be 1 broadcast domain. 4 interfaces on a router would have 4 broadcast domains.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 2

56. The network administrator has asked you to check the status of the workstation's IP stack by pinging the loopback address. What address would you ping to perform this task?

C. 127.0.0.1

The IP address of 127.0.0.1 is the well-known loopback IP address on a computer. When try pinging this address, you are testing if the TCP/IP stack is working or not.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

57. Which IP address can be assigned to an internet interface?

A. 9.255.255.10

The IP address which can be assigned to an Internet interface must a public IP address. Private IP address (10.0.0.0 - 10.255.255.255; 172.16.0.0 - 172.31.255.255; 192.168.0.0 - 192.168.255.255). Special IP addresses (the local loopback address 127.0.0.1, multicast addresses...) cannot be assigned to an Internet interface. In this question, only answer B doesn't belong to the range of private IP addresses.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

58. What TCP message does a host send to establish a connection with a destination host?

D. SYN

When a command that uses a TCP/IP application layer protocol, a message passes through the TCP/IP protocol stack on the local machine, and then across the network media to the protocols on the recipient. When the sending host wants to establish a connection, it sends a segment called a SYN to the receiving host. The receiving host returns a segment called an ACK to acknowledge the successful receipt of the segment. The sending host sends another ACK segment, then proceeds to send the data. This exchange of control information is referred to as a three-way handshake.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

59. The network administrator is using a Windows PC application that is called putty.exe for remote communication to a switch for network troubleshooting. Which two protocols could be used during this communication? (Choose two).

C. Telnet

E. SSH

Putty is a free implementation of Telnet and SSH for Windows and Unix platforms, and is used to connect to Cisco and other networking devices using SSH or Telnet.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

60. The corporate head office has a teleconferencing system that uses VOIP (voice over IP) technology. This system uses UDP as the transport for the data transmissions. If these UDP datagrams arrive at their destination out of sequence, what will happen?

B. UDP will pass the information in the datagrams up to the next OSI layer in the order that they arrive.

VOIP systems utilize UDP because it is faster and uses less overhead. Unlike TCP, UDP is connectionless and provides no reliability, no windowing, and no reordering of the received data. However, UDP provides some functions of TCP, such as data transfer, segmentation, and multiplexing using port numbers, and it does so with fewer bytes of overhead and with less processing required.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

61. Which two benefits are provided by using a hierarchical addressing network addressing scheme? (Choose two).

A. Ease of management and troubleshooting.
D. Reduces routing table entries.

Hierarchical addressing allows for the division of networks in subnet networks. It is beneficial when you are dealing with different network location. Subnetting a larger network IP due to geographical location helps narrow down your ability to manage and troubleshoot a subnetted location also reduces the routing table entries.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

62. Which of the following describes private IP addresses? (Choose two).

- B. A scheme to conserve public addresses.**
- E. Addresses that cannot be routed through the public internet.**

Private IP addresses were originally meant for security because they are not routable over the internet. They are also a means to save valuable public IP address space. Without private IP addressing, we would not have any more public IP addresses to issue to new devices.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

63. An administrator attempts a traceroute but receives a “Destination Unreachable” message. Which protocol is responsible for that message?

- E. ICMP**

Traceroute uses the ICMP protocol to send information back to the originating host from each hop (router).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

64. When two hosts are trying to communicate across a network, how does the host originating the communication determine the hardware address of the host that it wants to “talk” to?

- B. ARP request**

IPv4 uses MAC addresses to communicate on a local LAN, and to get an IP address from a known IP address, the host broadcasts uses ARP to get the MAC address.

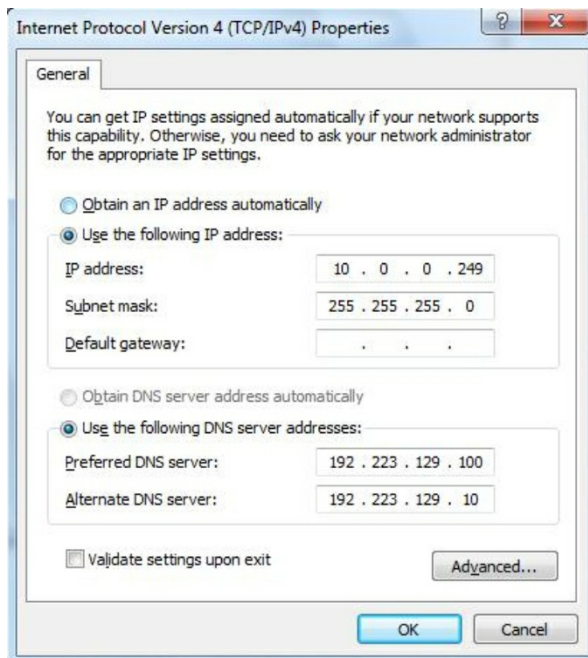
Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

65. Which of the following host addresses are members of networks that cannot be routed across the public internet? (Choose three).

- A. 10.172.13.65**
- C. 172.16.223.125**
- F. 192.168.23.252**

Private addresses cannot be routed to the public internet. Class A private is any address that starts with 10.0.0.0 to 10.255.255.255. Class B is 172.16.0.0 through 172.31.255.255, and Class C is 192.168.0.0 through 192.168.255.255.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 2



66. Refer to the exhibit. Which option can be configured for the default gateway of the Local Area Connection?

D. 10.0.0.254

What you really needed to look at is the subnet mask, which is a /24 in this question. This makes your subnet 10.0.0.0.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 2

67. Which command would you use on a Cisco router to verify the Layer 3 path to a host?

B. traceroute address

Traceroute is a computer network diagnostic tool for displaying the route (path) and measuring transit delays of packets across an Internet Protocol (IP) network. The history of the route is recorded as the round-trip times of the packets received from each successive host (remote node) in the route (path); the sum of the mean times in each hop indicates the total time spent to establish the connection. Traceroute proceeds unless all (three) sent packets are lost more than twice, then the connection is lost and the route cannot be evaluated. Ping only computes the final round-trip times from the destination point.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

68. Workstation A has been assigned an IP address of 192.0.2.24/28. Workstation B has been assigned an IP address of 192.0.2.100/28. The two workstations are connected with a straight-through cable. Attempts to ping between the hosts were unsuccessful. What two things can be done to allow communications between the hosts? (Choose two).

C. Change the subnet mask of the hosts to /25.

E. Replace the straight-through cable with a crossover cable.

A /28 is CIDR notation for the 255.255.255.240 subnet mask. This has a block size of 16 in the fourth octet. Workstation A is in the 192.0.2.16 subnet, Workstation B is in the 192.0.2.96 subnet. Both workstations are in the wrong subnet. Changing the subnet mask to /25 (255.255.255.128), provides two subnets: 0 and 128, which would put both hosts in the zero (0) subnet. With both workstations in the same subnet, you will need a crossover cable in order to be able to communicate between the two hosts.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

69. The network default gateway being applied to a host by DHCP is 192.168.5.33/28. Which of the following option is a valid IP address for that subnet?

C. 192.168.5.40

A /28 is CIDR notation for 255.255.255.240. This gives us a block size of 16 in the fourth octet (256-240=16). The host is .33, so we'll count past that number: 0, 16, 32, 48. This host is in the 32 subnet, with a broadcast of 47. Any number between 32 and 47 is a valid host.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

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

- C. ICMP**
- D. ARP**

This shows the inefficiency of IPv4. To have a host respond to a ping request you will use two protocols ARP and ICMP.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

71. An administrator issues the command ping 127.0.0.1 from the command line prompt on a PC. If a reply is received, what does this confirm?

- A. The PC has the TCP/IP protocol stack correctly installed.**

This is called the loopback address and tells you if your IP stack is initialized. You can actually ping any address from 127.0.0.1 through 127.255.255.254, but 127.0.0.1 is the most popular.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

72. What will happen if a private IP address is assigned to a public interface connected to an ISP?

- D. Addresses in a private range will be not routed on the internet backbone.**

By default, routers do not forward any traffic from the private IP range as defined by RFC 1918. Addresses in the 10/8, 172.16/12, and 192.16/16 will

not be routed to an interface with a public IP address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

73. Where does routing occur within the DoD TCP/IP reference model?

C. Internet

The Internet Layer of TCP/IP is equivalent to the Network Layer which is responsible for routing decision.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

74. On the network 131.1.123.0/27, what is the last IP address that can be assigned to a host?

C. 131.1.123.30

A /27 is CIDR notation for the 255.255.255.224 subnet mask. This gives us a block size of 32 in the fourth octet. The network in question is in the zero subnet, the next subnet is 32, so the broadcast address of the zero subnet is 31, which makes our last valid address .30.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

75. A Layer 2 broadcast is also known as a hardware broadcast. Of the following, which two are binary and hexadecimal Layer 2 broadcasts? (Choose two).

A. 11111111

B. FF.FF.FF.FF.FF.FF

Broadcasts would be all 1's in binary, all F's in hexadecimal.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

76. When is it necessary to use a public IP address on a routing interface?

C. Connect a network to the internet.

Private IP addresses were designed to conserve global IP address, provide privacy for corporate/home networks, but they cannot be routed through the internet, which was the idea, so NAT needs to be configured to allow access to the Internet from the private network. However, with that said, you need to have at least one public address on your router interface to your ISP in order to perform NAT.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

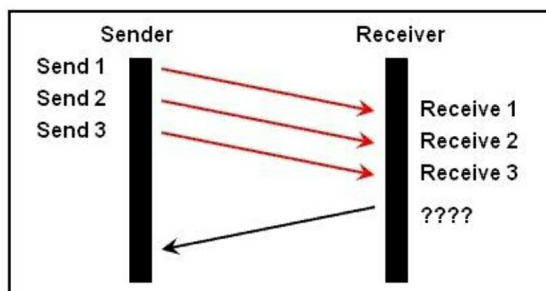
77. Which of the following are types of flow control? (Choose three).

- A. Buffering**
- C. Windowing**
- D. Congestion avoidance**

In data communications, flow control is the process of managing the rate of data transmission between two nodes to prevent a fast sender from overwhelming a slow receiver. It provides a mechanism for the receiver to control the transmission speed, so that the receiving node is not overwhelmed with data from transmitting node. Buffering, Windowing (adjust data flow), and congestion avoidance are all used in flow control.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

78. Refer to the exhibit. A TCP/IP Transfer is diagrammed in the exhibit. A window size of three has been negotiated for this transfer. Which message will be returned from the receiver to the sender as part of this TCP/IP transfer?



B. send ACK 4

The receiving host will send back to the transmitting host what is expecting "next", not what it already received.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

79. In addition to assigning an IP address, which of the following correctly describe regarding TCP/IP stack configuration features that DHCP can provide? (Choose three).

A. DNS servers

B. Subnet mask

F. Default gateway

The DHCP server is a device on the network with a pool of IP addresses at its disposal to automatically assign to devices as they join the network. The DHCP server assigns the network device its IP address, subnet mask, default gateway, Primary DNS server, and Secondary DNS server.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

80. 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?

E. ARP

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 2

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

- C. TRACERT uses ICMP packets.**
- D. They are encapsulated within IP datagrams.**

ICMP (Internet Control Message Protocol) is an error-reporting protocol used by network devices like routers used to generate error messages to the source IP address when network problems prevent delivery of IP packets. Any IP network device has the capability to send, receive or process ICMP messages. While ICMP is not used regularly in end-user applications, it is used by network administrators to troubleshoot network connections in diagnostic utilities including ping and traceroute.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 2

82. Which command can be used from a PC to verify the connectivity between hosts that connect through a switch in the same LAN?

- A. ping address**

ICMP pings are used to verify connectivity between two IP hosts. Traceroute is used to verify the router hop path traffic will take towards a destination. Since the hosts are in the same LAN, router hops are not involved.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 2

83. Which IP addresses are valid public Class A host addresses? Assume the default Class A subnet mask is in use. (Choose two).

- B. 11.22.33.44**
- C. 68.95.255.100**

The range for Class A IP addresses is 0.0.0.0 - 127.255.255.255. The range for private IP addresses is 10.0.0.0-10.255.255.255. Addresses from 127.0.0.0-127.255.255.255 cannot be used, all other addresses are public IP addresses.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

84. A small company has a Class C network address and needs to create five subnets, each accommodating 25 hosts. Which subnet mask needs to be configured?

D. 255.255.255.224

To create additional subnets, we need to borrow bits from the host bits. In order to accommodate 5 subnets, we use the formula 2^n . n is the number of bits to borrow from the host bits. Using 3 bits in the fourth octet will give us 6 subnets with 30 available addresses in each subnet. D is the correct answer. Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

85. What is the maximum number of bits that can be borrowed to create subnets if a Class B network address is being used?

D. 14

The default subnet mask for a Class B address is 255.255.0.0. This gives us 16 bits for network bits, 16 bits for host bits. All 0's in a subnet is a network address (255.255.0.0), all 1's in an address denotes a broadcast address (255.255.255.255). Therefore, 14 is the correct answer. Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

86. 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).

C. 192.168.4.67

D. 192.168.4.125

A /26 is CIDR notation for 255.255.255.192. This gives us a block size of 64 in the fourth octet ($256-192=64$). Counting the networks in blocks of 64 (192.168.4.0, 192.168.4.64, 192.168.4.128, and 192.168.4.192). A and B are in the 192.168.4.0 network, however, 192.168.4.63 is the broadcast of this subnet and cannot be used. E and F are in the subnet 192.168.4.128. E cannot be used as this is the subnet and cannot be used. C and D are correct, these fall into the 192.168.4.64 subnet.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

87. Given a subnet mask of 255.255.255.224, which of the following addresses can be assigned to network hosts? (Choose three).

- D. 92.11.178.93**
- E. 134.178.18.56**
- F. 192.168.16.87**

The subnet mask 255.255.255.224 gives us a block size of 32 in the fourth octet ($256-224=32$). A, B, and C are all broadcast addresses of their perspective subnets. D, E, and F are valid addresses that can be used for hosts.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

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

- C. 192.168.23.48**

A /28 is CIDR notation for 255.255.255.240. This gives us a block size of 16 in the fourth octet ($256-240=16$). The host is 192.168.23.61. Counting subnets in blocks of 16, 192.168.23.61 is in the 192.168.23.48 subnet. Valid hosts are 192.168.23.49 - 192.168.23.62.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

89. A new LAN segment is allocated the network number 172.16.0.0/25. What range of addresses are available for hosts on that network?

- B. 172.16.0.1 through 172.16.0.126**

A /25 is CIDR notation for the 255.255.255.128. This gives us a block size of 128 in the fourth octet. Two subnets are available, 0 and 128, with 126 available addresses for each subnet - 172.16.0.1-172.16.0.126 and 172.16.0.129-172.16.0.254.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

90. Which three network addresses are reserved for private network use? (Choose three).

- A. 10.0.0.0**
- C. 172.31.0.0**
- E. 192.168.255.0**

RFC 1918 defines the private IP address range. The ranges of private IP Addresses are: 10.0.0.0-10.255.255.255 , 172.16.0.0-172.31.255.255, and 192.168.0.0-192.168.255.255.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

91. Which command will assign the last usable IP address from the 192.168.32.128/28 subnetwork to a router interface?

- A. Router(config-if)# ip address 192.168.32.142 255.255.255.240**

A /28 is CIDR notation for 255.255.255.240. This gives us a block size of 16 in the fourth octet, with 14 available addresses in the subnet. 192.168.32.128 is the subnet address, the first available address is 192.168.32.129, the last available address 192.168.32.142.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

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

- C. 172.19.20.16**

A /28 is CIDR notation for 255.255.255.240. This gives us a block size of 16 in the fourth octet (256-240=16). Counting the networks in blocks of 16 (172.19.20.0, 172.19.20.16, 172.19.20.32), 172.19.20.23 falls into the 172.19.20.16 subnet.

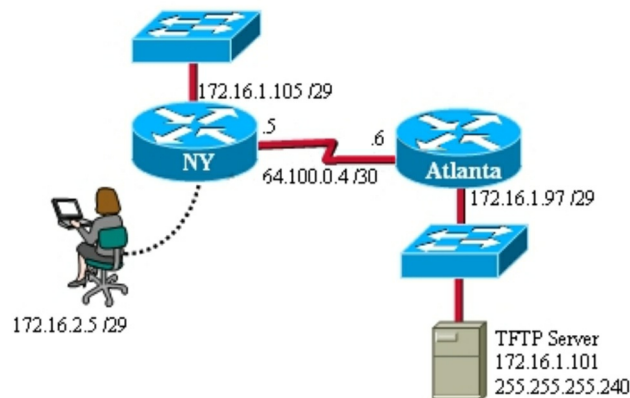
Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

93. Which of the following correctly pairs the dotted decimal subnet mask with the correct number of binary bits that represent the subnet mask?

E. 255.255.255.240 and /28

A /16 is CIDR notation for 255.255.0.0; /25 is CIDR notation for 255.255.255.128; /26 is CIDR notation for 255.255.255.192; /27 is CIDR notation for 255.255.255.224; /28 is CIDR notation for 255.255.255.240. Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

94. 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?



C. The TFTP server has an incorrect subnet mask.

The TFTP server is using a mask of 255.255.255.240 (/28) while the router is configured with a /29. Because of this, the Atlanta router does not see the TFTP server as being in the same subnet.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

95. A network engineer needs to configure a branch office for 82 hosts. What is the most efficient use of a subnet mask?

A. 255.255.255.128

To calculate required hosts, we use the formula $2^n - 2$, n is the bit number. A subnet mask of 255.255.255.128 gives us 2 subnets, with 126 available hosts in each subnet.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

96. What starting binary pattern indicates an address range evenly split between network and host size?

C. 10xxxxxx

IP addresses can be identified in a decimal or binary format. Class A address range is from 0-127 in decimal, 0xxxxxxx in binary. Class B address range is 128--191 in decimal, 10xxxxxx in binary. Class C address range is 192-223 in decimal, 110xxxxx in binary. C is the correct answer as this relates to a Class B address range with a default mask of 255.255.0.0.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

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

B. 192.168.2.62

A subnet mask of 255.255.255.224 (/27 in CIDR), gives us a block size of 32 in the fourth octet ($256 - 224 = 32$). Of the IP addresses given, and starting at the zero subnet, the subnets are 192.168.2.0, 192.168.2.32, and 192.168.2.64. A is the broadcast address for the 192.168.2.32 subnet. C and D are valid hosts in the 192.168.2.32 subnet. E is a subnet address. B is the correct address, as this is the last valid address of the 192.168.2.32 subnet.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

98. Your ISP has given you the address 223.5.14.7/29 to assign to your

router's interface. They have also given you the default gateway address of 223.5.14.4. After you have configured the address, the router is unable to ping any remote devices. What is preventing the router from pinging remote devices?

C. The IP address is the broadcast address for this subnet.

A /29 is CIDR notation for the 255.255.255.248 subnet mask which gives us a block size of 8 in the fourth octet. Starting with the zero subnet (223.5.14.0/29), and using a block size of 8, the next subnet will be 223.5.14.8. Valid addresses for the assigned subnet is 223.5.14.1 - 223.5.14.6. The ISP assigned .7 for your router, which is the broadcast address of the zero (0) subnet.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

99. A network administrator has been assigned an IP address space of 192.168.1.0/24 for a network with three segments. The first segment needs to support 60 hosts. The second segment needs to support 45 hosts. The third segment needs to support 30 hosts. Which two statements describe this choice? (Choose two).

B. The assigned address represents private IP address space.

C. User IP addresses must be translated to public IP addresses when accessing the Internet.

The address 192.168.x.x represents a private IP addresses which cannot be routed across the internet, and must use NAT translation to traverse the internet.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

100. How many hosts are available for 192.168.1.1/28?

A. 14

A /28 is CIDR notation for the 255.255.255.240 subnet. This gives us a block size of 16 in the fourth octet, with 14 available hosts per subnet.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam

200-301 Chapter 3

101. You need to configure 52 hosts for a computer lab. Which subnet mask is appropriate?

D. 255.255.255.192

To calculate required hosts, we use the formula $2^n - 2$, n is the bit number. A subnet mask of 255.255.255.192 gives us 4 subnets (block size of 64), with 62 available hosts in each subnet.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

102. Which subnet mask provides the most efficient use of a Class C address space for a company that requires 10 subnets and 12 hosts per subnet?

F. 255.255.255.240

A /28 is CIDR notation for 255.255.255.240. This gives us a block size of 16 in the fourth octet, with 14 available addresses in the subnet which will meet this requirement.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

103. What is the last usable address of the network 10.10.64.0/25?

B. 10.10.67.254

This subnet mask gives us a block size of 4 (256-252) in the third octet. The valid subnet range for this address is 10.10.64.0 - 10.10.67.255. The next subnet is 10.10.68.0, therefore, the broadcast address is 10.10.67.254.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

104. What is the most efficient subnet mask for a small branch office with seven hosts?

C. 255.255.255.240

A subnet mask 255.255.255.240 gives us a block size of 16 in the fourth octet, with 14 available addresses in the subnet which will meet this requirement.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

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

D. Assign the addresses statically on each node.

It's best to use a static addressing scheme where the number of systems is manageable rather than using a dynamic method such as DHCP as it is easy to operate and manage.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

106. Which IP address is a private address?

C. 172.20.14.36

RFC 1918 defines the private IP address range. The ranges of private IP Addresses are: 10.0.0.0-10.255.255.255 , 172.16.0.0-172.31.255.255, and 192.168.0.0-192.168.255.255.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

107. Which class of IP address will provide sufficient addresses for 66,000 or more hosts?

A. Class A

A Class A subnet has 24 bits for available hosts. Using the formula 2^n , $n = 24$, A Class A network can have over 16 million available addresses. A Class B subnet has 16 bits available for hosts. Using the formula 2^n , $n = 16$, A Class B network can have up to 65536 available addresses.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam

200-301 Chapter 3

108. From which IP address class can 15 bits be borrowed to create subnets?

A. A

A Class A network is represented as n.n.n.n.n.n.n.n h.h.h.h.h.h.h.h h.h.h.h.h.h.h.h. n represents network bits, h represents host bits. 24 bits can be used for subnetting in a Class A network.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

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

**B. The lowest host address in the subnet is 10.16.2.1
255.255.254.0.**

**D. The broadcast address of the subnet is 10.16.3.255
255.255.254.0.**

The mask 255.255.254.0 (/23 in CIDR) gives us a block size of 2 in the third octet ($256-254=2$). Subnets are counted in blocks of 2 in the third octet. The host 10.16.3.65, is in the 2.0 subnet. The next subnet is 4.0, so the broadcast address for the 2.0 subnet is 3.255. The valid host addresses are 10.16.2.1 - 10.16.3.254.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

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

C. 192.168.1.40/29

A .248 subnet mask (/29 in CIDR) uses 5 bits in the fourth octet. This gives us a block size of 8. Count the networks in block sizes of 8 in the fourth octet. 192.168.1.42 is part of the 192.168.1.40 network. The first available address is 192.168.1.41, the last available address is 192.168.1.46. The broadcast address is 192.168.1.47.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

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

- A. 10.1.168.0**
- C. 10.1.174.255**
- D. 10.1.160.255**

A /20 is CIDR notation for 255.255.240.0 which gives us a block size of 16 in the third octet ($256-240=16$). This leaves 12 bits available for hosts (2^n-2 , $n=12$). 12 host bits gives us 4094 available hosts (10.1.160.1 - 10.1.175.254).
Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

112. If a host on a network has the address 172.16.45.14/30, what is the address of the subnetwork to which this host belongs?

- D. 172.16.45.12**

A /30 is CIDR notation for the 255.255.255.252 subnet mask. This gives us a block size of 4 in the fourth subnet ($256-252=4$). Count the networks in blocks of 4, the 172.16.45.14 is in the 172.16.45.12 subnet.
Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

113. 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?

- B. 2**

A /30 is CIDR notation for the 255.255.255.252 subnet mask. This gives us a block size of 4 in the fourth subnet ($256-252=4$). With only four addresses available, one is used for the subnet ID, one for the broadcast address, it leaves us with only two available addresses for assignment to hosts.
Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

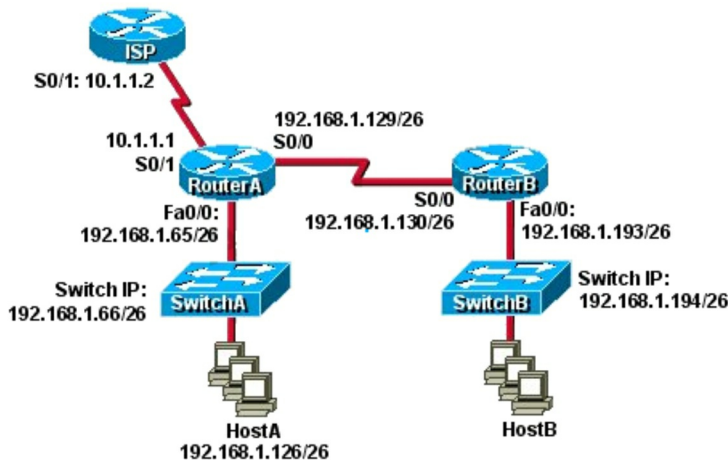
114. What is the subnet address of 172.16.159.159/22?

C. 172.16.156.0

A /22 is CIDR notation for 255.255.252.0. This gives us a block size of 4 in the third octet (256-252=4). Counting the networks in blocks of 4, 172.16.159.159 falls into the 172.16.156.0 subnet. Valid hosts range from 172.16.156.1 - 172.16.159.254.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

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



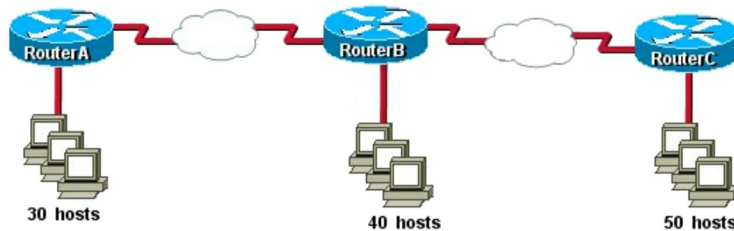
B. 192.168.1.65

The default gateway will be the IP address of the router that it connects to,

not the switch.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

116. 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?



A. 255.255.255.192

A subnet mask of 255.255.255.192 with CIDR of /26, has a block size of 64, with 62 available hosts per subnet which are sufficient to accommodate this requirement.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

117. Which of the following describe Class A host addresses? (Choose three).

A. The decimal value of the first octet can range from 1 to 126.

C. The first octet represents the entire network portion of the address.

E. The value of the first binary place in the first octet must be 0.

IP addresses can be identified in a decimal or binary format. Class A address range is from 0-127 in decimal, 0xxxxxxx in binary. Class B address range is 128--191 in decimal, 10xxxxxx in binary. Class C address range is 192-223 in decimal, 110xxxxx in binary. C is the correct answer as this relates to a

Class B address range with a default mask of 255.255.0.0.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

118. Refer to the exhibit. After configuring two interfaces on the HQ router, the network administrator notices an error message. What must be done to fix this error?

```
HQ#configure terminal
HQ(config)#interface fastEthernet0/0
HQ(config-if)#ip address 192.168.1.17 255.255.255.0
HQ(config-if)#no shutdown
HQ(config-if)#interface serial0/0
HQ(config-if)#ip address 192.168.1.65 255.255.255.240
HQ(config-if)#no shutdown
% 192.168.1.0 overlaps with FastEthernet0/0
```

D. The subnet mask of the FastEthernet interface should be changed to 255.255.255.240.

The subnet mask for the FastEther0/0 interface (255.255.255.0) gives us a block size of 1 in the fourth octet, with 254 available addresses in the subnet. The IP address 192.168.1.17 255.255.255.0 is part of the 192.168.1.0/24 subnet. The subnet mask for the Serial0/0 interface (255.255.255.240) gives us a block size of 16 in the fourth octet, with 14 available addresses in the subnet. The IP address 192.168.1.65 255.255.255.240 is part of the 192.168.1.64/24 subnet, which would overlap with the FastEthernet subnet. Changing the subnet mask of FastEthernet0/0 to 255.255.255.240, this IP address would be in the 192.168.1.16 subnet, with the last available address is 192.168.1.30, so these networks would no longer overlap.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

119. From where does a small network get its IP network address?

C. Internet Service Provider (ISP)

Internet Service Providers assign IP network addresses to local companies and businesses. The IANA, an organization under the Internet Architecture Board oversees global IP addresses.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

120. A network administrator has subnetted the 172.16.0.0 network using a subnet mask of 255.255.255.192. A duplicate IP address of 172.16.2.120 has accidentally been configured on a workstation in the network. The technician must assign this workstation a new IP address within that same subnetwork. Which address should be assigned to the workstation?

B. 172.16.2.80

A subnet mask of 255.255.255.192 has a block size of 64 in the fourth octet. Counting the subnets (0, 64, 128, 192), the IP address 172.16.2.120 will be a part of the 172.16.2.64 network. The first available address in this subnet is 172.16.2.65, the last available address is 172.16.2.126.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

121. If an Ethernet port on a router was assigned an IP address of 172.16.112.1/20, what is the maximum number of hosts allowed on this subnet?

C. 4094

An IPv4 address contains 32 bits. In this question, the first 20 bits are used for networks (or subnets). The remaining 12 bits are available for hosts. Using the formula $2^n - 2$ ($n=12$), gives us 4094 available hosts.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

122. A host computer has the IP address 192.168.43.139 and netmask 255.255.255.240. On which logical IP network does this host reside?

F. 192.168.43.128/28

A subnet mask of 255.255.255.240 has a block size of 16 in the fourth octet. Counting the subnets in blocks of 16, the IP address 192.168.43.139 will be a part of the 192.168.43.128 network. The next subnet is 192.168.43.144. Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

123. 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 4
password cisco
login
exit
```

C. Change the fifth line to ip default-gateway 192.168.17.241.

The default gateway must reside on the same IP subnet as the device. Here, the subnet mask for the VLAN interface is /28. Only choice C will fix this issue, as then the default gateway is on the same subnet as the Catalyst 2950. Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

124. 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**
- D. Seven 48-port switches**
- E. One router interface**

To support 300 workstations in a single broadcast domain, we need to use a subnet mask which supports 512 hosts. A /24 subnet mask (255.255.255.0) only provides 254 available hosts. A /23 subnet mask (255.255.254.0) provides 512 addresses (510 usable). In order to provide 300 additional switchports for each host, seven 48 port Switches can be connected together and then connected to the one router interface.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

125. You have been asked to come up with a subnet mask that will allow all three web servers to be on the same network while providing the maximum number of subnets. Which network address and subnet mask meet this requirement?

- B. 192.168.252.8 255.255.255.248**

A subnet mask of 255.255.255.248 will allow 32 subnets with 6 available hosts per subnet. A subnet mask of 255.255.255.252 will allow 30 subnets with only 2 usable IP addresses per subnet. A subnet mask of 255.255.255.240 allows for 16 subnets, 14 hosts per subnet. B is the best answer.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

126. Given an IP address 172.16.28.252 with a subnet mask of 255.255.240.0, what is the correct network address?

- A. 172.16.16.0**

A subnet mask of 255.255.240.0 has a block size of 16 in the third octet. Counting the subnets in blocks of 16 in the third octet, the IP address 172.16.28.252 will be a part of the 172.16.16.0 network. The broadcast address for this subnet is 172.16.31.255, which makes the valid host range 172.16.16.0-172.16.31.254. The next subnet is 172.16.32.0.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

127. You are working in a data center environment and are assigned the address range 10.188.31.0/23. You are asked to develop an IP addressing plan to allow the maximum number of subnets with as many as 30 hosts each. Which IP address range meets these requirements?

D. 10.188.31.0/27

To facilitate a requirement of 30 hosts per subnet, we use the formula $2^n - 2$. A /27 subnet mask allows for 30 available hosts per subnet. The question requires the maximum number of subnets (minimum the number of hosts-per-subnet) so /27 is the best choice.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

128. 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?

C. IP address: 192.168.20.30
Subnet Mask: 255.255.255.248
Default Gateway: 192.168.20.25

A /29 is CIDR notation for 255.255.255.248. This gives us a block size of 8 in the fourth octet ($256 - 248 = 8$), with 6 available addresses in each subnet. Valid hosts in the 192.168.20.24 subnet are 192.168.20.25 - 192.168.20.30.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

129. Which of the following IP addresses are valid Class B host addresses if a default Class B mask is in use? (Choose two).

B. 133.6.5.4
E. 190.6.5.4

The Class B default mask is 255.255.0.0 and the range of valid addresses is 128.0.0.0 - 191.255.255.255. The Class A default subnet mask is 255.0.0.0 with a valid range of 1.0.0.0 - 127.255.255.255 (127.0.0.0-127.255.255.255 is reserved and cannot be used). The Class C default subnet is 255.255.255.0 with a valid range of 192.0.0.0 - 223.255.255.255. Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

130. What are two reasons that duplex mismatches can be difficult to diagnose? (Choose two).

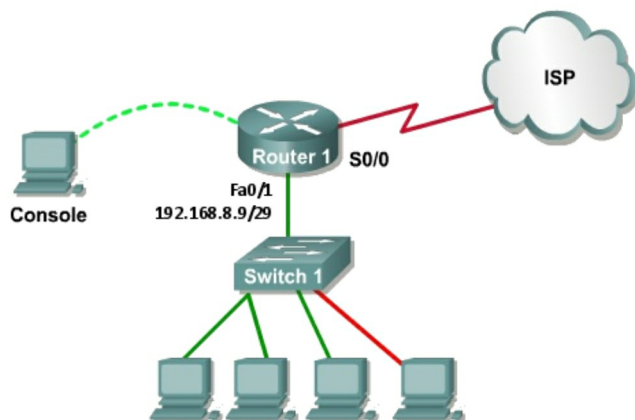
A. The interface displays a connected (up/up) state even when the duplex settings are mismatched.

B. The symptoms of a duplex mismatch may be intermittent.

When interfaces operate in different duplex modes, (half duplex on one end, full duplex on the other end), a network works in a much slower than its nominal speed. Communication is possible over a connection in spite of a duplex mismatch, but cause problems when both ends of the connection attempts to transfer data at the same time. The connection will work, but will perform very poor because of the mismatch.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

131. Refer to the exhibit. What is the subnet broadcast address of the LAN connected to Router1?

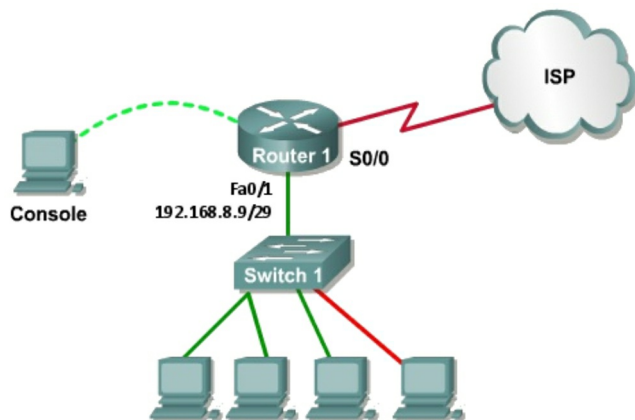


A. 192.168.8.15

A 255.255.255.248 subnet mask (/29 in CIDR) gives us a block size of 8 in the fourth octet. Counting networks in blocks of 8 in the fourth octet, 192.168.8.9 is part of the 192.168.8.8 network. The first available address is 192.168.8.9, the last available address is 192.168.8.14. The broadcast address is 192.168.8.15.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

132. Refer to the exhibit. Including the address on the Router1 Ethernet interface, how many hosts can have IP addresses on the LAN to which Router1 is connected?



A. 6

A 255.255.255.248 subnet mask (/29 in CIDR) gives us a block size of 8 in the fourth octet, with 6 available addresses in the subnet.

Reference: Todd Lammle CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 3

133. An Ethernet cable is attached to a PC NIC and then attached to a switch port. The PC power is turned on and the switch port link LED turns green. The link light indicates what two conditions? (Choose two).

A. Layer 2 communication has been established between the PC and switch.

E. The Layer 1 media is functioning between the PC and switch.

When the switch successfully completes the POST process, the LEDs become green. Switch ports that have devices remain amber for a period because Spanning Tree Protocol (STP), which is enabled by default, is in Learning mode on those ports before they transition to green and allow forwarding of traffic. After these lights transition to green, your switch will be fully up and running.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

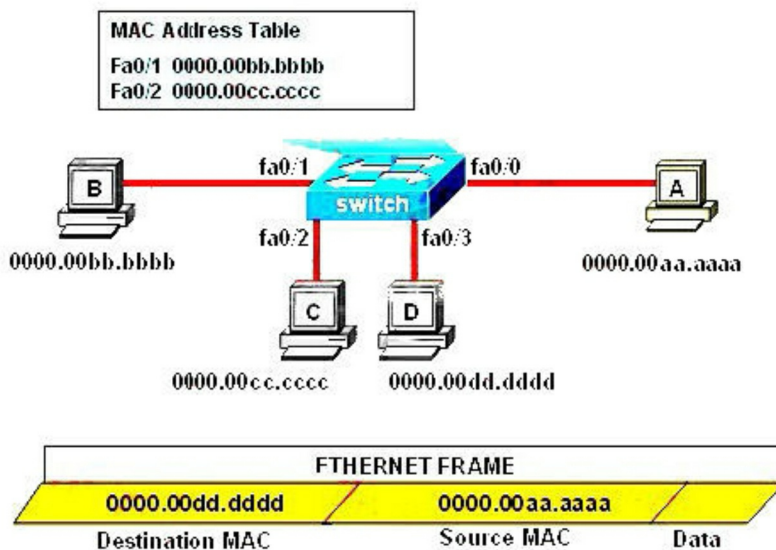
134. Which address type does a switch use to make selective forwarding decisions?

E. destination MAC address

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

135. 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).



B. The MAC address of 0000.00aa.aaaa will be added to the MAC Address Table.

D. The frame will be forwarded out fa0/1, fa0/2, and fa0/3.

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

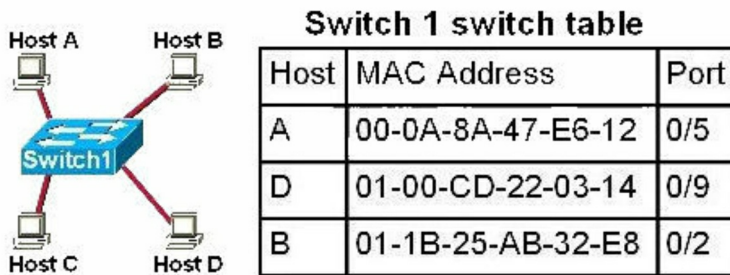
136. Which two characteristics apply to Layer 2 switches? (Choose two).

- A. Increases the number of collision domains.**
- C. Implements VLAN.**

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

137. 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?



- B. send the frame out all ports except port 0/2.**

When frame receives the frame, it checks the source address on MAC table if MAC address found in MAC table it tries to forward if not in MAC table adds the Address on MAC table. After checking the source address, it checks the destination address on MAC table, if MAC address found on MAC table it forwards to proper ports otherwise floods on all ports except the source port.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

138. 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

B. It will forward the frame out port Fa0/6 only.

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

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

B. allows remote management of the switch

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

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

A. The system is malfunctioning.

This state could be of hardware, software, or both.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301

Chapter 7

141. What are two effects on network performance of configuring a switch to store an entire frame before forwarding it to the destination? (Choose two).

B. Increased latency.

C. Filtering of all frame errors.

A store-and-forward switch makes a forwarding decision on a data packet after it has received the whole frame and checked its integrity, a cut-through switch engages in the forwarding process soon after it has examined the destination MAC (DMAC) address of an incoming frame.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
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142. Which command will set the default gateway to 192.168.12.1 on a Cisco switch?

C. Switch(config)# ip default-gateway 192.168.12.1

The correct syntax to configure a default gateway IP address on a Switch is the ip default-gateway followed by the IP address of the gateway, in global configuration mode.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
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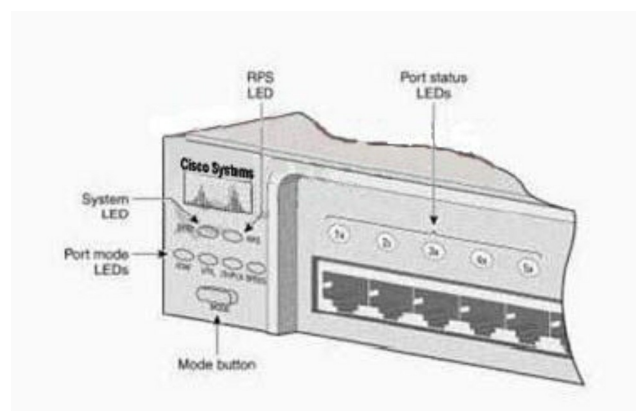
143. Refer to the exhibit. Switch-1 needs to send data to a host with a MAC address of 00b0.d056.efa4. What will Switch-1 do with this data?

```
Switch-1# show mac address-table
Dynamic Addresses Count:          3
Secure Addresses (User-defined) Count: 0
Static Addresses (User-defined) Count: 0
System Self Addresses Count:     41
Total Mac addresses:              50
Non-static Address Table:
-----
Destination Address  Address Type  VLAN  Destination Port
-----
0010.0de0.e289      Dynamic      1     FastEthernet0/1
0010.7b00.1540      Dynamic      2     FastEthernet0/3
0010.7b00.1545      Dynamic      2     FastEthernet0/2
```

B. Switch-1 will flood the data out all of its ports except the port from which the data originated.

The MAC address table of Switch1 does not have the MAC address of the host in the table. Switch1 will flood the data out all of its ports except the port from which the data originated to determine which port the host is located in. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

144. Refer to the exhibit. After the power-on self-test (POST), the system LED of a Cisco 2950 switch turns amber. What is the status of the switch?



C. POST failed and there is a problem that prevents the operating system of the switch from being loaded.

Each time you power up the switch, eight Power-On Self Tests (POSTs) run automatically. When the switch begins the POST, the port status LEDs display amber for two seconds, and then display green. If a test fails, the port status LED associated with the test displays amber.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

145. What are two advantages of Layer 2 Ethernet switches over hubs? (Choose two).

B. Filtering frames based on MAC addresses.

C. Allowing simultaneous frame transmissions.

Hub is considered a layer 1 device. When a packet arrives at one port, it is copied to the other ports without checking the content of that packet.

Switches operate at layer 2. When a packet arrives at one port, it checks in its database (based on MAC address) to see which port it should forward that packet out. Switches run in full duplex mode, which allows data to be sent and received at the same time. Switches effectively double the speed of the network when compared to hubs.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
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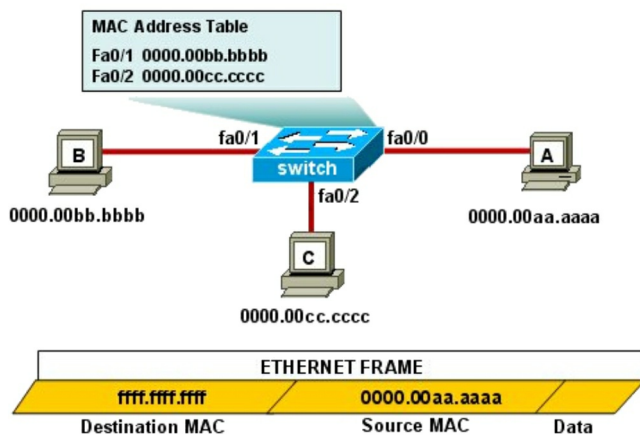
146. A switch receives a frame on one of its ports. There is no entry in the MAC address table for the destination MAC address. What will the switch do with the frame?

B. Forward it out of all ports except the one that received it.

When a switch receives the data frame from a host not having the MAC address already in the MAC table, it will add the MAC address to the source port on the MAC address table and sends the data frame. If the switch already has the MAC address in its table for the destination, it will forward the frame directly to the destination port. If it was not already in its MAC table, then they frame would have been flooded out all ports except for the port that it came from.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
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147. 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).



B. The MAC address of 0000.00aa.aaaa will be added to the MAC Address Table.

D. The frame will be forwarded out all active switch ports except for port fa0/0.

If a frame is received and the source is not in the CAM, the new MAC address will be added along with the port number it was received on. Also, if the destination address is a broadcast or unknown in the CAM, this frame will be flooded out all active ports in the VLAN, except for the port it was received on.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

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

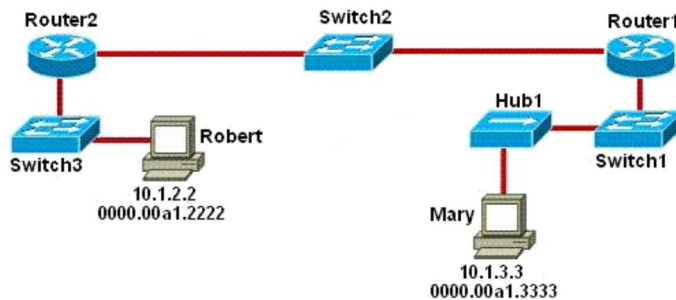
D. Sends out an ARP request with the destination IP address.

In this case, it will send out an ARP request for MAC address of the

destination IP (assuming it doesn't already have it in its table) and then address it to the destination's MAC address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
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149. 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).

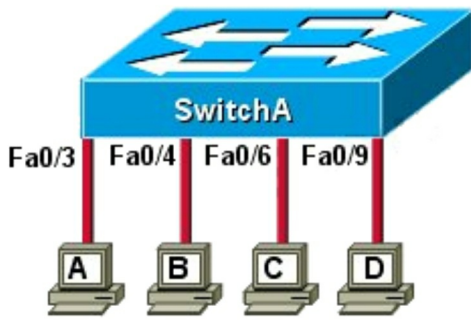


- B. Switch1**
- D. Switch2**
- F. Switch3**

Switches use the destination MAC address information for forwarding traffic, while routers use the destination IP address information. Local Area Networks employ Layer 2 Switches and Bridges to forward and filter network traffic. When a switch or bridge is listening to the network traffic, it receives each frame and compares it to the MAC address table. By checking the MAC address table, the switch/bridge is able to determine which port the frame came in on. If the frame is on the MAC table the frame is filtered or transmitted on only that port. If the switch determines that the frame is not on the MAC table, the frame is forwarded out to all ports except the incoming port.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
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150. 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?



SwitchA MAC Address Table

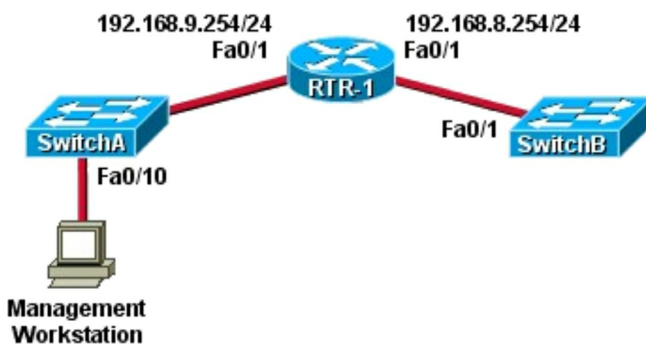
Address	Port
00b0.d043.ac2e	FastEthernet0/4
00b0.d0fe.ac32	FastEthernet0/6
00b0.d0da.cb56	FastEthernet0/9

A. The switch will add the source address and port to the MAC address table and forward the frame to host D.

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

151. Refer to the exhibit. A technician has installed SwitchB and needs to configure it for remote access from the management workstation connected to SwitchA. Which set of commands is required to accomplish this task?



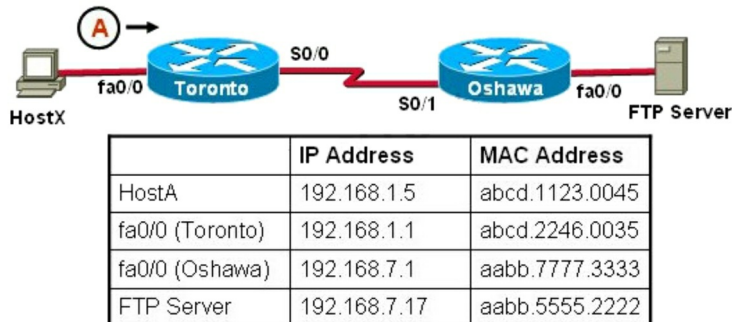
```

C. SwitchB(config)#ip default-gateway 192.168.8.254
SwitchB(config)# interface vlan 1
SwitchB(config-if)#ip address 192.168.8.252 255.255.255.0
SwitchB(config-if)#no shutdown

```

To remote access to SwitchB, it must have a management IP address on a VLAN on that switch. Traditionally, we often use VLAN 1 as the management VLAN. In the exhibit, we can recognize that the Management Workstation is in a different subnet from the SwitchB. For inter-subnetwork communication to occur, you must configure at least one default gateway. This default gateway is used to forward traffic originating from the switch only, not to forward traffic sent by devices connected to the switch. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

152. 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?



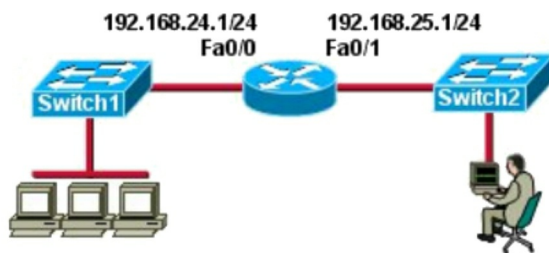
E. abcd.2246.0035

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

which is Toronto.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
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153. The network administrator cannot connect to Switch1 over a Telnet session, although the hosts attached to Switch1 can ping the interface Fa0/0 of the router. Given the information in the graphic and assuming that the router and Switch2 are configured properly, which of the following commands should be issued on Switch1 to correct this problem?



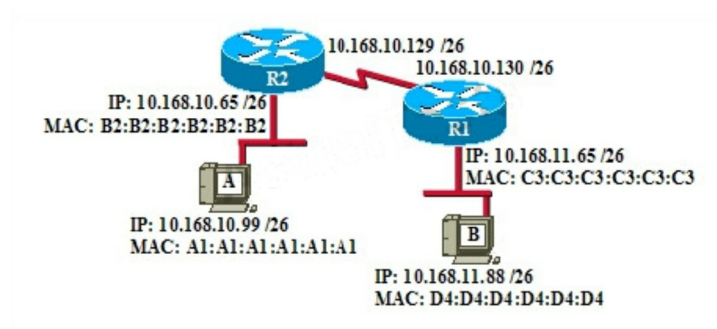
```
Switch1# show running-config
|
hostname Switch1
|
enable secret 5 $1$8V43$Wm12DE8klwUjf8EcZnFT7/
enable password guess
|
<output omitted>
|
interface Vlan1
ip address 192.168.24.2 255.255.255.0
no ip route-cache
|
ip http server
|
line con 0
line vty 0 4
password cisco
login
|
end
```

C. Switch1(config)#ip default-gateway 192.168.24.1

Since we know hosts can reach the router through the switch, we know that connectivity, duplex, speed, etc. are good. However, for the switch itself to reach networks outside the local one, the ip default-gateway command must be used.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 7

154. 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?



E. C3:C3:C3:C3:C3:C3

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

155. Which name describes an IPv6 host-enabled tunneling technique that uses IPv4 UDP, does not require dedicated gateway tunnels, and, can pass through existing IPv4 NAT gateways?

B. Teredo

Teredo is a transition technology that gives full IPv6 connectivity for IPv6-capable hosts that are on the IPv4 Internet but have no native connection to an IPv6 network.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 17

156. Which of these represents an IPv6 link-local address?

D. FE80::

In the Internet Protocol Version 6 (IPv6), the address block fe80::/10 has been reserved for link-local unicast addressing. The actual link local addresses are assigned with the prefix fe80::/64. They may be assigned by automatic (stateless) or stateful (e.g. manual) mechanisms.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 17

157. Which option is a valid IPv6 address?

A. 2004:1:25A4:886F::1

IPv6 addresses are denoted by eight groups of hexadecimal quartets separated by colons. A valid IPv6 address is represented as 2001:cdba:0000:0000:0000:0000:3257:9652. Four-digit group of zeroes within an IPv6 address may be reduced to a single zero omitted.

2001:cdba:0000:0000:0000:0000:3257:9652 can be shortened to 2001:cdba:0:0:0:0:3257:9652.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 17

158. Which statement about IPv6 is true?

D. Broadcasts have been eliminated and replaced with multicasts.

IPv6 has three types of addresses - Unicast - a packet is delivered to one interface; Multicast - a packet delivered to multiple interfaces; Anycast - a packet is delivered to the nearest of multiple interfaces (in terms of routing distance). IPv6 does not use broadcast messages.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 17

159. Which IPv6 address is the all-router multicast group?

A. FF02::2

The IP address of all routers of IPV6 is FF02::2, the IP address of all routers of IPV4 is 224.0.0.2.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301

Chapter 17

160. Which three are characteristics of an IPv6 anycast address? (Choose three).

- A. the same address for multiple devices in the group**
- B. delivery of packets to the group interface that is closest to the sending device**
- F. one-to-nearest communication model**

A new address type made specifically for IPv6 is called the Anycast Address. These IPv6 addresses are global addresses, and can be assigned to more than one interface unlike an IPv6 unicast address. Anycast is designed to send a packet to the nearest interface that is a part of that anycast group. The sender creates a packet and forwards the packet to the anycast address as the destination address which goes to the nearest router. The nearest router or interface is found by using the metric of a routing protocol currently running on the network.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

161. Which address is the IPv6 all-RIP-routers multicast group address that is used by RIPng as the destination address for RIP updates?

- C. FF02::9**

IPv6 RIP functions the same and offers the same benefits as RIP in IPv4. RIP enhancements for IPv6, detailed in RFC 2080, include support for IPv6 addresses and prefixes, and the use of the all-RIP-devices multicast group address FF02::9 as the destination address for RIP update messages.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

162. Which IPv6 address is the equivalent of the IPv4 interface loopback address 127.0.0.1?

- A. ::1**

The IPv6 unicast loopback address is equivalent to the IPv4 loopback address, 127.0.0.1. The IPv6 loopback address is 0:0:0:0:0:0:0:1, or ::1.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

163. What are three IPv6 transition mechanisms? (Choose three).

- B. Teredo tunneling**
- C. ISATAP tunneling**
- E. 6to4 tunneling**

IPv6 has three transition mechanisms. 6 to 4 tunneling - this mechanism allows IPv6 sites to communicate with each other over the IPv4 network without explicit tunnel setup. ISATAP tunneling (Intra-Site Automatic Tunnel Addressing Protocol) is a mechanism for transmitting IPv6 packets over IPv4 network. Teredo tunneling this mechanism tunnels IPv6 datagrams within IPv4 UDP datagrams, allowing private IPv4 address and IPv4 NAT traversal to be used.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

164. Which two statements describe characteristics of IPv6 unicast addressing? (Choose two).

- D. There is only one loopback address and it is ::1.**
- E. Global addresses start with 2000:/3.**

Loopback address are identified as ::1, Link-local address are identified as FE80::/10, Site-local addresses are identified as FEC0::/10, Global addresses are identified as 2000::/3, Multicast addresses are identified as FF00::/8.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

165. How is an EUI-64 format interface ID created from a 48-bit MAC address?

B. By inserting 0xFFFE between the upper three bytes and the lower three bytes of the MAC address.

The modified EUI-64 format interface identifier is derived from the 48-bit link-layer (MAC) address by inserting the hexadecimal number FFFE between the upper three bytes (OUI field) and the lower three bytes (serial

number) of the link layer address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

166. What is known as “one-to-nearest” addressing in IPv6?

B. Anycast

IPv6 Anycast addresses are used for one-to-nearest communication, meaning an Anycast address is used by a device to send data to one specific recipient (interface) that is the closest out of a group of recipients (interfaces).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

167. Which two of these statements are true of IPv6 address representation? (Choose two).

A. Every IPv6 interface contains at least one loopback address.

E. A single interface may be assigned multiple IPv6 addresses of any type.

A single interface may be assigned multiple addresses of any type (unicast, anycast, multicast). Every IPv6-enabled interface must contain at least one loopback and one link-local address. Optionally, every interface can have multiple unique local and global addresses.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

168. The network administrator has been asked to give a reason for moving from an IPv4 network to an IPv6 network. What are two reasons for adopting IPv6 over IPv4? (Choose two).

D. no broadcast.

F. autoconfiguration.

IPv6 replaced broadcasts with multicast. IPv6 also uses autoconfiguration to auto assign IP addresses to an interface.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

169. In which integration method is an IPv6 packet encapsulated within an

IPv4 protocol?

B. tunneling

Overlay tunneling encapsulates IPv6 packets in IPv4 packets for delivery across an IPv4 infrastructure. An IPv6 packet is encapsulated into IPv4 packet and sent to the remote tunnel destination. This is where the IPv4 packet header is stripped, and the original IPv6 packet is forwarded further into an IPv6 cloud.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 17

170. Which two statements about IPv6 router advertisement messages are true? (Choose two).

A. They use ICMPv6 type 134.

B. The advertised prefix length must be 64 bits.

IPv6 router advertisement message is one type of the ICMPv6 packets with Type field value of 134. The advertised IPv6 prefix length must be 64 bits for the stateless address autoconfiguration to be operational.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 17

171. Which statement about IPv6 is true?

D. An IPv6 address is 128 bits long and is represented as hexadecimal characters.

IPv6 addresses are 128 bits in length, and denoted by eight groups of hexadecimal quartets separated by colons. A valid IPv6 address is represented as 2001:cdba:0000:0000:0000:0000:3257:9652.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 17

172. Which command can you use to manually assign a static IPv6 address to a router interface?

D. ipv6 address 2001:db8:2222:7272::72/64

A, B, and C are invalid configurations. D is the correct syntax for configuring

an IPv6 address on an interface.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

173. What are three features of the IPv6 protocol? (Choose three).

B. autoconfiguration

C. no broadcasts

E. plug-and-play

An important feature of IPv6 is that it allows plug and play option to the network devices by allowing them to configure themselves independently. It is possible to plug a node into an IPv6 network without requiring any human intervention. This feature was critical to allow network connectivity to an increasing number of mobile devices. This is accomplished by autoconfiguration. IPv6 does not implement traditional IP broadcast, i.e. the transmission of a packet to all hosts on the attached link using a special broadcast address, and therefore does not define broadcast addresses. In IPv6, the same result can be achieved by sending a packet to the link-local all nodes multicast group at address ff02::1, which is analogous to IPv4 multicast to address 224.0.0.1.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

174. Which two are features of IPv6? (Choose two).

A. anycast.

C. multicast.

IPv6 addresses uses unicast addressing, anycast addressing, and multicast addressing. A unicast address identifies a single network interface. The packets are sent to a unicast address to that specific interface. An anycast address is assigned to a group of interfaces, usually belonging to different nodes. A packet sent to an anycast address is delivered to just one of the member interfaces, typically the nearest host. A multicast address is also used by multiple hosts, which acquire the multicast address destination by participating in the multicast distribution protocol among the network routers. A packet that is sent to a multicast address is delivered to all interfaces that have joined the corresponding multicast group.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

175. What is the alternative notation for the IPv6 address
B514:82C3:0000:0000:0029:EC7A:0000:EC72?

D. B514:82C3::0029:EC7A:0:EC72

Leading zeros in a field are optional. Successive fields of 0 are represented as ::, but only once in an address. D is the correct answer.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

176. How many bits are contained in each field of an IPv6 address?

D. 16

An IPv6 address is represented as eight groups of four hexadecimal digits, each group representing 16 bits (two octets).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

177. Which IPv6 address is valid?

D. 2031:0:130F::9C0:876A:130B

An IPv6 address is represented as eight groups of four hexadecimal digits, each group representing 16 bits. The groups are separated by colons (:). An example of an IPv6 address is 2001:0db8:85a3:0000:0000:8a2e:0370:7334. The leading 0's in a group can be collapsed using ::, but this can only be done once in an IP address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

178. Which statements are TRUE regarding Internet Protocol version 6 (IPv6) addresses? (Choose three).

- A. An IPv6 address is divided into eight 16-bit groups.**
- B. A double colon (::) can only be used once in a single IPv6 address.**
- E. Groups with a value of 0 can be represented with a single 0 in**

IPv6 address.

IPv6 addresses are contained into eight 16-bit groups, divided by a colon (:). Groups with a value of 0 can be represented with a single 0 in the address. Multiple groups of 16-bit 0s can be represented with double colon (::), but can only be used once in the notation.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

179. Identify the four valid IPv6 addresses. (Choose four).

A. ::

B. ::192:168:0:1

E. 2002:c0a8:101::42

F. 2003:dead:beef:4dad:23:46:bb:101

A is correct because “::” is named the “unspecified” address and is typically used in the source field of a datagram that is sent by a device that seeks to have its IP address configured. Answers B and E are the short form of 0:0:0:0:192:168:0:1 and 2002:c0a8:0101:0:0:0:0:0042, F is a normal IPv6 address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

180. Which of the following describes the process of encapsulating IPv6 packets inside IPv4 packets?

B. Tunneling

Overlay tunneling encapsulates IPv6 packets in IPv4 packets for delivery across an IPv4 infrastructure. At the tunnel head end, an IPv6 packet is encapsulated into IPv4 packet and sent to the remote tunnel destination. This is where the IPv4 packet header is stripped, and the original IPv6 packet is forwarded further into an IPv6 cloud.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

181. Which of these represents an IPv6 link-local address?

A. FE80::380e:611a:e14f:3d69

In the Internet Protocol Version 6 (IPv6), the address block fe80::/10 has been reserved for link-local unicast addressing. The actual link local addresses are assigned with the prefix fe80::/64. They may be assigned by automatic (stateless) or stateful (e.g. manual) mechanisms.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

182. The network administrator has been asked to give reasons for moving from IPv4 to IPv6. What are two valid reasons for adopting IPv6 over IPv4? (Choose two).

- A. no broadcast**
- E. autoconfig**

IPv6 does not use broadcasts, and autoconfiguration is a feature of IPV6 that allows for hosts to automatically obtain an IPv6 address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

183. Which IPv6 header field is equivalent to the TTL?

- A. Hop Limit**

This field is same as Time To Live (TTL) in IPv4, which is used to stop packet to loop in the network infinitely. The value of Hop Limit field is decremented by 1 when it passes a Layer 3 device (like a router). When this field reaches 0 the packet is dropped.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

184. Which two statements about the tunnel mode ipv6ip command are true? (Choose two).

- A. It enables the transmission of IPv6 packets within the configured tunnel.**
- B. It specifies IPv4 as the encapsulation protocol.**

The “tunnel mode ipv6ip” command specifies IPv6 as the passenger protocol, and IPv4 as both the encapsulation and transport protocol for the IPv6 tunnel. The tunnel source and destination are configured with IPv4 addressing, the

tunnel interface is configured with IPv6.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

185. In which three ways is an IPv6 header simpler than an IPv4 header?
(Choose three).

A. Unlike IPv4 headers, IPv6 headers have a fixed length.

B. IPv6 uses an extension header instead of the IPv4

Fragmentation field.

C. IPv6 headers eliminate the IPv4 Checksum field.

IPv6 eliminates the Header Checksum field, which handles error checking in IPv4. IPv6 depends on reliable transmission in the data link protocols and on error checking in upper-layer protocols instead.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

186. Which two features can dynamically assign IPv6 addresses? (Choose two).

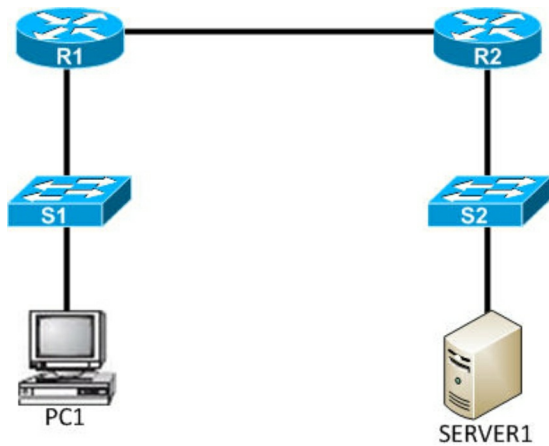
A. IPv6 stateless autoconfiguration

D. IPv6 stateful autoconfiguration

Stateful autoconfiguration is the IPv6 equivalent of DHCP. A new protocol, called DHCPv6, is used to pass out addressing and service information in the same way that DHCP is used in IPv4. Stateless Autoconfiguration allows an interface to automatically “lease” an IPv6 address and does not require the establishment of a server to assign out address space.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

187. Refer to the exhibit. PC1 is trying to login into SERVER1. Which of the following troubleshooting steps is incorrect?



D. Ping the remote server to verify local LAN connectivity.

Ping is a tool that helps to verify IP-level connectivity. When troubleshooting, the ping command is used to send an ICMP Echo Request to a target host name or IP address. Use Ping whenever you want to verify that a host computer can send IP packets to a destination host. You can also use the Ping tool to isolate network hardware problems and incompatible configuration.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 18

188. Refer to the exhibit. Which of these statements correctly describes the state of the switch once the boot process has been completed?

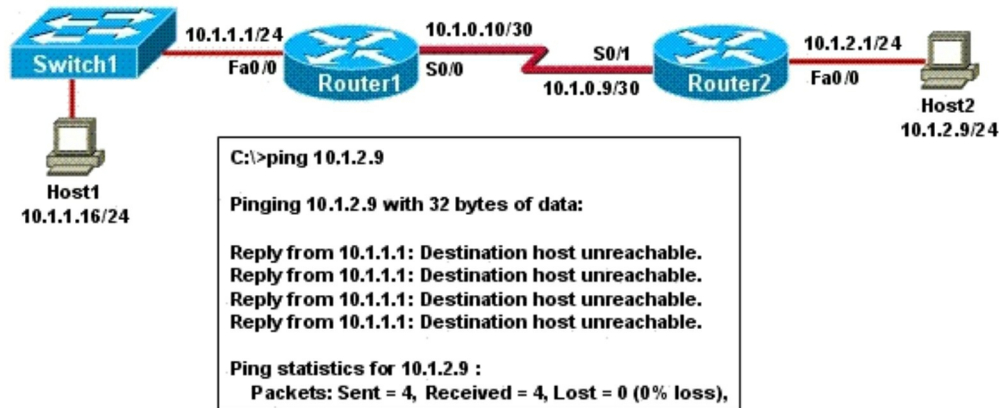
```
00:00:39: %LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to down
00:00:40: %SPANTREE-5-EXTENDED_SYSID: Extended Sysid enabled for type vlan
00:00:42: %SYS-5-CONFIG_I: Configured from memory by console
00:00:42: %SYS-5-RESTART: System restarted --
Cisco IOS Software, C2960 Software (C2960-LANBASEK9-M), Version 12.2(25)SEE2, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2006 by Cisco Systems, Inc.
Compiled Fri 28-Jul-06 11:57 by yenanh
00:00:44: %LINK-5-CHANGED: Interface Vlan1, changed state to administratively down
00:00:44: %LINK-3-UPDOWN: Interface FastEthernet0/1, changed state to up
00:00:44: %LINK-3-UPDOWN: Interface FastEthernet0/2, changed state to up
00:00:44: %LINK-3-UPDOWN: Interface FastEthernet0/11, changed state to up
00:00:45: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up
00:00:45: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up
00:00:45: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/11, changed state to up
00:00:48: %LINK-3-UPDOWN: Interface FastEthernet0/12, changed state to up
00:00:49: %LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/12, changed state to up
```

B. Remote access management of this switch will not be possible without configuration change.

The line says “Interface VLAN1, changed state to administratively down”. This shows that VLAN1 is shut down. Remote management of this switch is not possible unless VLAN1 is brought back up. Since VLAN1 is the only interface shown in the output, you have to assume that no other VLAN interface has been configured with an IP Address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 18

189. Refer to the exhibit. A network administrator attempts to ping Host2 from Host1 and receives the results that are shown. What is the problem?

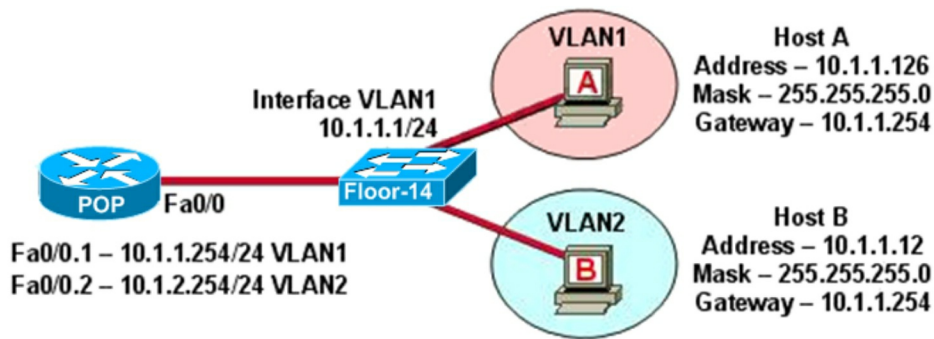


C. The link between Router1 and Router2 is down.

Host1 tries to communicate with Host2. The message destination host unreachable from Router1 indicates that the problem occurs when the data is forwarded from Host1 to Host2. According to the topology, we can infer that the link between Router1 and Router2 is down.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 18

190. Refer to the exhibit. The network shown in the diagram is experiencing connectivity problems. Which of the following will correct the problems? (Choose two).



- B. Configure the gateway on Host B as 10.1.2.254.**
- D. Configure the IP address of Host B as 10.1.2.2.**

Switch 1 is configured with VLAN1 and VLAN2. The IP member Host A in VLAN1 is Address: 10.1.1.126; Mask: 255.255.255.0; Gateway: 10.1.1.254. The IP member Host B in VLAN2 is Address: 10.1.1.12; Mask: 255.255.255.0; Gateway: 10.1.1.254. The configuration of sub-interface on Router 2 is Fa0/0.1 - 10.1.1.254/24 VLAN1; Fa0/0.2 - 10.1.2.254/24 VLAN2. The configurations of the gateways of members in VLAN2 and the associated network segments are wrong. The layer 3 addressing information of Host B should be modified to Address: 10.1.2.X; Mask: 255.255.255.0. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

191. A user is unable to connect to the internet. Based on the layered approach to troubleshooting starting at the lowest layer, what is the correct troubleshooting order?

B. 2143

The correct troubleshooting order is:
 Step 1 = Verify ethernet cable connection
 Step 2 = Verify NIC operation

Step 3 = Verify IP configuration

Step 4 = Verify URL

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 18

192. The network administrator is using a Windows PC application that is called putty.exe for remote communication to a switch for network troubleshooting. Which two protocols could be used during this communication? (Choose two).

C. Telnet

E. SSH

Putty is a free implementation of Telnet and SSH for Windows and Unix platforms, and is used to connect to Cisco and other networking devices using SSH or Telnet.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 18

193. Refer to the exhibit. A user cannot reach any web sites on the Internet, but others in the department are not having a problem. What is the most likely cause of the problem?

```
Windows IP Configuration

Host Name . . . . . : home-PC
Primary Dns Suffix . . . . . :
Node Type . . . . . : Hybrid
IP Routing Enabled. . . . . : No
WINS Proxy Enabled. . . . . : No

Ethernet adapter Local Area Connection:

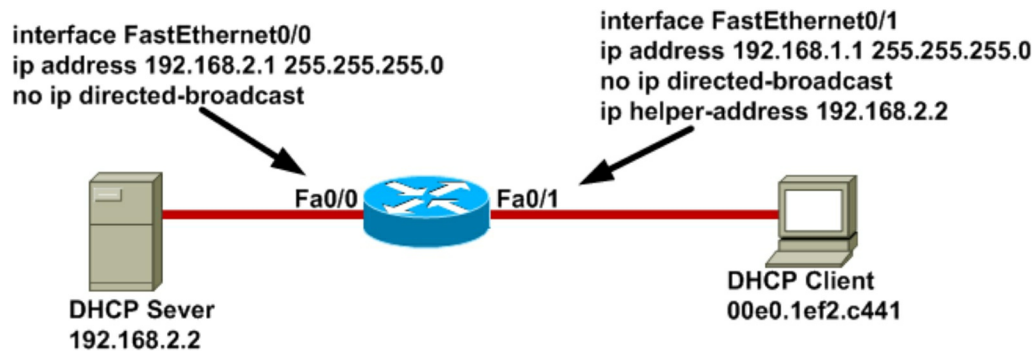
Connection-specific DNS Suffix . . :
Description . . . . . : Wired Network Connection
Physical Address. . . . . : 00-13-CE-9B-33-93
DHCP Enabled. . . . . : No
IP Address. . . . . : 10.10.10.2
Subnet Mask . . . . . : 255.255.255.0
Deafult Gateway . . . . . : 10.10.10.1

C:\
```

C. A DNS server address is not reachable by the PC.

IP routing does not need to be enabled on PC's, this is a router function. From the output, the IP address and default gateway are on the same subnet. DHCP has not been enabled on this PC so it has been configured with a static address so reaching the DHCP server is not the issue. Finally, NAT must be configured correctly or the other users in the department would also be having issues. A DNS issue is most likely the cause of this problem. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

194. Refer to the exhibit. The DHCP settings have recently been changed on the DHCP server and the client is no longer able to reach network resources. What should be done to correct this situation?



E. Issue the ipconfig command with the /release and /renew options in a command window.

A PC will retain its DHCP assigned IP address until the lease time expires, which often is 24 hours or more. When changes are made to the DHCP server, the client should issue the ipconfig/release and then ipconfig/renew commands to obtain a new IP address lease.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

Chapter 2 Network Access

The objectives covered in this chapter:

20% 2.0 Network Access

2.1 Configure and verify VLANs (normal range) spanning multiple switches

2.1.a Access ports (data and voice)

2.1.b Default VLAN

2.1.c Connectivity

2.2 Configure and verify interswitch connectivity

2.2.a Trunk ports

2.2.b 802.1Q

2.2.c Native VLAN

2.3 Configure and verify Layer 2 discovery protocols (Cisco Discovery Protocol and LLDP)

2.4 Configure and verify (Layer 2/Layer 3) EtherChannel (LACP)

2.5 Describe the need for and basic operations of Rapid PVST+ Spanning Tree Protocol and identify basic operations

2.5.a Root port, root bridge (primary/secondary), and other port names

2.5.b Port states (forwarding/blocking)

2.5.c PortFast benefits

2.6 Compare Cisco Wireless Architectures and AP

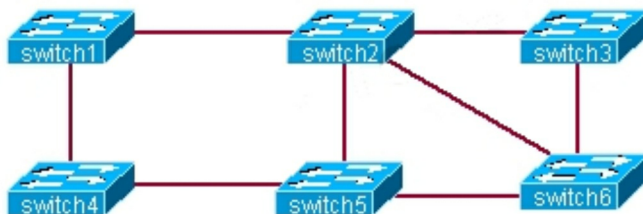
modes

2.7 Describe physical infrastructure connections of WLAN components (AP, WLC, access/trunk ports, and LAG)

2.8 Describe AP and WLC management access connections (Telnet, SSH, HTTP, HTTPS, console, and TACACS+/RADIUS)

2.9 Configure the components of a wireless LAN access for client connectivity using GUI only such as WLAN creation, security settings, QoS profiles, and advanced WLAN settings

1. Based on the network shown in the graphic. Which option contains both the potential networking problem and the protocol or setting that should be used to prevent the problem?



- A. routing loops, hold down timers
- B. switching loops, split horizon
- C. routing loops, split horizon
- D. switching loops, VTP

- E. routing loops, STP
- F. switching loops, STP

2. Which command sequence can you enter to create VLAN 20 and assign it to an interface on a switch?

A. Switch(config)#vlan 20
Switch(config)#Interface gig x/y
Switch(config-if)#switchport access vlan 20

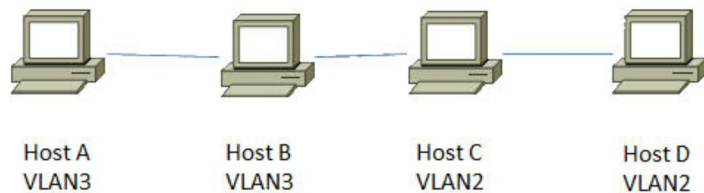
B. Switch(config)#Interface gig x/y
Switch(config-if)#vlan 20
Switch(config-vlan)#switchport access vlan 20

C. Switch(config)#vlan 20
Switch(config)#Interface vlan 20
Switch(config-if)#switchport trunk native vlan 20

D. Switch(config)#vlan 20
Switch(config)#Interface vlan 20
Switch(config-if)#switchport access vlan 20

E. Switch(config)#vlan 20
Switch(config)#Interface vlan 20
Switch(config-if)#switchport trunk allowed vlan 20

3. Refer to the exhibit. Host A can communicate with Host B but not with Hosts 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.

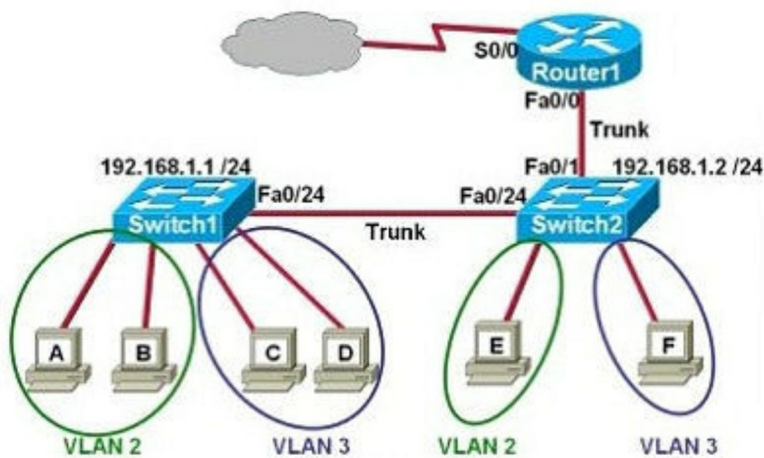
4. Which technology can enable multiple VLANs to communicate with one another?

- A. inter-VLAN routing using a Layer 3 switch
- B. inter-VLAN routing using a Layer 2 switch
- C. intra-VLAN routing using router on a stick
- D. intra-VLAN routing using a Layer 3 switch

5. Which command can you enter to view the ports that are assigned to VLAN 20?

- A. Switch#show vlan id 20
- B. Switch#show ip interface brief
- C. Switch#show interface vlan 20
- D. Switch#show ip interface vlan 20

6. Refer to the exhibit. Which two statements are true about interVLAN routing in the topology that is shown in the exhibit? (Choose two).



- A. The FastEthernet 0/0 interface on Router1 must be configured with subinterfaces.
 - B. The FastEthernet 0/0 interface on Router1 and Switch2 trunk ports must be configured using the same encapsulation type.
 - C. Router1 and Switch2 should be connected via a crossover cable.
 - D. Router1 needs more LAN interfaces to accommodate the VLANs that are shown in the exhibit.
 - E. Router1 will not play a role in communications between host A and host D.
 - F. Host E and host F use the same IP gateway address.
7. A department decides to replace its hub with a Catalyst 2950 switch that is no longer needed by another department. To prepare the switch for installation, the network administrator has erased the startup configuration and reloaded the switch. However, PCs that are connected to the switch experience various connectivity problems. What is a possible cause of the problem?
- A. The "mode" button was not pressed when the switch was reloaded.
 - B. The switch was not configured with an IP address or a default gateway.
 - C. The running configuration should have been erased.
 - D. The management VLAN is disabled.
 - E. The VLAN database was not erased.
8. Refer to the exhibit. C-router is to be used as a "router-on-a-stick" to route between the VLANs. All the interfaces have been properly configured and IP routing is operational. The hosts in the VLANs have been configured with the appropriate default gateway. What can be said about this configuration?



A. No further routing configuration is required.

B. These commands need to be added to the configuration:

```
C-router(config)#router rip
```

```
C-router(config-router)#network 172.19.0.0
```

C. These commands need to be added to the configuration:

```
C-router(config)#router ospf 1
```

```
C-router(config-router)#network 172.19.0.0 0.0.3.255 area 0
```

D. These commands need to be added to the configuration:

```
C-router(config)# router eigrp 123
```

```
C-router(config-router)# network 172.19.0.0
```

9. A switch is configured with all ports assigned to vlan 2 with full duplex FastEthernet to segment existing departmental traffic. What is the effect of adding switch ports to a new VLAN on the switch?

A. An additional broadcast domain will be created.

B. More collision domains will be created.

C. IP address utilization will be more efficient.

D. More bandwidth will be required than was needed previously.

10. What are three benefits of implementing VLANs? (Choose three).

A. A higher level of network security can be reached by separating sensitive data traffic from other network traffic.

B. Broadcast storms can be mitigated by increasing the number of broadcast domains, thus reducing their size.

C. VLANs make it easier for IT staff to configure new logical groups, because the VLANs all belong to the same broadcast domain.

D. A more efficient use of bandwidth can be achieved allowing many physical groups to use the same network infrastructure.

E. Broadcast storms can be mitigated by decreasing the number of broadcast domains, thus increasing their size.

F. A more efficient use of bandwidth can be achieved allowing many logical networks to use the same network infrastructure.

G. Port-based VLANs increase switch-port use efficiency, thanks to 802.1Q trunks.

11. VLAN 3 is not yet configured on your switch. What happens if you set

the switchport access vlan 3 command in interface configuration mode?

- A. The command is accepted and the respective VLAN is added to vlan.dat.
- B. The command is rejected.
- C. The port turns amber.
- D. The command is accepted and you must configure the VLAN manually.

12. A router has two Fast Ethernet interfaces and needs to connect to four VLANs in the local network. How can you accomplish this task, using the fewest physical interfaces and without decreasing network performance?

- A. Implement a router-on-a-stick configuration.
- B. Use a hub to connect the four VLANs with a Fast Ethernet interface on the router.
- C. Add a second router to handle the VLAN traffic.
- D. Add two more Fast Ethernet interfaces.

13. Which three elements must be used when you configure a router interface for VLAN trunking? (Choose three).

- A. One IP network or subnetwork for each subinterface.
- B. Subinterface encapsulation identifiers that match VLAN tags.
- C. One physical interface for each subinterface.
- D. Subinterface numbering that matches VLAN tags.
- E. A management domain for each subinterface.
- *F. one subinterface per VLAN

14. Two switches are connected through a trunk link. Which two commands show that there is a native VLAN mismatch on that link? (Choose two).

- A. show interface trunk
- B. show vlan brief
- C. show interface switchport
- D. show interface *interface*
- E. show switchport trunk
- F. show interface vlan

15. Refer to the exhibit. A technician has configured the FastEthernet 0/1 interface on Sw11 as an access link in VLAN 1. Based on the output from the show vlan brief command issued on Sw12, what will be the result of making this change on Sw11?



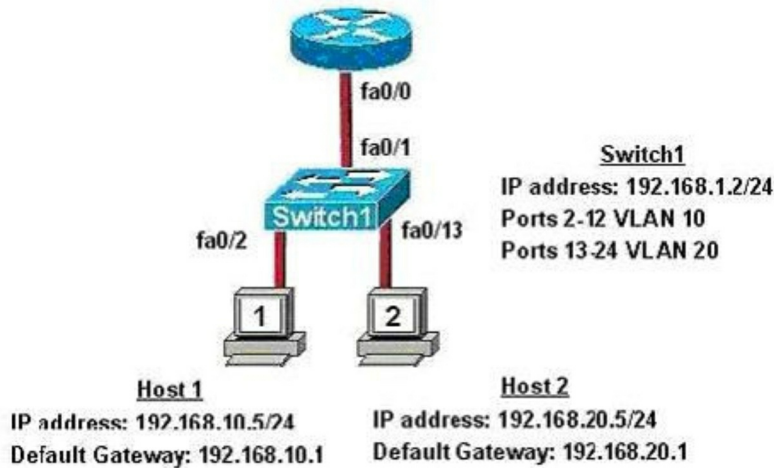
Sw12#show vlan brief

VLAN	Name	Status	Ports
1	default	active	
10	Marketing	active	Fa0/6, Fa0/7, Fa0/8, Fa0/9 Fa0/10, Fa0/11, Fa0/12, Fa0/13 Fa0/14, Fa0/15
15	Accounting	active	Fa0/16, Fa0/18, Fa0/19, Fa0/20 Fa0/21, Fa0/22, Fa0/24
20	Admin	active	Fa0/2, Fa0/3, Fa0/4, Fa0/5
1002	fdi-default	active	
1003	token-ring-default	active	
1004	fdinet-default	active	
1005	trnet-default	active	

- A. Only the hosts in VLAN 10 and VLAN 15 on the two switches will be able to communicate with each other.
- B. Only the hosts in VLAN 1 on the two switches will be able to communicate with each other.
- C. The hosts in all VLANs on the two switches will be able to communicate with each other.
- D. Hosts will not be able to communicate between the two switches.

16. Refer to the exhibit. What commands must be configured on the 2950 switch and the router to allow communication between host 1 and host 2?

(Choose two).



- A. Switch1 (config)#interface fastethernet 0/1
Switch1 (config-if)# switchport mode trunk
- B. Switch1 (config)#interface vlan 1
Switch1 (config-if)#ip default-gateway 192.168.1.1
- C. Router(config)#interface fastethernet 0/0
Router(config-if)#no shut down
Router(config)#interface fastethernet 0/0.1
Router(config-subif)#encapsulation dot1q 10
Router(config-subif)#ip address 192.168.10.1 255.255.255.0
Router(config)#interface fastethernet 0/0.2
Router(config-subif)#encapsulation dot1q 20
Router(config-subif)#ip address 192.168.20.1 255.255.255.0

```
D. Router(config)#interface fastethernet 0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shut down
```

```
E. Switch1(config)#vlan database
Switch1(config-vlan)#vtp domain XYZ
Switch1(config-vlan)#vtp server
```

```
F. Router(config)#router eigrp 100
Router(config-router)#network 192.168.10.0
Router(config-router)#network 192.168.20.0
```

17. Which three of these statements regarding 802.1Q trunking are correct? (Choose three).

- A. 802.1Q trunks require full-duplex, point-to-point connectivity.
- B. 802.1Q trunks can use 10 Mb/s Ethernet interfaces.
- C. 802.1Q trunking ports can also be secure ports.
- D. 802.1Q native VLAN frames are untagged by default.
- E. 802.1Q trunks should have native VLANs that are the same at both ends.

18. Refer to the exhibit. A frame on VLAN 1 on switch S1 is sent to switch S2 where the frame is received on VLAN 2. What causes this behavior?

```
S1#show interface trunk
Port    Mode    Encapsulation    Status    Native vlan
Fa0/1   on      802.1q           Trunking    1
```

```
Port    Vlans allowed a trunk
Fa0/1   1.1005
```

```
Port    Vlans allowed and active in management domain
Fa0/1   12
```

```
S2#show interface trunk
Port    Mode    Encapsulation    Status    Native vlan
Fa0/1   on      802.1q           Trunking    2
```

```
Port    Vlans allowed a trunk
Fa0/1   1.1005
```

```
Port    Vlans allowed and active in management domain
Fa0/1   12
```

- A. VLANs that do not correspond to a unique IP subnet
- B. allowing only VLAN 2 on the destination
- C. native VLAN mismatches

D. trunk mode mismatches

19. Assuming the default switch configuration, which VLAN range can be added, modified, and removed on a Cisco switch?

- A. 2 through 1001
- B. 2 through 1005
- C. 1 through 1002
- D. 1 through 1001

20. What is the purpose of frame tagging in virtual LAN (VLAN) configurations?

- A. Inter-VLAN routing
- B. Encryption of network packets
- C. Frame identification over trunk links
- D. Frame identification over access links

21. In a switched environment, what does the IEEE 802.1Q standard describe?

- A. The operation of VTP.
- B. A method of VLAN trunking.
- C. An approach to wireless LAN communication.
- D. The process for root bridge selection.
- E. VLAN pruning.

22. What is the function of the command `switchport trunk native vlan 999` on a Cisco Catalyst switch?

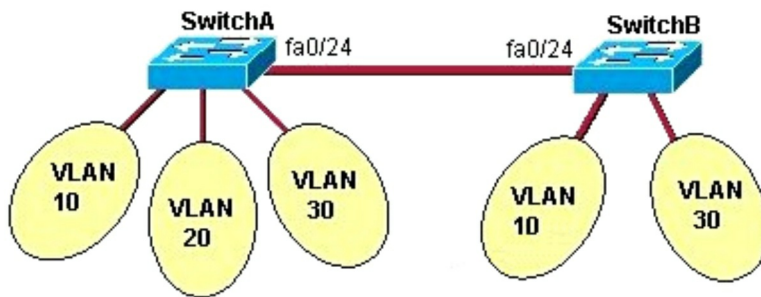
- A. It creates a VLAN 999 interface.
- B. It designates VLAN 999 for untagged traffic.
- C. It blocks VLAN 999 traffic from passing on the trunk.
- D. It designates VLAN 999 as the default for all unknown tagged traffic.

23. Which of the following are benefits of VLANs? (Choose three).

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

F. They simplify switch administration.

24. Refer to the exhibit. All switch ports are assigned to the correct VLANs, but none of the hosts connected to SwitchA can communicate with hosts in the same VLAN connected to SwitchB. Based on the output shown, what is the most likely problem?



```
SwitchA# show running-config
Building configuration...
<output omitted>
Current configuration : 100 bytes
!
interface FastEthernet0/24
 switchport mode access
 no ip address
!
<output omitted>
end
```

```
SwitchB# show running-config
Building configuration...
<output omitted>
Current configuration : 100 bytes
!
interface FastEthernet0/24
 switchport mode access
 no ip address
!
<output omitted>
end
```

- A. The access link needs to be configured in multiple VLANs.
- B. The link between the switches is configured in the wrong VLAN.
- C. The link between the switches needs to be configured as a trunk.

- D. VTP is not configured to carry VLAN information between the switches.
- E. Switch IP addresses must be configured in order for traffic to be forwarded between the switches.

25. Which two link protocols are used to carry multiple VLANs over a single link? (Choose two).

- A. VTP
- B. 802.1q
- C. IGP
- D. ISL
- E. 802.3u

26. Which statement about VLAN operation on Cisco Catalyst switches is true?

- A. When a packet is received from an 802.1Q trunk, the VLAN ID can be determined from the source MAC address and the MAC address table.
- B. Unknown unicast frames are retransmitted only to the ports that belong to the same VLAN.
- C. Broadcast and multicast frames are retransmitted to ports that are configured on different VLAN.
- D. Ports between switches should be configured in access mode so that VLANs can span across the ports.

27. Which two benefits are provided by creating VLANs? (Choose two).

- A. Added security
- B. Dedicated bandwidth
- C. Provides segmentation
- D. Allows switches to route traffic between subinterfaces
- E. Contains collisions

28. What are three advantages of VLANs? (Choose three).

- A. VLANs establish broadcast domains in switched networks.
- B. VLANs utilize packet filtering to enhance network security.
- C. VLANs provide a method of conserving IP addresses in large networks.
- D. VLANs provide a low-latency internetworking alternative to routed networks.
- E. VLANs allow access to network services based on department, not physical location.

F. VLANs can greatly simplify adding, moving, or changing hosts on the network.

29. On a corporate network, hosts on the same VLAN can communicate with each other, but they are unable to communicate with hosts on different VLANs. What is needed to allow communication between the VLANs?

A. A router with subinterfaces configured on the physical interface that is connected to the switch.

B. A router with an IP address on the physical interface connected to the switch.

C. A switch with an access link that is configured between the switches.

D. A switch with a trunk link that is configured between the switches.

30. Which three statements about RSTP are true? (Choose three).

A. RSTP significantly reduces topology reconverging time after a link failure.

B. RSTP expands the STP port roles by adding the alternate and backup roles.

C. RSTP port states are blocking, discarding, learning, or forwarding.

D. RSTP provides a faster transition to the forwarding state on point-to-point links than STP does.

E. RSTP also uses the STP proposal-agreement sequence.

F. RSTP uses the same timer-based process as STP on point-to-point links.

31. Refer to the exhibit. Why has this switch not been elected the root bridge for VLAN1?

```
Switch# show spanning-tree vlan 1
VLAN0001
  Spanning tree enabled protocol rstp
  Root ID    Priority 20481
            Address 0008.217a.5800
            Cost   38
            Port   1 (FastEthernet0/1)
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
```

```
Bridge ID   Priority 32769 (priority 32768 sys-id-ext 1)
            Address 0008.205e.6600
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
            Aging Time 300
```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/1	Root	FWD	19	128.1	P2p
Fa0/4	Desg	FDD	38	128.1	P2p
Fa0/11	Altn	BLK	57	128.1	P2p
Fa0/13	Desg	FWD	38	128.1	P2p

- A. It has more than one interface that is connected to the root network segment.
- B. It is running RSTP while the elected root bridge is running 802.1d spanning tree.
- C. It has a higher MAC address than the elected root bridge.
- D. It has a higher bridge ID than the elected root bridge.

32. Which command enables RSTP on a switch?

- A. spanning-tree mode rapid-pvst
- B. spanning-tree uplinkfast
- C. spanning-tree backbonefast
- D. spanning-tree mode mst

33. Which two of these statements regarding RSTP are correct? (Choose two).

- A. RSTP cannot operate with PVST+.
- B. RSTP defines new port roles.
- C. RSTP defines no new port states.
- D. RSTP is a proprietary implementation of IEEE 802.1D STP.
- E. RSTP is compatible with the original IEEE 802.1D STP.

34. What is one benefit of PVST+?

- A. PVST+ supports Layer 3 load balancing without loops.
- B. PVST+ reduces the CPU cycles for all the switches in the network.
- C. PVST+ allows the root switch location to be optimized per VLAN.
- D. PVST+ automatically selects the root bridge location, to provide optimized bandwidth usage.

35. Which port state is introduced by Rapid-PVST?

- A. learning
- B. listening
- C. discarding
- D. forwarding

36. What value is primarily used to determine which port becomes the root port on each non-root switch in a spanning-tree topology?

- A. Lowest port MAC address.
- B. Port priority number and MAC address.
- C. VTP revision number.

- D. Highest port priority number.
- E. Path cost.

37. Which three statements accurately describe layer 2 Ethernet switches? (Choose three).

- A. Microsegmentation decreases the number of collisions on the network.
- B. If a switch receives a frame for an unknown destination, it uses ARP to resolve the address.
- C. Spanning Tree Protocol allows switches to automatically share vlan information.
- D. In a properly functioning network with redundant switched paths, each switched segment will contain one root bridge with all its ports in the forwarding state. All other switches in that broadcast domain will have only one root port.
- E. Establishing vlans increases the number of broadcast domains.
- F. Switches that are configured with vlans make forwarding decisions based on both layer 2 and layer 3 address information.

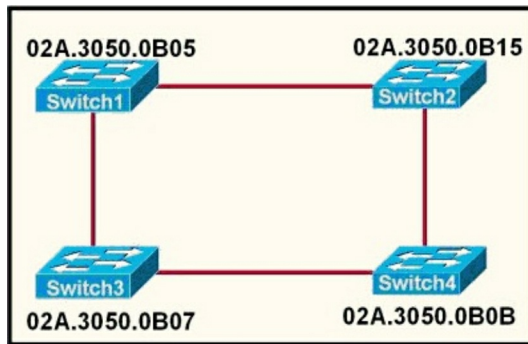
38. Which term describes a spanning-tree network that has all switch ports in either the blocking or forwarding state?

- A. converged
- B. redundant
- C. provisioned
- D. spanned

39. Which two protocols are used by bridges and/or switches to prevent loops in a layer 2 network? (Choose two).

- A. 802.1d
- B. VTP
- C. 802.1q
- D. SAP
- E. STP

40. Refer to the exhibit. Four Cisco 2950 switches are set to their default priority settings. During the spanning-tree process, which switch will be elected as the root bridge?

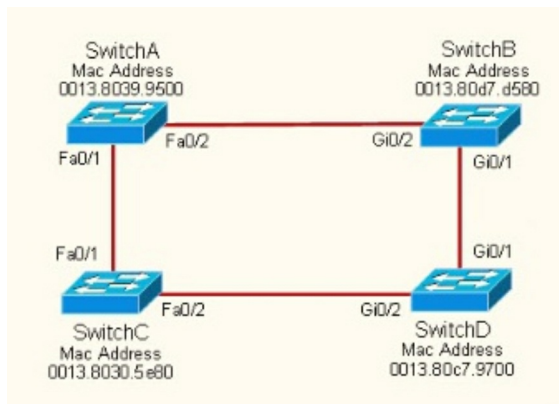


- A. Switch 3
- B. Switch 4
- C. Switch 2
- D. Switch 1

41. Three switches are connected to one another via trunk ports. Assuming the default switch configuration, which switch is elected as the root bridge for the spanning-tree instance of vlan 1?

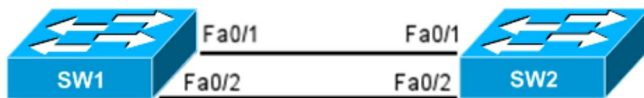
- A. The switch with the lowest MAC address.
- B. The switch with the highest MAC address.
- C. The switch with the highest IP address.
- D. The switch with the lowest IP address.

42. Refer to the exhibit. Each of these four switches has been configured with a hostname, as well as being configured to run RSTP. No other configuration changes have been made. Which three of these show the correct RSTP port roles for the indicated switches and interfaces? (Choose three).



- A. SwitchA, Fa0/2, designated
- B. SwitchA, Fa0/1, root
- C. SwitchB, Gi0/2, root
- D. SwitchB, Gi0/1, designated
- E. SwitchC, Fa0/2, root
- F. SwitchD, Gi0/2, root

43. Refer to the exhibit. A network administrator is configuring an EtherChannel between SW1 and SW2. The SW1 configuration is shown. What is the correct configuration for SW2?



SW1

```
interface FastEthernet 0/1
  channel-group 1 mode auto
  switchport trunk encapsulation dot1q
  switchport mode trunk

interface FastEthernet 0/2
  channel-group 1 mode auto
  switchport trunk encapsulation dot1q
  switchport mode trunk
```

```
A. interface FastEthernet 0/1
channel-group 1 mode active
switchport trunk encapsulation dot1q
switchport mode trunk
interface FastEthernet 0/2
channel-group 1 mode active
switchport trunk encapsulation dot1q
switchport mode trunk
```

```
B. interface FastEthernet 0/1
channel-group 2 mode auto
switchport trunk encapsulation dot1q
switchport mode trunk
interface FastEthernet 0/2
channel-group 2 mode auto
switchport trunk encapsulation dot1q
switchport mode trunk
```

```
C. interface FastEthernet 0/1
channel-group 1 mode desirable
switchport trunk encapsulation dot1q
switchport mode trunk
interface FastEthernet 0/2
channel-group 1 mode desirable
switchport trunk encapsulation dot1q
switchport mode trunk
```

```
D. interface FastEthernet 0/1
channel-group 1 mode passive
switchport trunk encapsulation dot1q
switchport mode trunk
interface FastEthernet 0/2
channel-group 1 mode passive
switchport trunk encapsulation dot1q
switchport mode trunk
```

44. What parameter can be different on ports within an EtherChannel?

- A. Speed
- B. DTP negotiation settings

- C. Trunk encapsulation
- D. Duplex

45. Refer to the exhibit. What set of commands was configured on interface Fa0/3 to produce the given output?

```
FastEthernet0/3:
Port state      = 1
Channel group   = 2          Mode = Passive          Gcchange = -
Port-channel    = Po2       GC      = -             Pseudo port-channel = Po2
Port index      = 0         Load = 0x00           Protocol = LACP
```

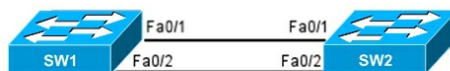
A. interface FastEthernet 0/3
channel-group 1 mode desirable
switchport trunk encapsulation dot1q
switchport mode trunk

B. interface FastEthernet 0/3
channel-group 2 mode passive
switchport trunk encapsulation dot1q
switchport mode trunk

C. interface FastEthernet 0/3
channel-group 2 mode active
switchport trunk encapsulation dot1q
switchport mode trunk

D. interface FastEthernet 0/3
channel-group 2 mode on
switchport trunk encapsulation dot1q
switchport mode trunk

46. Refer to the exhibit. If the devices produced the given output, what is the cause of the EtherChannel problem?



```

SW1#show etherchannel summary
Flags: D - down      P - in port-channel
       I - stand-alone s - suspended
       H - Hot-standby (LACP only)
       R - Layer3      S - Layer2
       U - in use      f - failed to allocate aggregator
       u - unsuitable for bundling
       w - waiting to be aggregated
       d - default port
  
```

```

Number of channel-groups in use: 2
Number of aggregators:          2
  
```

Group	Port-channel	Protocol	Ports
1	Pol(SU)	-	Fa0/2(P) Fa0/1(D)

```

SW1#show interface fa0/1
FastEthernet0/1 is down, line protocol is down (disabled)
Hardware is Lance, address is 00e0.5c11.9501
(bia 00e0.5c11.9501)
MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Full-duplex, 10Mb/s
input flow-control is off, output flow-control is off
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:08, output 00:00:05, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes);
Total output drops: 0
Queueing strategy: fifo
Output queue :0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  
```

```

SW2#show etherchannel summary
Flags: D - down      P - in port-channel
       I - stand-alone s - suspended
       H - Hot-standby (LACP only)
       R - Layer3      S - Layer2
       U - in use      f - failed to allocate aggregator
       u - unsuitable for bundling
       w - waiting to be aggregated
       d - default port
  
```

```

Number of channel-groups in use: 2
Number of aggregators:          2
  
```

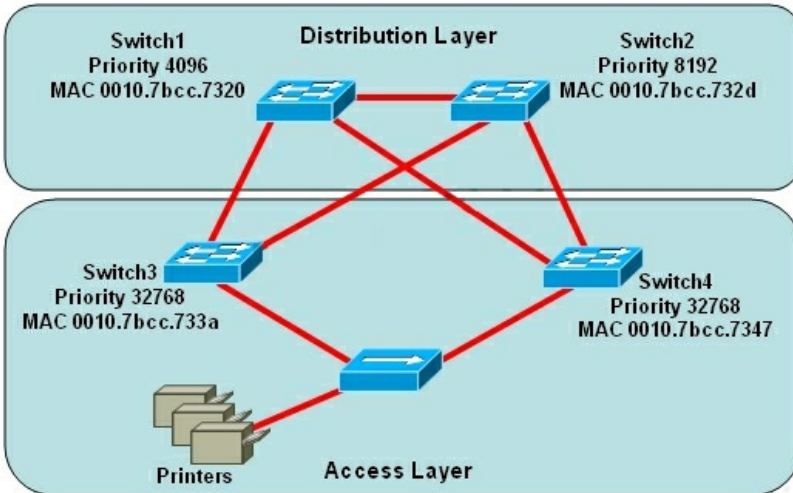
Group	Port-channel	Protocol	Ports
1	Pol(SU)	-	Fa0/2(P) Fa0/1(D)

```

SW2#show interface fa0/1
FastEthernet0/1 is down, line protocol is down (disabled)
Hardware is Lance, address is 00d0.97a7.7901
(bia 00d0.97a7.7901)
MTU 1500 bytes, BW 100000 Kbit, DLY 1000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Full-duplex, 100Mb/s
input flow-control is off, output flow-control is off
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:08, output 00:00:05, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes);
Total output drops: 0
Queueing strategy: fifo
Output queue :0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  
```

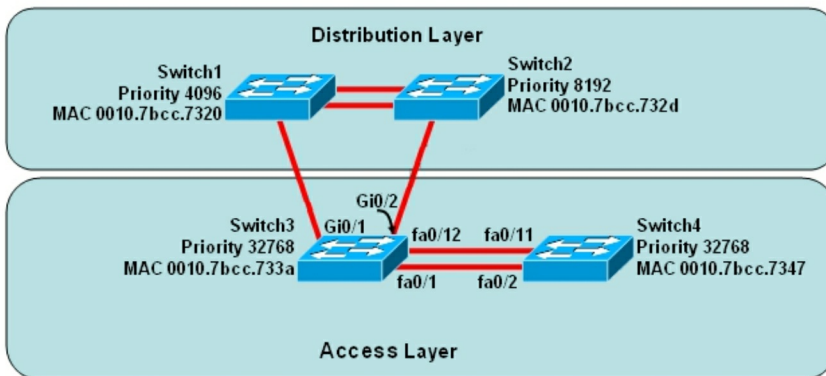
- SW1's Fa0/1 interface is administratively shut down.
- There is an encapsulation mismatch between SW1's Fa0/1 and SW2's Fa0/1 interfaces.
- There is an MTU mismatch between SW1's Fa0/1 and SW2's Fa0/1 interfaces.
- There is a speed mismatch between SW1's Fa0/1 and SW2's Fa0/1 interfaces.

47. Refer to the exhibit. Which switch provides the spanning-tree designated port role for the network segment that services the printers?



- A. Switch1
- B. Switch2
- C. Switch3
- D. Switch4

48. Refer to the exhibit. At the end of an RSTP election process, which access layer switch port will assume the discarding role?



- A. Switch3, port fa0/1

- B. Switch3, port fa0/12
- C. Switch4, port fa0/11
- D. Switch4, port fa0/2
- E. Switch3, port Gi0/1
- F. Switch3, port Gi0/2

49. Refer to the exhibit. Given the output shown from this Cisco Catalyst 2950, what is the reason that interface FastEthernet 0/10 is not the root port for VLAN 2?

```
Switch#show spanning-tree interface fastethernet0/10
```

Vlan	Role	Sts	Cost	Prio.Nbr	Type
VLAN0001	Root	FWD	19	128.1	P2p
VLAN0002	Altn	BLK	19	128.2	P2p
VLAN0003	Root	FWD	19	128.2	P2p

- A. This switch has more than one interface connected to the root network segment in VLAN 2.
- B. This switch is running RSTP while the elected designated switch is running 802.1d Spanning Tree.
- C. This switch interface has a higher path cost to the root bridge than another in the topology.
- D. This switch has a lower bridge ID for VLAN 2 than the elected designated switch.

50. Which three statements are typical characteristics of VLAN arrangements? (Choose three).

- A. A new switch has no VLANs configured.
- B. Connectivity between VLANs requires a Layer 3 device.
- C. VLANs typically decrease the number of collision domains.
- D. Each VLAN uses a separate address space.
- E. A switch maintains a separate bridging table for each VLAN.
- F. VLANs cannot span multiple switches.

51. Refer to the exhibit. The output that is shown is generated at a switch. Which three statements are true? (Choose three).

```

Switch# show spanning-tree vlan 30
VLAN0030
Spanning tree enabled protocol rstp
Root ID Priority 24606
Address 00d0.047b.2800
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 24606 (priority 24576 sys-id-ext 30)
Address 00d0.047b.2800
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300
Interface   Role   Sts   Cost   Prio.Nbr   Type
-----
Fa1/1       Desg FWD   4     128.1    p2p
Fa1/2       Desg FWD   4     128.2    p2p
Fa5/1       Desg FWD   4     128.257  p2p

```

- A. All ports will be in a state of discarding, learning, or forwarding.
- B. Thirty VLANs have been configured on this switch.
- C. The bridge priority is lower than the default value for spanning tree.
- D. All interfaces that are shown are on shared media.
- E. All designated ports are in a forwarding state.
- F. This switch must be the root bridge for all VLANs on this switch.

52. What are two characteristics of a switch that is configured as a VTP client? (Choose two).

- A. If a switch that is configured to operate in client mode cannot access a VTP server, then the switch reverts to transparent mode.
- B. On switches that are configured to operate in client mode. VLANs can be created, deleted, or renamed locally.
- C. The local VLAN configuration is updated only when an update that has a higher configuration revision number is received.
- D. VTP advertisements are not forwarded to neighboring switches that are configured in VTP transparent mode.
- E. VTP client is the default VTP mode.
- F. When switches in VTP client mode are rebooted, they send a VTP advertisement request to the VTP servers.

53. Which protocol provides a method of sharing VLAN configuration information between two Cisco switches?

- A. STP
- B. VTP
- C. 802.1Q
- D. RSTP

54. Which spanning-tree protocol rides on top of another spanning-tree protocol?

- A. MSTP
- B. RSTP
- C. PVST+
- D. Mono Spanning Tree

55. Which two spanning-tree port states does RSTP combine to allow faster convergence? (Choose two).

- A. blocking
- B. listening
- C. learning
- D. forwarding
- E. discarding

56. Which two states are the port states when RSTP has converged? (Choose two).

- A. discarding
- B. listening
- C. learning
- D. forwarding
- E. disabled

57. Refer to the exhibit. Switch port FastEthernet 0/24 on ALSwitch1 will be used to create an IEEE 802.1Q-compliant trunk to another switch. Based on the output shown, what is the reason the trunk does not form, even though the proper cabling has been attached?

```
ALSwitch1# show running-config
«output omitted»
interface FastEthernet0/24 no ip address
«output omitted»
ALSwitch1# show interfaces FastEthernet0/24 switchport
Name: Fa0/24
Switchport: Enable
Administrative Mode: static access
Operation Mode: static access
Administrative Trunking Encapsulation: dot1q
Operation Trunking Encapsulation: native
Negotiation of Trunking: Off
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Operation private-vlan: none
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL

Protected: false

Voice VLAN: none (Inactive)
Appliance trust: none
```

- A. VLANs have not been created yet.
- B. An IP address must be configured for the port.
- C. The port is currently configured for access mode.
- D. The correct encapsulation type has not been configured.
- E. The “no shutdown” command has not been entered for the port.

58. Which switch would STP choose to become the root bridge in the selection process?

- A. 32768: 11-22-33-44-55-66
- B. 32768: 22-33-44-55-66-77
- C. 32769: 11-22-33-44-55-65
- D. 32769: 22-33-44-55-66-78

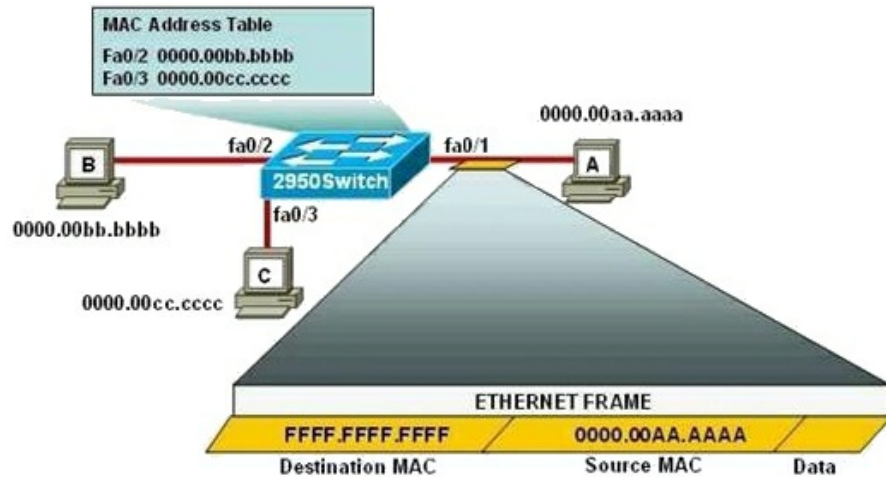
59. Which IEEE standard protocol is initiated as a result of successful DTP completion in a switch over Fast Ethernet?

- A. 802.3ad
- B. 802.1w
- C. 802.1D
- D. 802.1Q

60. Which two commands can be used to verify a trunk link configuration status on a given Cisco switch interface? (Choose two).

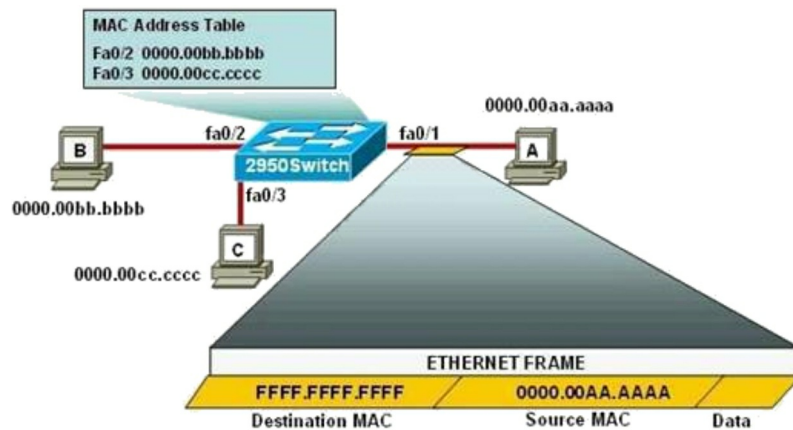
- A. show interface trunk
- B. show interface *interface #*
- C. show ip interface brief
- D. show interface vlan
- E. show interface switchport

61. Refer to the exhibit. Which ports will be STP designated ports if all the links are operating at the same bandwidth? (Choose three).



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

62. Refer to the exhibit. How should the FastEthernet0/1 ports on the 2950 model switches that are shown in the exhibit be configured to allow connectivity between all devices?



A. The ports only need to be connected by a crossover cable.

B. SwitchX(config)#interface fastethernet 0/1
SwitchX(config-if)#switchport mode trunk

C. SwitchX(config)#interface fastethernet 0/1
SwitchX(config-if)#switchport mode access
SwitchX(config-if)#switchport access vlan 1

D. SwitchX(config)#interface fastethernet 0/1
SwitchX(config-if)#switchport mode trunk
SwitchX(config-if)#switchport trunk vlan 1
SwitchX(config-if)#switchport trunk vlan 10
SwitchX(config-if)#switchport trunk vlan 20

63. Refer to the exhibit. Which statement is true?

```
SwitchA# show spanning-tree vlan 20

VLAN0020
Spanning tree enabled protocol rstp
Root ID    Priority    24596
           Address    0017.596d.2a00
           Cost      38
           Port      11 (FastEthernet0/11)
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
Bridge ID  Priority    28692 (priority 28672 sys-id-ext 20)
           Address    0017.596d.1580
           Hello Time 2 sec  Max Age 20 sec  Forward Delay 15 sec
           Aging Time 300

Interface    Role Sts Cost      Prio.Nbr Type
-----
Fa0/11       Root FWD 19        128.11  P2p
Fa0/12       Altn BLK 19        128.12  P2p
```

- A. The Fa0/11 role confirms that SwitchA is the root bridge for VLAN 20.
- B. VLAN 20 is running the Per VLAN Spanning Tree Protocol.
- C. The MAC address of the root bridge is 0017.596d.1580.
- D. SwitchA is not the root bridge. because not all of the interface roles are designated.

64. Which two of these are characteristics of the 802.1Q protocol? (Choose two).

- A. It is a layer 2 messaging protocol which maintains vlan configurations across network.
- B. It includes an 8-bit field which specifies the priority of a frame.
- C. It is used exclusively for tagging vlan frames and does not address network reconvergence following switched network topology changes.
- D. It modifies the 802.3 frame header, and thus requires that the FCS be recomputed.

E. It is a trunking protocol capable of carrying untagged frames.

65. Refer to the exhibit. Which two statements are true of the interfaces on Switch1? (Choose two).

```
Switch1# show mac-address-table
Dynamic Addresses Count: 19
Secure Addresses (User-defined) Count: 0
Static Addresses (User-defined) Count: 0
System Self Addresses Count: 41
Total MAC addresses: 50
Non-static Address Table:
Destination Address   AddressType   VLAN   Destination Port
-----
0010.0de0.e289        Dynamic       1      FastEthernet0/1
0010.7b00.1540        Dynamic       2      FastEthernet0/5
0010.7b00.1545        Dynamic       2      FastEthernet0/5
0060.5cf4.0076        Dynamic       1      FastEthernet0/1
0060.5cf4.0077        Dynamic       3      FastEthernet0/1
0060.5cf4.1315        Dynamic       1      FastEthernet0/1
0060.70cb.f301        Dynamic       2      FastEthernet0/1
0060.70cb.3f01        Dynamic       5      FastEthernet0/2
00e0.1e42.9978        Dynamic       4      FastEthernet0/1
00e0.1e9f.3900        Dynamic       3      FastEthernet0/1
0060.70cb.33f1        Dynamic       6      FastEthernet0/3
0060.70cb.103f        Dynamic       6      FastEthernet0/4

<output omitted>

Switch1# show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater

Device ID           Local Interface   Holdtime   Capability   Platform   Port ID
Switch2             Fas 0/1           157        S            2950-12    Fas 0/1
Switch3             Fas 0/2           143        S            2950-12    Fas 0/5

Switch1#
```

- A. Multiple devices are connected directly to FastEthernet0/1.
- B. A hub is connected directly to FastEthernet0/5.

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

66. Refer to the exhibit. The two exhibited devices are the only Cisco devices on the network. The serial network between the two devices has a mask of 255.255.255.252. Given the output that is shown, what three statements are true of these devices? (Choose three).



```
Manchester# show cdp entry*
-----
Device ID: London
Entry address(es):
  IP address: 10.1.1.2
Platform: cisco 2610, Capabilities: Router
Interface: Serial0/0, Port ID (outgoing port): Serial0/1
Holdtime : 125 sec

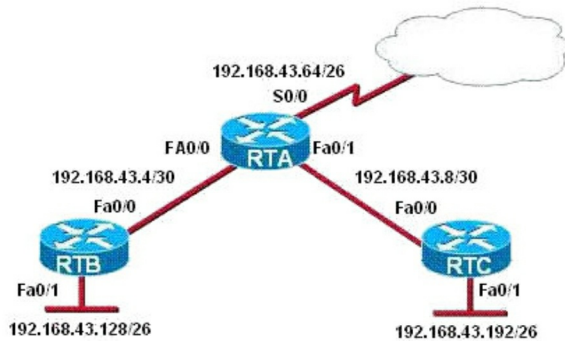
<output imitted>
```

- A. The Manchester serial address is 10.1.1.1.
- B. The Manchester serial address is 10.1.1.2.
- C. The London router is a Cisco 2610.
- D. The Manchester router is a Cisco 2610.
- E. The CDP information was received on port Serial0/0 of the Manchester router.
- F. The CDP information was sent by port Serial0/0 of the London router.

67. Which command can you enter to re-enable Cisco Discovery Protocol on a local router after it has been disabled?

- A. Router(config-if)#cdp run
- B. Router(config-if)#cdp enable
- C. Router(config)#cdp run
- D. Router(config)#cdp enable

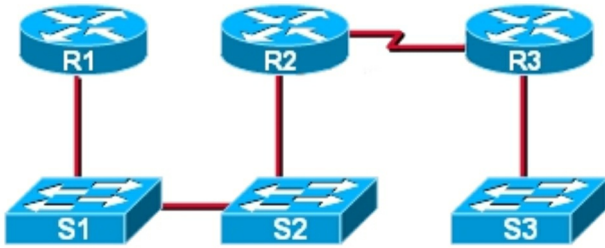
68. Refer to the exhibit. For security reasons, information about RTA, including platform and IP addresses, should not be accessible from the Internet. This information should, however, be accessible to devices on the internal networks of RTA. Which command or series of commands will accomplish these objectives?



When CDP is enabled globally using the `cdp run` command, it is enabled by default on all supported interfaces to send and receive CDP information. You can disable CDP on an interface that supports CDP with the `no cdp enable` command.

- A. `RTA(config)#no cdp run`
- B. `RTA(config)#no cdp enable`
- C. `RTA(config)#interface s0/0 RTA(config-if)#no cdp run`
- D. `RTA(config)#interface s0/0 RTA(config-if)#no cdp enable`

69. 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 Cisco device enabled with CDP sends out periodic interface updates to a multicast address in order to make itself known to neighbors. Since it is a layer two protocol, these packets are not routed. The devices detected would be immediately connected neighbors.

- 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

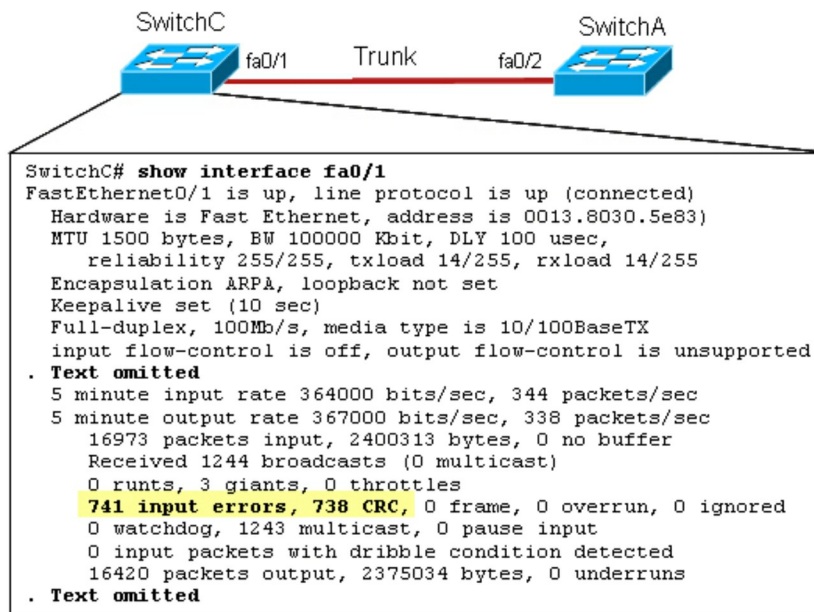
70. Which statements accurately describe CDP? (Choose three).

- 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.

71. Cisco Catalyst switches CAT1 and CAT2 have a connection between them using ports FA0/13. An 802.1Q trunk is configured between the two switches. On CAT1, VLAN 10 is chosen as native, but on CAT2 the native VLAN is not specified. What will happen in this scenario?

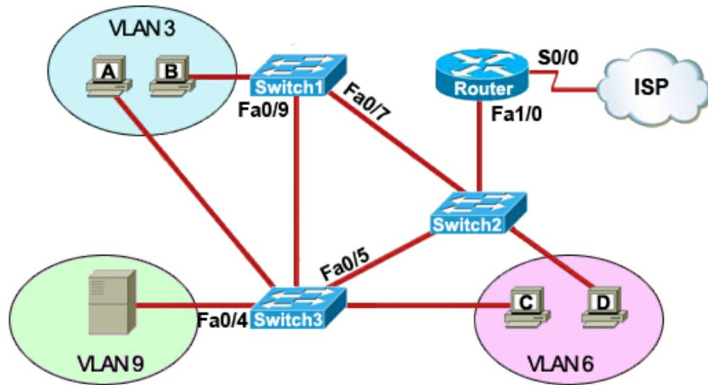
- A. 802.1Q giants frames could saturate the link.
- B. VLAN 10 on CAT1 and VLAN 1 on CAT2 will send untagged frames.
- C. A native VLAN mismatch error message will appear.
- D. VLAN 10 on CAT1 and VLAN 1 on CAT2 will send tagged frames.

72. Refer to the exhibit. Given this output for SwitchC, what should the network administrator's next action be?



- A. Check the trunk encapsulation mode for SwitchC's fa0/1 port.
- B. Check the duplex mode for SwitchC's fa0/1 port.
- C. Check the duplex mode for SwitchA's fa0/2 port.
- D. Check the trunk encapsulation mode for SwitchA's fa0/2 port.

73. Refer to the exhibit. A problem with network connectivity has been observed. It is suspected that the cable connected to switch port Fa0/9 on Switch1 is disconnected. What would be an effect of this cable being disconnected?

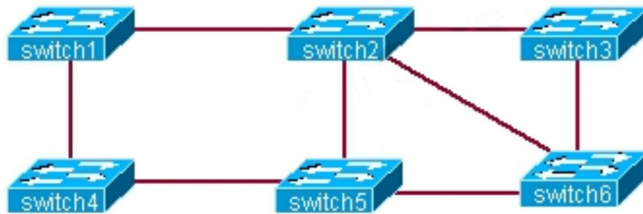


- A. Host B would not be able to access the server in VLAN9 until the cable is reconnected.
- B. Communication between VLAN3 and the other VLANs would be disabled.
- C. The transfer of files from Host B to the server in VLAN9 would be significantly slower.
- D. For less than a minute, Host B would not be able to access the server in VLAN9. Then normal network function would resume.

Chapter 2 Answers

1. Based on the network shown in the graphic. Which option contains both

the potential networking problem and the protocol or setting that should be used to prevent the problem?



F. switching loops, STP

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 7

2. Which command sequence can you enter to create VLAN 20 and assign it to an interface on a switch?

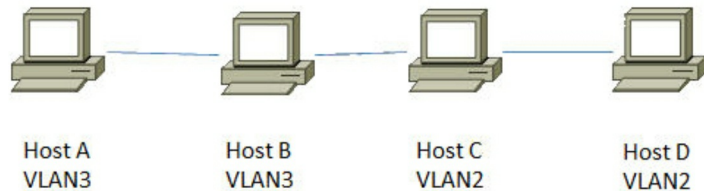
A. Switch(config)#vlan 20
Switch(config)#Interface gig x/y
Switch(config-if)#switchport access vlan 20

To create a VLAN on a Cisco Switch, enter global configuration mode, execute the command `vlan 20`. This will create VLAN 20 on the Switch. The next step is to assign an interface to this VLAN. Enter the desired interface,

using the command `switchport access vlan 20` will assign this interface to VLAN 20.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 8

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



B. Install a router and configure a route to route between VLANs 2 and 3.

Two VLANs require a router in between otherwise they cannot communicate. Different VLANs and different IP subnets need a router to route between them.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 8

4. Which technology can enable multiple VLANs to communicate with one another?

A. inter-VLAN routing using a Layer 3 switch

Because VLANs breakup broadcast domains, in order for hosts in one VLAN can communicate with hosts in a different VLAN, routing must be available via a Router or Layer 3 Switch. This relates to Router-on-a-stick configuration.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 8

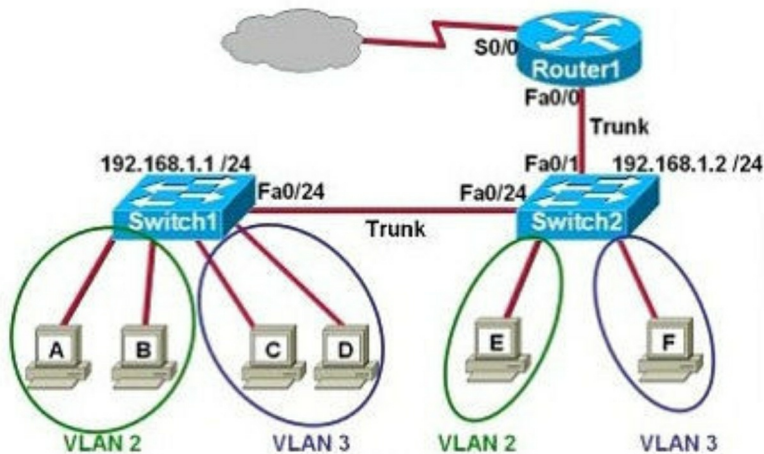
5. Which command can you enter to view the ports that are assigned to VLAN 20?

A. Switch#show vlan id 20

By using the show vlan id 20, the output will display the VLAN (20), and what ports are currently assigned to this vlan.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 8

6. Refer to the exhibit. Which two statements are true about interVLAN routing in the topology that is shown in the exhibit? (Choose two).



A. The FastEthernet 0/0 interface on Router1 must be configured with subinterfaces.

B. The FastEthernet 0/0 interface on Router1 and Switch2 trunk ports must be configured using the same encapsulation type.

To facilitate routing between vlans using a Router, the interfaces between the

Switch and the router must use the same encapsulation type (dot1q). This is accomplished by using sub-interfaces on one physical interface on the router, and the port from the Switch that connects to the router must be in trunking mode.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

7. A department decides to replace its hub with a Catalyst 2950 switch that is no longer needed by another department. To prepare the switch for installation, the network administrator has erased the startup configuration and reloaded the switch. However, PCs that are connected to the switch experience various connectivity problems. What is a possible cause of the problem?

E. The VLAN database was not erased.

Switches running Cisco IOS Software have a running configuration file and a startup configuration file. The RAM stores the running configuration, and the NVRAM stores the startup configuration. The running configuration runs in RAM, and is lost when the Switch is restarted. The startup configuration is stored in NVRAM, and can be deleted to factory defaults. A separate file stores the VLAN information. The file is called vlan.dat file and is stored in NVRAM for modular switches or in Flash for fixed configuration switches. To reset these switches to factory defaults, you need to delete the startup configuration and the vlan.dat file.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

8. Refer to the exhibit. C-router is to be used as a "router-on-a-stick" to route between the VLANs. All the interfaces have been properly configured and IP routing is operational. The hosts in the VLANs have been configured with the appropriate default gateway. What can be said about this configuration?



A. No further routing configuration is required.

With inter-vlan routing between VLANs on a Switch, a routing protocol is not required in this topology.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

9. A switch is configured with all ports assigned to vlan 2 with full duplex FastEthernet to segment existing departmental traffic. What is the effect of adding switch ports to a new VLAN on the switch?

A. An additional broadcast domain will be created.

Each VLAN creates its own broadcast domain. Since this is a full duplex switch, each port is a separate collision domain.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

10. What are three benefits of implementing VLANs? (Choose three).

A. A higher level of network security can be reached by separating sensitive data traffic from other network traffic.

B. Broadcast storms can be mitigated by increasing the number of broadcast domains, thus reducing their size.

F. A more efficient use of bandwidth can be achieved allowing many logical networks to use the same network infrastructure.

VLAN is a network structure which allows users to communicate while in different locations by sharing one multicast domain and a single broadcast. They provide numerous networking benefits and have become popular in the market. Benefits of VLANs include they are inexpensive, offers better management, improves network security, enhances performance, segments multiple networks, and better administration.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

11. VLAN 3 is not yet configured on your switch. What happens if you set the switchport access vlan 3 command in interface configuration mode?

A. The command is accepted and the respective VLAN is added to vlan.dat.

The switchport access vlan 3 will configure the interface to VLAN 3, and update the VLAN database.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

12. A router has two Fast Ethernet interfaces and needs to connect to four VLANs in the local network. How can you accomplish this task, using the fewest physical interfaces and without decreasing network performance?

A. Implement a router-on-a-stick configuration.

A router on a stick allows you to use sub-interfaces to create multiple logical networks on a single physical interface.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

13. Which three elements must be used when you configure a router interface for VLAN trunking? (Choose three).

A. One IP network or subnet for each subinterface.

- B. Subinterface encapsulation identifiers that match VLAN tags.**
- F. One subinterface per VLAN.**

This commonly referred to as Router on a stick. Router-on-a-stick is a term frequently used to describe a setup up that consists of a router and switch connected using one Ethernet link configured as an 802.1q trunk link. In this setup, the switch is configured with multiple VLANs and the router performs all routing between the different networks/VLANs.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

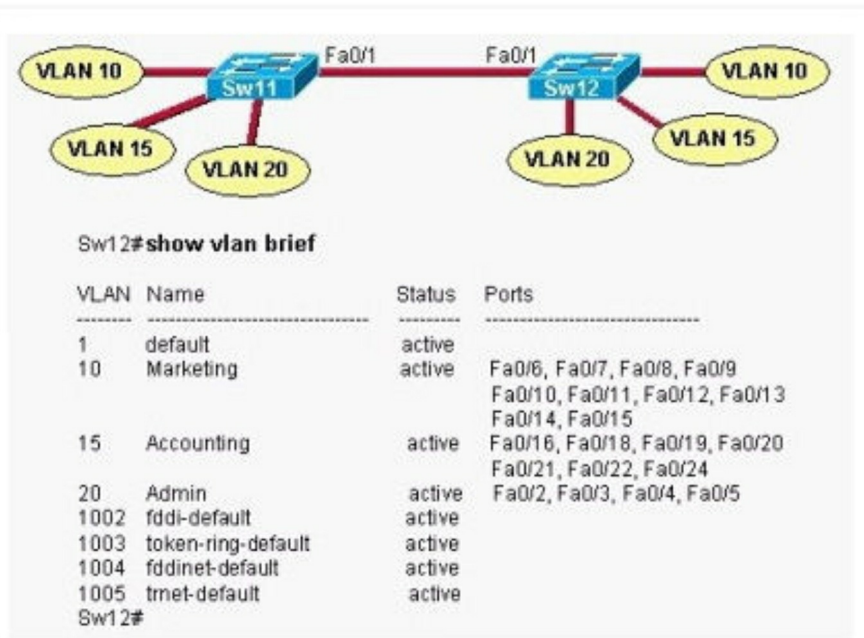
14. Two switches are connected through a trunk link. Which two commands show that there is a native VLAN mismatch on that link? (Choose two).

- A. show interface trunk**
- C. show interface switchport**

Use the show interfaces trunk command to check whether the local and peer native VLANs match. If the native VLAN does not match on both sides, VLAN leaking occurs. Show interfaces switchport will verify whether a VLAN is active and display the status of them.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

15. Refer to the exhibit. A technician has configured the FastEthernet 0/1 interface on Sw11 as an access link in VLAN 1. Based on the output from the show vlan brief command issued on Sw12, what will be the result of making this change on Sw11?



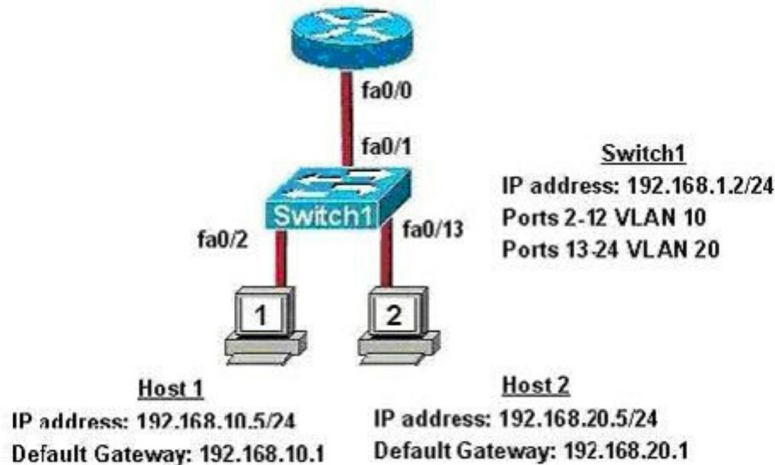
D. Hosts will not be able to communicate between the two switches.

VLANs are local to each switch's database, and VLAN information is not passed between switches without implementing VLAN Trunk Protocol (VTP). Trunks carry traffic from all VLANs to and from the switch by

default but, can be configured to carry only specified VLAN traffic. Trunk links are required to pass VLAN information between switches. So Sw11 port should be a trunk non-access port. Additionally, there are no ports assigned to VLAN 1.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

16. Refer to the exhibit. What commands must be configured on the 2950 switch and the router to allow communication between host 1 and host 2? (Choose two).



**A. Switch1 (config)#interface fastethernet 0/1
Switch1 (config-if)# switchport mode trunk**

**C. Router(config)#interface fastethernet 0/0
Router(config-if)#no shut down
Router(config)#interface fastethernet 0/0.1
Router(config-subif)#encapsulation dot1q 10
Router(config-subif)#ip address 192.168.10.1 255.255.255.0
Router(config)#interface fastethernet 0/0.2
Router(config-subif)#encapsulation dot1q 20
Router(config-subif)#ip address 192.168.20.1 255.255.255.0**

The router will need to use subinterfaces, where each subinterface is assigned

a VLAN and IP address for each VLAN. On the switch, the connection to the router needs to be configured as a trunk using the switchport mode trunk command.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 8

17. Which three of these statements regarding 802.1Q trunking are correct? (Choose three).

- B. 802.1Q trunks can use 10 Mb/s Ethernet interfaces.**
- D. 802.1Q native VLAN frames are untagged by default.**
- E. 802.1Q trunks should have native VLANs that are the same at both ends.**

By default, a 802.1Q trunk is defined as the Native VLAN in order to forward untagged frames. 802.1Q can support speeds from 10Mb and above. The native VLAN that is configured on each end of an 802.1Q trunk, must be the same.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 8

18. Refer to the exhibit. A frame on VLAN 1 on switch S1 is sent to switch S2 where the frame is received on VLAN 2. What causes this behavior?

```
S1#show interface trunk
Port    Mode    Encapsulation    Status    Native vlan
Fa0/1   on      802.1q           Trunking    1
```

```
Port    Vlans allowed a trunk
Fa0/1   1.1005
```

```
Port    Vlans allowed and active in management domain
Fa0/1   12
```

```
S2#show interface trunk
Port    Mode    Encapsulation    Status    Native vlan
Fa0/1   on      802.1q           Trunking    2
```

```
Port    Vlans allowed a trunk
Fa0/1   1.1005
```

```
Port    Vlans allowed and active in management domain
Fa0/1   12
```

C. native VLAN mismatches

Untagged frames are encapsulated with the native VLAN. In this case, the

native VLANs are different so although S1 will tag it as VLAN 1 it will be received by S2.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

19. Assuming the default switch configuration, which VLAN range can be added, modified, and removed on a Cisco switch?

A. 2 through 1001

VLAN 1 is the default VLAN on Cisco switch. It always exists and cannot be added, modified or removed. VLANs 1002-1005 are default VLANs for FDDI & Token Ring and they can't be deleted or used for Ethernet.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

20. What is the purpose of frame tagging in virtual LAN (VLAN) configurations?

C. Frame identification over trunk links

Trunk links carry frames for multiple VLANs. Therefore, frame tags are used for identification of frames from different VLANs.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

21. In a switched environment, what does the IEEE 802.1Q standard describe?

B. A method of VLAN trunking.

IEEE 802.1Q, often referred to as Dot1q, is the networking standard that supports virtual LANs (VLANs) on an IEEE 802.3 Ethernet network. The standard defines a system of VLAN tagging for Ethernet frames and the accompanying procedures to be used by bridges and switches in handling such frames.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

22. What is the function of the command switchport trunk native vlan 999 on a Cisco Catalyst switch?

B. It designates VLAN 999 for untagged traffic.

Configuring the Native VLAN for Untagged Traffic, a trunk port configured with 802.1Q tagging can receive both tagged and untagged traffic. By default, the switch forwards untagged traffic in the native VLAN configured for the port. The native VLAN is VLAN 1 by default.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

23. Which of the following are benefits of VLANs? (Choose three).

B. They allow logical grouping of users by function.

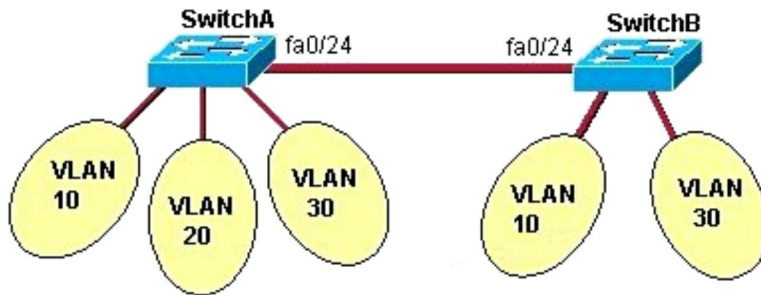
C. They can enhance network security.

E. They increase the number of broadcast domains while decreasing the size of the broadcast domains.

VLANs allow users to communicate while in different locations within the network. It's inexpensive in that changes, adds, and moves can be made by making necessary configurations on the VLAN port. Better management solves scalability issues in a large network by breaking the domain into several VLAN groups or smaller broadcast configurations. It improves network security by segregating users into different VLAN groups to ensure that non-members cannot receive their traffic. VLANs also enhance performance, they can segment multiple networks, and allow easier administration.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

24. Refer to the exhibit. All switch ports are assigned to the correct VLANs, but none of the hosts connected to SwitchA can communicate with hosts in the same VLAN connected to SwitchB. Based on the output shown, what is the most likely problem?



```
SwitchA# show running-config
Building configuration...
<output omitted>
Current configuration : 100 bytes
!
interface FastEthernet0/24
 switchport mode access
 no ip address
!
<output omitted>
end
```

```
SwitchB# show running-config
Building configuration...
<output omitted>
Current configuration : 100 bytes
!
interface FastEthernet0/24
 switchport mode access
 no ip address
!
<output omitted>
end
```

C. The link between the switches needs to be configured as a trunk.

Correct. In order to pass traffic from VLANs on different switches, the connections between the switches must be configured as trunk ports.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

25. Which two link protocols are used to carry multiple VLANs over a single link? (Choose two).

- B. 802.1q**
- D. ISL**

The Inter-Switch Link (ISL) and 802.1Q protocols are used to establish trunk links carrying traffic for multiple VLANs.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

26. Which statement about VLAN operation on Cisco Catalyst switches is true?

B. Unknown unicast frames are retransmitted only to the ports that belong to the same VLAN.

Each VLAN resides in its own broadcast domain. Any incoming frames with unknown destinations are only transmitted to ports that reside in the same VLAN as the incoming frame.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

27. Which two benefits are provided by creating VLANs? (Choose two).

- A. Added security**
- C. Provides segmentation**

VLANs provide a number of advantages, such as ease of administration, confinement of broadcast domains, reduced broadcast traffic, and enforcement of security policies.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 8

28. What are three advantages of VLANs? (Choose three).

- A. VLANs establish broadcast domains in switched networks.**
- E. VLANs allow access to network services based on department,**

not physical location.

F. VLANs can greatly simplify adding, moving, or changing hosts on the network.

VLAN technology is often used in practice, because it can better control layer2 broadcast to improve network security. This makes network more flexible and scalable. Packet filtering is a function of firewall instead of VLAN.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 8

29. On a corporate network, hosts on the same VLAN can communicate with each other, but they are unable to communicate with hosts on different VLANs. What is needed to allow communication between the VLANs?

A. a router with subinterfaces configured on the physical interface that is connected to the switch.

This commonly referred to as Router on a stick. Router-on-a-stick is a term frequently used to describe a setup up that consists of a router and switch connected using one Ethernet link configured as an 802.1q trunk link. In this setup, the switch is configured with multiple VLANs and the router performs all routing between the different networks/VLANs.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 8

30. Which three statements about RSTP are true? (Choose three).

A. RSTP significantly reduces topology reconverging time after a link failure.

B. RSTP expands the STP port roles by adding the alternate and backup roles.

D. RSTP provides a faster transition to the forwarding state on point-to-point links than STP does.

Rapid Spanning Tree Protocol (RSTP), which significantly reduces the convergence time when a topology change occurs in the network. Spanning Tree Protocol can take 30 to 50 seconds to transit from a blocking state to a forwarding state. RSTP is typically able to respond less than 10 seconds of a physical link failure. RSTP works by adding an alternative port and a backup

port compared to STP. These ports are allowed to immediately enter the forwarding state rather than passively wait for the network to converge. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

31. Refer to the exhibit. Why has this switch not been elected the root bridge for VLAN1?

```
Switch# show spanning-tree vlan 1
VLAN0001
  Spanning tree enabled protocol rstp
  Root ID    Priority    20481
            Address    0008.217a.5800
            Cost      38
            Port      1 (FastEthernet0/1)
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

  Bridge ID  Priority    32769 (priority 32768 sys-id-ext 1)
            Address    0008.205e.6600
            Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
            Aging Time 300

Interface    Role  Sts    Cost    Prio.Nbr  Type
-----
Fa0/1        Root  FWD    19       128.1     P2p
Fa0/4        Desg  FDD    38       128.1     P2p
Fa0/11       Altn  BLK    57       128.1     P2p
Fa0/13       Desg  FWD    38       128.1     P2p
```

D. It has a higher bridge ID than the elected root bridge.

When a switch receives a BPDU, it first compares Switch priority, the lowest priority number wins the root election. In the event of a tie, it compares the MAC address, the smaller one wins. The Switch has a 32769 priority, which is greater than 20481, so this Switch will not elect the root bridge. Another Switch has a lower priority, and won the election for VLAN 1.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

32. Which command enables RSTP on a switch?

A. spanning-tree mode rapid-pvst

Rapid Spanning Tree Protocol (RSTP) is an enhancement of the original STP 802.1D protocol. The RSTP 802.1w protocol is an IEEE open implementation. The command to configure RSTP is

```
switch(config)#spanning-tree mode rapid-pvst
```

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

33. Which two of these statements regarding RSTP are correct? (Choose two).

B. RSTP defines new port roles.

E. RSTP is compatible with the original IEEE 802.1D STP.

When network topology changes, rapid spanning tree protocol will speed up significantly to re-calculate the spanning tree instance. RSTP defines the status of 3 ports roles: discarding status, learning status, and forwarding status. It contains most of the parameters of 802.1D as well.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

34. What is one benefit of PVST+?

C. PVST+ allows the root switch location to be optimized per VLAN.

VLAN Spanning Tree (PVST) maintains a spanning tree instance for each VLAN configured in the network. A switch can be the root bridge of one VLAN, another switch can be the root bridge of other VLANs in a common topology.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

35. Which port state is introduced by Rapid-PVST?

C. discarding

PVST+ is based on IEEE 802.1D Spanning Tree Protocol (STP). PVST+ has

only 3 port states (discarding, learning and forwarding), STP has 5 port states (blocking, listening, learning, forwarding and disabled). Discarding is a new port state in PVST+.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

36. What value is primarily used to determine which port becomes the root port on each non-root switch in a spanning-tree topology?

E. Path cost.

The path cost to the root bridge is the most important value to determine which port will become the root port on each non-root switch. The port with lowest cost to the root bridge will become root port.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

37. Which three statements accurately describe layer 2 Ethernet switches? (Choose three).

A. Microsegmentation decreases the number of collisions on the network.

D. In a properly functioning network with redundant switched paths, each switched segment will contain one root bridge with all its ports in the forwarding state. All other switches in that broadcast domain will have only one root port.

E. Establishing vlans increases the number of broadcast domains.

Microsegmentation is a network design where each workstation or device on a network gets its own dedicated segment (collision domain) to the switch. Each network device gets the full bandwidth of the segment and does not have to share the segment with other devices. Microsegmentation reduces and can even eliminate collisions because each segment is its own collision domain. Note: Microsegmentation decreases the number of collisions but it increases the number of collision domains.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

38. Which term describes a spanning-tree network that has all switch ports in

either the blocking or forwarding state?

A. converged

Spanning Tree Protocol convergence happens when bridges and switches have transitioned to either the forwarding or blocking state. When layer 2 is converged, the root bridge is elected, and all port roles (Root, Designated, and Non-Designated) in all switches are selected.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

39. Which two protocols are used by bridges and/or switches to prevent loops in a layer 2 network? (Choose two).

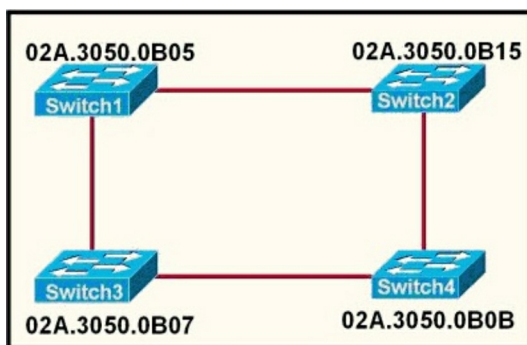
A. 802.1d

E. STP

Spanning Tree Protocol (802.1D) is used to prevent Layer 2 loops. 802.1Q is a standard that supports VLAN tagging. SAP is a concept of the OSI model in the application layer.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

40. Refer to the exhibit. Four Cisco 2950 switches are set to their default priority settings. During the spanning-tree process, which switch will be elected as the root bridge?



D. Switch 1

In spanning-tree, a bridge with the lowest priority and mac address wins the election to become the root bridge. If the bridge priority is the same across all Switches, the lowest mac address wins the election.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

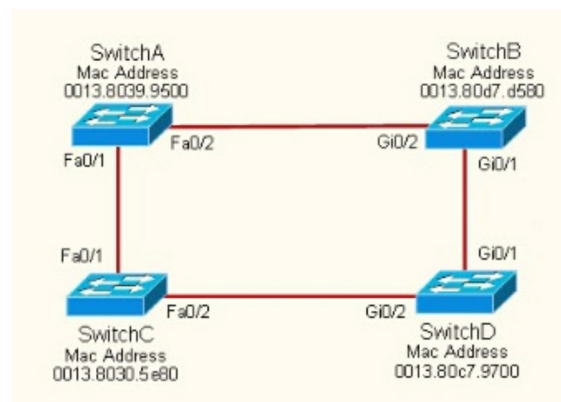
41. Three switches are connected to one another via trunk ports. Assuming the default switch configuration, which switch is elected as the root bridge for the spanning-tree instance of vlan 1?

A. The switch with the lowest MAC address.

Each switch in a network will have a Bridge ID Priority value. This BID is a combination of a priority value and the MAC address, with the priority value listed first. The lowest BID will win the election process. If the switch priority is left at the default, the MAC address is the deciding factor in the root bridge election.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

42. Refer to the exhibit. Each of these four switches has been configured with a hostname, as well as being configured to run RSTP. No other configuration changes have been made. Which three of these show the correct RSTP port roles for the indicated switches and interfaces? (Choose three).



- A. SwitchA, Fa0/2, designated
- B. SwitchA, Fa0/1, root
- F. SwitchD, Gi0/2, root

SwitchC has lowest MAC address so it will become root bridge and 2 of its ports (Fa0/1 & Fa0/2) will be designated ports. Because SwitchA (Fa0/1) and SwitchD (Gi0/2) will be root ports. SwitchB will select the interface with lower cost to the root bridge as the root port using cost on the interfaces. The receiving switch will add its local port cost value to the cost in the BPDU. SwitchC advertises its cost to the root bridge with a value of 0. Switch D adds 4 (the cost value of 1Gbps link) and advertises this value (4) to SwitchB. SwitchB adds another 4 and learns that it can reach SwitchC via Gi0/1 port with a total cost of 8. The same process happens for SwitchA and SwitchB learns that it can reach SwitchC via Gi0/2 with a total cost of 23. Switch B Selects Gi0/1 as its root port. Identify the port roles of the ports between SwitchA & SwitchB. The MAC address of SwitchA is lower than that of SwitchB so Fa0/2 of SwitchA will be designated port while Gi0/2 of SwitchB will be alternative port.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

43. Refer to the exhibit. A network administrator is configuring an EtherChannel between SW1 and SW2. The SW1 configuration is shown. What is the correct configuration for SW2?



SW1

```
interface FastEthernet 0/1
  channel-group 1 mode auto
  switchport trunk encapsulation dot1q
  switchport mode trunk

interface FastEthernet 0/2
  channel-group 1 mode auto
  switchport trunk encapsulation dot1q
  switchport mode trunk
```

```
C. interface FastEthernet 0/1  
channel-group 1 mode desirable  
switchport trunk encapsulation dot1q  
switchport mode trunk  
interface FastEthernet 0/2  
channel-group 1 mode desirable  
switchport trunk encapsulation dot1q  
switchport mode trunk
```

If the etherchannel was configured with mode “auto”, it was using PagP, so, we need to configure the other switch with “desirable” mode. Etherchannel modes are PagP and LACP. PagP modes are auto and Desirable; LACP modes are active and passive.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

44. What parameter can be different on ports within an EtherChannel?

B. DTP negotiation settings

All interfaces in an EtherChannel must be configured identically to form an EtherChannel. Specific settings that must be identical are speed settings, Duplex settings, STP settings, VLAN membership, Native VLAN, Allowed VLANs for trunk ports, and Trunking Encapsulation (ISL or 802.1Q),

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

45. Refer to the exhibit. What set of commands was configured on interface Fa0/3 to produce the given output?

```
FastEthernet0/3:  
Port state      = 1  
Channel group   = 2  
Port-channel    = Po2  
Port index      = 0  
Mode = Passive  
GC = -  
Load = 0x00  
Gchange = -  
Pseudo port-channel = Po2  
Protocol = LACP
```

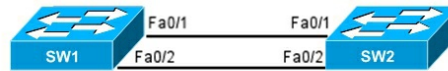
B. interface FastEthernet 0/3

**channel-group 2 mode passive
switchport trunk encapsulation dot1q
switchport mode trunk**

Based on the output shown, the configured channel group number was 2 and the mode used was passive. so only choice B is correct.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

46. Refer to the exhibit. If the devices produced the given output, what is the cause of the EtherChannel problem?



```

SW1#show etherchannel summary
Flags: D - down          P - in port-channel
       I - stand-alone  s - suspended
       H - Hot-standby (LACP only)
       R - Layer3       S - Layer2
       U - in use       f - failed to allocate aggregator
       u - unsuitable for bundling
       w - waiting to be aggregated
       d - default port
  
```

```

Number of channel-groups in use: 2
Number of aggregators:          2

Group  Port-channel  Protocol    Ports
-----+-----+-----+-----
1      Pol(SU)        -           Fa0/2(P) Fa0/1(D)
  
```

```

SW1#show interface fa0/1
FastEthernet0/1 is down, line protocol is down (disabled)
Hardware is Lance, address is 00E0.5c11.9501
(bia 00E0.5c11.9501)
MTU 1500 bytes, BW 10000 Kbit, DLY 1000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Full-duplex, 10Mb/s
input flow-control is off, output flow-control is off
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:08, output 00:00:05, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes);
Total output drops: 0
Queueing strategy: fifo
Output queue :0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  
```

```

SW2#show etherchannel summary
Flags: D - down          P - in port-channel
       I - stand-alone  s - suspended
       H - Hot-standby (LACP only)
       R - Layer3       S - Layer2
       U - in use       f - failed to allocate aggregator
       u - unsuitable for bundling
       w - waiting to be aggregated
       d - default port
  
```

```

Number of channel-groups in use: 2
Number of aggregators:          2

Group  Port-channel  Protocol    Ports
-----+-----+-----+-----
1      Pol(SU)        -           Fa0/2(P) Fa0/1(D)
  
```

```

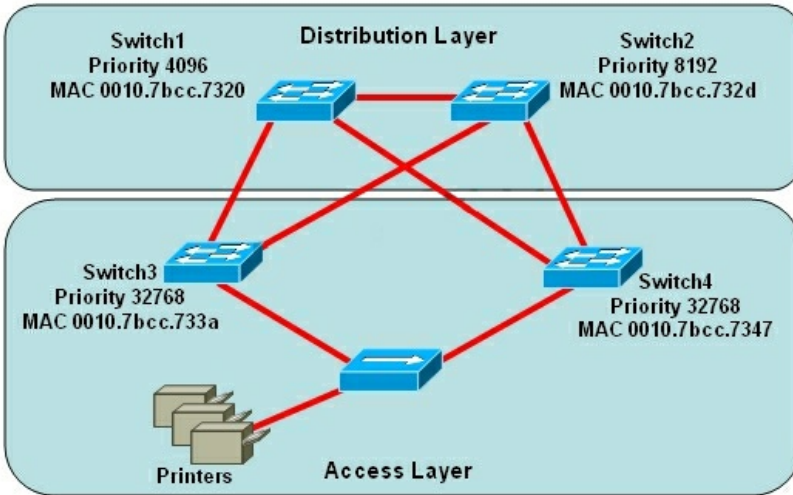
SW2#show interface fa0/1
FastEthernet0/1 is down, line protocol is down (disabled)
Hardware is Lance, address is 00d0.97a7.7901
(bia 00d0.97a7.7901)
MTU 1500 bytes, BW 100000 Kbit, DLY 1000 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Full-duplex, 100Mb/s
input flow-control is off, output flow-control is off
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:08, output 00:00:05, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes);
Total output drops: 0
Queueing strategy: fifo
Output queue :0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
  
```

D. There is a speed mismatch between SW1's Fa0/1 and SW2's Fa0/1 interfaces.

You must configure all interfaces in an EtherChannel to operate at the same speeds and duplex modes. Based on the output shown, SW1 is configured to run at 10Mb while SW2 is operating at 100 Mb.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

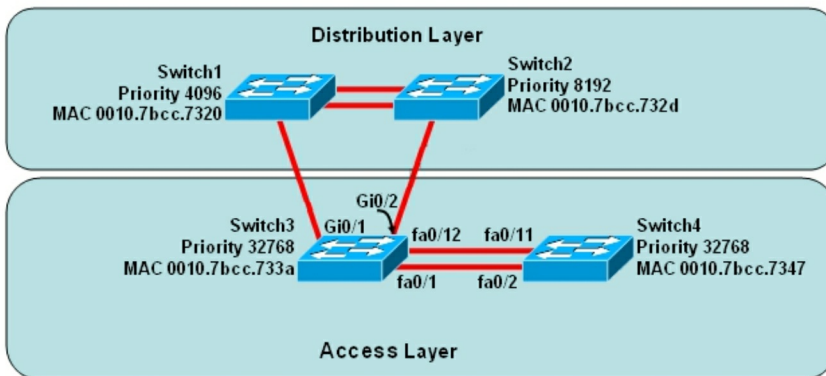
47. Refer to the exhibit. Which switch provides the spanning-tree designated port role for the network segment that services the printers?



C. Switch3

Printers are connected by hubs. Consider which switch that provides the spanning-tree designated port role between Switch3 and Switch4. They have the same priority 32768. Compare their MAC addresses. Switch3 with a smaller MAC address will provide a designated port for printers. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

48. Refer to the exhibit. At the end of an RSTP election process, which access layer switch port will assume the discarding role?



C. Switch4, port fa0/11

Switch 3 has a lower bridge ID than Switch 4, so both ports of Switch3 will be in forwarding state. The alternative port will belong to Switch4. Switch4 will need to block one of its ports to avoid a bridging loop between the two switches.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

49. Refer to the exhibit. Given the output shown from this Cisco Catalyst 2950, what is the reason that interface FastEthernet 0/10 is not the root port for VLAN 2?

```
Switch#show spanning-tree interface fastethernet0/10
Vlan          Role      Sts      Cost          Prio.Nbr      Type
-----
VLAN0001      Root      FWD      19             128.1          P2p
VLAN0002      Altn      BLK      19             128.2          P2p
VLAN0003      Root      FWD      19             128.2          P2p
```

C. This switch interface has a higher path cost to the root bridge than another in the topology.

Since the port is in the blocked status, we must assume that there is a shorter path to the root bridge elsewhere.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

50. Which three statements are typical characteristics of VLAN arrangements? (Choose three).

- B. Connectivity between VLANs requires a Layer 3 device.**
- D. Each VLAN uses a separate address space.**
- E. A switch maintains a separate bridging table for each VLAN.**

By default, all ports on a new switch belong to VLAN 1 (default & native VLAN), and well-known VLANs. In order to communicate between different VLANs a Layer 3 device is required. VLANs don't affect the number of collision domains, they increase the number of broadcast domains, and maintains a separate bridging table for each VLAN so that it can send frame to ports on the same VLAN only. VLANs can span multiple Switches via STP or manually entered by an Administrator.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

51. Refer to the exhibit. The output that is shown is generated at a switch. Which three statements are true? (Choose three).

```
Switch# show spanning-tree vlan 30
VLAN0030
Spanning tree enabled protocol rstp
Root ID Priority 24606
Address 00d0.047b.2800
This bridge is the root
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID Priority 24606 (priority 24576 sys-id-ext 30)
Address 00d0.047b.2800
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300
Interface   Role  Sts  Cost  Prio.Nbr  Type
-----
Fa1/1       Desg FWD   4     128.1    p2p
Fa1/2       Desg FWD   4     128.2    p2p
Fa5/1       Desg FWD   4     128.257  p2p
```

A. All ports will be in a state of discarding, learning, or forwarding.

C. The bridge priority is lower than the default value for spanning tree.

E. All designated ports are in a forwarding state.

From the output, all ports are in designated role (forwarding state). The command “show spanning-tree vlan 30” only shows information about VLAN 30. The bridge priority of this switch is 24606 which is lower than the default value bridge priority 32768. All three interfaces on this switch have the connection type “p2p”, which means Point-to-point environment – not a shared media. The only thing we can specify is this switch is the root bridge for VLAN 30 but we cannot guarantee it is also the root bridge for other VLANs.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

52. What are two characteristics of a switch that is configured as a VTP client? (Choose two).

C. The local VLAN configuration is updated only when an update that has a higher configuration revision number is received.

F. When switches in VTP client mode are rebooted, they send a VTP advertisement request to the VTP servers.

When a switch receives a summary advertisement packet, the switch compares the configuration revision to its own revision. If its own configuration revision is higher or equal, the packet is ignored. If it is lower, an advertisement request is sent. When a switch is in VTP client mode, you cannot change its VLAN configuration. The client switch receives VTP updates from a VTP server in the VTP domain and then modifies its configuration accordingly.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

53. Which protocol provides a method of sharing VLAN configuration information between two Cisco switches?

B. VTP

VLAN Trunk Protocol (VTP) reduces administration in a switched network. When you configure a new VLAN on one VTP server, the VLAN is distributed through all switches in the domain. This reduces the need to configure the same VLAN everywhere. VTP is a Cisco-proprietary protocol that is available on most of the Cisco Catalyst series products.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

54. Which spanning-tree protocol rides on top of another spanning-tree protocol?

A. MSTP

Multiple Spanning Tree (MST) rides on top of RSTP so it converges very fast. The idea behind MST is that some VLANs can be mapped to a single spanning tree instance because most networks do not need more than a few logical topologies.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

55. Which two spanning-tree port states does RSTP combine to allow faster convergence? (Choose two).

A. blocking

B. listening

The 802.1D disabled, blocking, and listening port states have been merged into the 802.1W discarding state.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

56. Which two states are the port states when RSTP has converged? (Choose two).

A. discarding

D. forwarding

RSTP only has 3 port states that are discarding, learning and forwarding. When RSTP has converged there are only 2 port states left, discarding and forwarding.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

57. Refer to the exhibit. Switch port FastEthernet 0/24 on ALSwitch1 will be used to create an IEEE 802.1Q-compliant trunk to another switch. Based on the output shown, what is the reason the trunk does not form, even though the proper cabling has been attached?

```
ALSwitch1# show running-config
«output omitted»
interface FastEthernet0/24 no ip address
«output omitted»
ALSwitch1# show interfaces FastEthernet0/24 switchport
Name: Fa0/24
Switchport: Enable
Administrative Mode: static access
Operation Mode: static access
Administrative Trunking Encapsulation: dot1q
Operation Trunking Encapsulation: native
Negotiation of Trunking: Off
Access Mode VLAN: 1 (default)
Trunking Native Mode VLAN: 1 (default)
Voice VLAN: none
Administrative private-vlan host-association: none
Administrative private-vlan mapping: none
Operation private-vlan: none
Trunking VLANs Enabled: ALL
Pruning VLANs Enabled: 2-1001
Capture Mode Disabled
Capture VLANs Allowed: ALL

Protected: false

Voice VLAN: none (Inactive)
Appliance trust: none
```


C. The port is currently configured for access mode.

According to the output shown the switchport (layer 2 Switching) is enabled and the port is in access mode. To make a trunk link the port should be configured as a trunk port, not an access port, by using the following command: (Config- if)#switchport mode trunk.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

58. Which switch would STP choose to become the root bridge in the selection process?

A. 32768: 11-22-33-44-55-66

In spanning-tree, a bridge with the lowest priority and mac address wins the election to become the root bridge. If the bridge priority is the same across all switches, the lowest mac address wins the election.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

59. Which IEEE standard protocol is initiated as a result of successful DTP completion in a switch over Fast Ethernet?

D. 802.1Q

Dynamic Trunking Protocol (DTP) is a Cisco proprietary protocol for negotiating trunking on a link between two devices and for negotiating the type of trunking encapsulation (802.1Q) to be used.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

60. Which two commands can be used to verify a trunk link configuration status on a given Cisco switch interface? (Choose two).

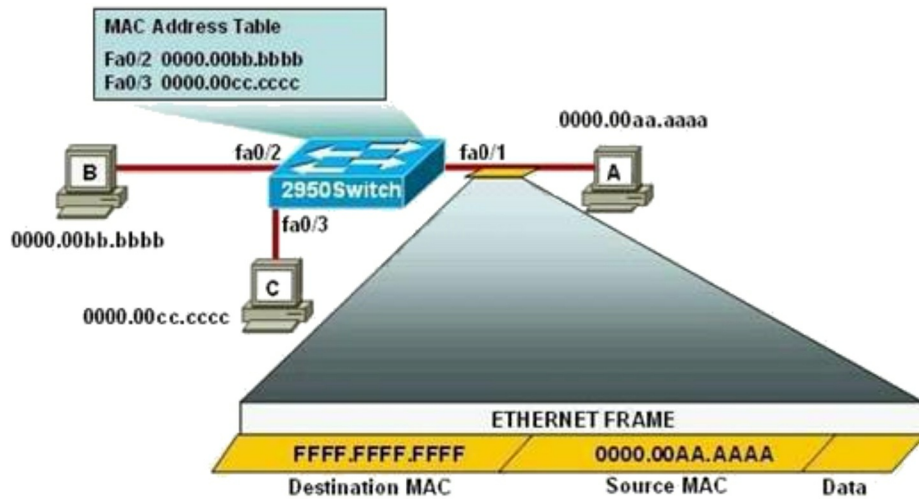
A. show interface trunk

E. show interface switchport

The "show interfaces trunk" command and "show interfaces switchport" command can be used to verify the status of an interface (trunking or not).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

61. Refer to the exhibit. Which ports will be STP designated ports if all the links are operating at the same bandwidth? (Choose three).



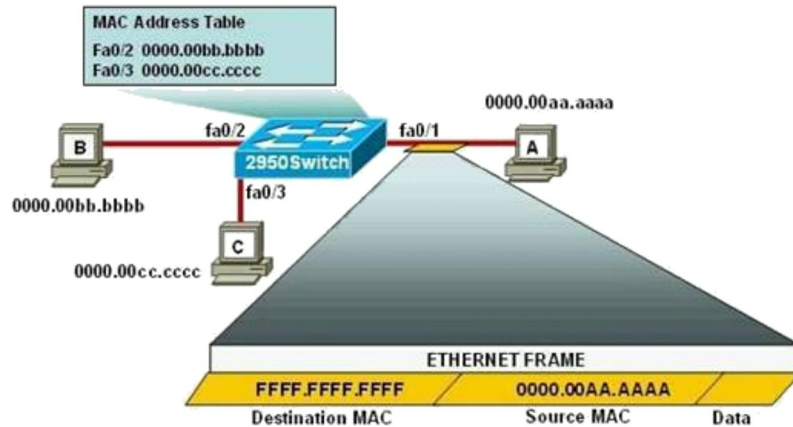
- B. Switch A - Fa0/1**
- C. Switch B - Fa0/0**
- D. Switch B - Fa0/1**

This question is to check the spanning tree election problem. Find the root bridge, which can be accomplished by comparing the bridge ID, the smallest will be selected. Bridge-id= bridge priority + MAC address. The three switches in the figure all have the default priority, so we should compare the MAC address, it is easy to find that SwitchB is the root bridge. Find the root port on the non-root bridge, which can be completed through comparing root path cost. The smallest will be selected as the root port. Next, find the Designated Port by comparing the path cost. If the costs happen to be the same, then compare the BID. The smallest will be selected. Each link has a DP. Based on the exhibit above, we can find DP on each link. The DP on the link between SwitchA and SwitchC is SwitchA'Fa0/1, because it has the

smallest MAC address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

62. Refer to the exhibit. How should the FastEthernet0/1 ports on the 2950 model switches that are shown in the exhibit be configured to allow connectivity between all devices?



**B. SwitchX(config)#interface fastethernet 0/1
SwitchX(config-if)#switchport mode trunk**

In order for multiple VLANs to cross switches, the connection between the switches must be a trunk. The “switchport mode trunk” command is all that is needed, the individual VLANs should not be listed over that trunk interface. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

63. Refer to the exhibit. Which statement is true?

```
SwitchA# show spanning-tree vlan 20
```

```
VLAN0020
```

```
Spanning tree enabled protocol rstp
```

```
Root ID    Priority    24596
           Address    0017.596d.2a00
           Cost      38
           Port      11 (FastEthernet0/11)
           Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Bridge ID   Priority    28692 (priority 28672 sys-id-ext 20)
           Address    0017.596d.1580
           Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
           Aging Time 300
```

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/11	Root	FWD	19	128.11	P2p
Fa0/12	Altn	BLK	19	128.12	P2p

D. SwitchA is not the root bridge. because not all of the interface roles are designated.

Only a non-root bridge can have a root port. Fa0/11 is the root port so we can confirm this switch is not the root bridge. From the output, we learn that this switch is running Rapid STP, not PVST. 0017.596d.1580 is the MAC address of this switch, not of the root bridge. The MAC address of the root bridge is 0017.596d.2a00. All of the interface roles of the root bridge are designated. SwitchA has one Root port and 1 Alternative port so it is not the root bridge. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

64. Which two of these are characteristics of the 802.1Q protocol? (Choose two).

D. It modifies the 802.3 frame header, and thus requires that the FCS be recomputed.

E. It is a trunking protocol capable of carrying untagged frames.

The 802.1Q protocol stipulates the realization of the VLAN. 802.1Q is a standardized relay method that inserts 4 bytes field into the original Ethernet frame and re-calculates the frame check sequence. 802.1Q frame relay supports two types of frame: marked and non-marked. Non-marked frame carries no VLAN identification information.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

65. Refer to the exhibit. Which two statements are true of the interfaces on Switch1? (Choose two).

```
Switch1# show mac-address-table
Dynamic Addresses Count: 19
Secure Addresses (User-defined) Count: 0
Static Addresses (User-defined) Count: 0
System Self Addresses Count: 41
Total MAC addresses: 50
Non-static Address Table:
Destination Address    AddressType    VLAN    Destination Port
-----
0010.0de0.e289        Dynamic        1        FastEthernet0/1
0010.7b00.1540        Dynamic        2        FastEthernet0/5
0010.7b00.1545        Dynamic        2        FastEthernet0/5
0060.5cf4.0076        Dynamic        1        FastEthernet0/1
0060.5cf4.0077        Dynamic        3        FastEthernet0/1
0060.5cf4.1315        Dynamic        1        FastEthernet0/1
0060.70cb.f301        Dynamic        2        FastEthernet0/1
0060.70cb.3f01        Dynamic        5        FastEthernet0/2
00e0.1e42.9978        Dynamic        4        FastEthernet0/1
00e0.1e9f.3900        Dynamic        3        FastEthernet0/1
0060.70cb.33f1        Dynamic        6        FastEthernet0/3
0060.70cb.103f        Dynamic        6        FastEthernet0/4

<output omitted>

Switch1# show cdp neighbors
Capability Codes: R - Router, T - Trans Bridge, B - Source Route Bridge
                  S - Switch, H - Host, I - IGMP, r - Repeater

Device ID    Local Interface    Holdtime    Capability    Platform    Port ID
Switch2      Fas 0/1            157         S             2950-12     Fas 0/1
Switch3      Fas 0/2            143         S             2950-12     Fas 0/5

Switch1#
```

- B. A hub is connected directly to FastEthernet0/5.**
- E. FastEthernet0/1 is configured as a trunk link.**

Fa0/1 is connected to Switch2. Seven MAC addresses correspond to Fa0/1, and these MAC addresses are in different VLANs. From this we know that Fa0/1 is the trunk interface. From the information given by show cdp neighbors, we find that there is no Fa0/5 in CDP neighbor. However, F0/5 corresponds to two MAC addresses in the same VLAN. Fa0/5 is connected to a hub. Based on the output shown, there are multiple MAC addresses from different VLANs attached to the FastEthernet 0/1 interface. Only trunks are able to pass information from devices in multiple VLANs.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 9

66. Refer to the exhibit. The two exhibited devices are the only Cisco devices on the network. The serial network between the two devices has a mask of 255.255.255.252. Given the output that is shown, what three statements are true of these devices? (Choose three).



```
Manchester# show cdp entry*
```

```
-----  
Device ID: London  
Entry address(es):  
  IP address: 10.1.1.2  
Platform: cisco 2610, Capabilities: Router  
Interface: Serial0/0, Port ID (outgoing port): Serial0/1  
Holdtime : 125 sec
```

```
<output imitted>
```

- A. The Manchester serial address is 10.1.1.1.**

C. The London router is a Cisco 2610.

E. The CDP information was received on port Serial0/0 of the Manchester router.

From the output, the IP address of the neighbor router is 10.1.1.2, and the subnet mask of the network between two routers is 255.255.255.252. There are only 2 available hosts in this network, so the ip address of Manchester router is 10.1.1.1. The platform of the neighbor router is Cisco 2610, as shown in the output. “Interface” refers to the local port on the local router, in this case it is the port of Manchester router, and “Port ID (outgoing port)” refers to the port on the neighbor router.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

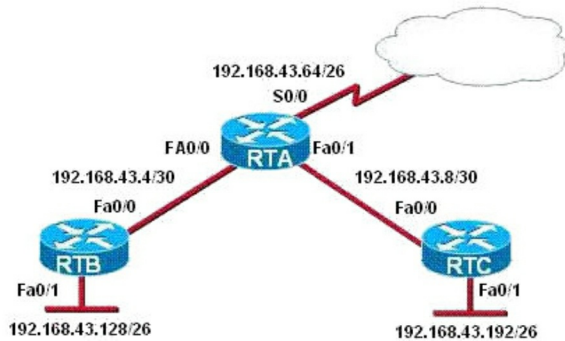
67. Which command can you enter to re-enable Cisco Discovery Protocol on a local router after it has been disabled?

C. Router(config)#cdp run

In order to enable the Cisco Discovery Protocol on a router, it must be configured from global configuration using the cdp run command. It can also be configured on the interface by using the cdp enable command in interface configuration mode.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

68. Refer to the exhibit. For security reasons, information about RTA, including platform and IP addresses, should not be accessible from the Internet. This information should, however, be accessible to devices on the internal networks of RTA. Which command or series of commands will accomplish these objectives?

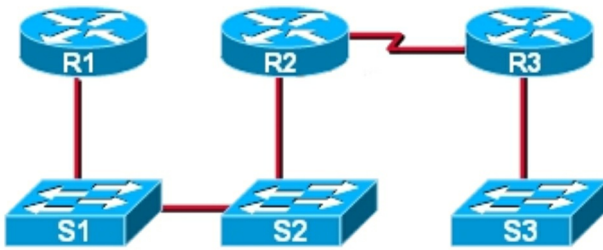


D. RTA(config)#interface s0/0 RTA(config-if)#no cdp enable

When CDP is enabled globally using the `cdp run` command, it is enabled by default on all supported interfaces to send and receive CDP information. You can disable CDP on an interface that supports CDP with the `no cdp enable` command.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

69. 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?



C. R3 and S2

A Cisco device enabled with CDP sends out periodic interface updates to a multicast address in order to make itself known to neighbors. Since it is a layer two protocol, these packets are not routed. The devices detected would be immediately connected neighbors.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

70. Which statements accurately describe CDP? (Choose three).

- B. CDP is a Cisco proprietary protocol.**
- C. CDP is a datalink layer protocol.**
- E. CDP can discover directly connected neighboring Cisco devices.**

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

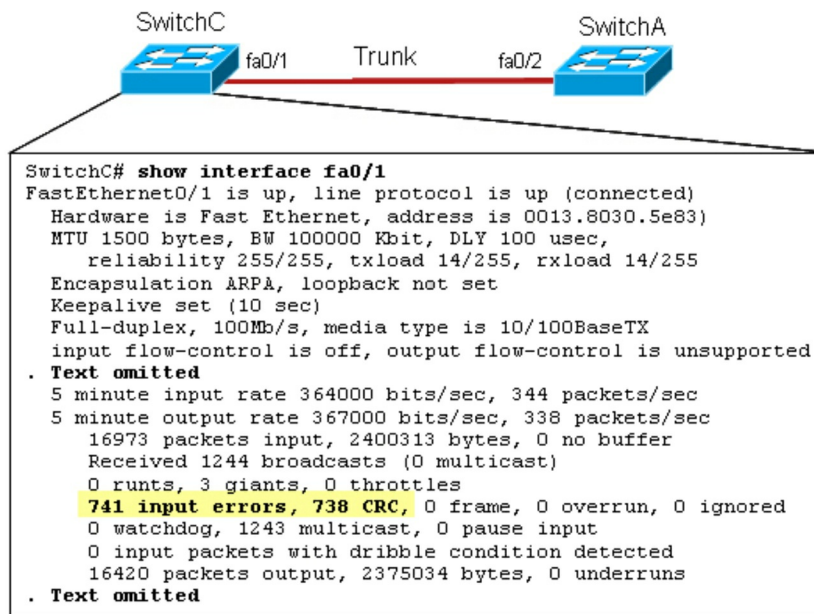
71. Cisco Catalyst switches CAT1 and CAT2 have a connection between them using ports FA0/13. An 802.1Q trunk is configured between the two switches. On CAT1, VLAN 10 is chosen as native, but on CAT2 the native VLAN is not specified. What will happen in this scenario?

C. A native VLAN mismatch error message will appear.

A native VLAN mismatch error will appear by the Cisco Discovery Protocol if there is a native VLAN mismatch on an 802.1Q link. A VLAN mismatch can cause traffic from one vlan to leak into another vlan.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

72. Refer to the exhibit. Given this output for SwitchC, what should the network administrator's next action be?

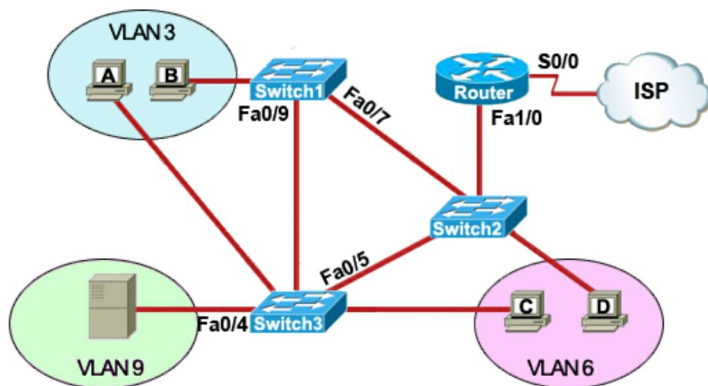


C. Check the duplex mode for SwitchA's fa0/2 port.

This port is configured for full duplex, so the next step would be to check the duplex setting of the port on the other switch. A mismatched trunk encapsulation would not result in input errors and CRC errors.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

73. Refer to the exhibit. A problem with network connectivity has been observed. It is suspected that the cable connected to switch port Fa0/9 on Switch1 is disconnected. What would be an effect of this cable being disconnected?



D. For less than a minute, Host B would not be able to access the server in VLAN9. Then normal network function would resume.

Spanning-Tree Protocol (STP) is a Layer 2 protocol that utilizes a special-purpose algorithm to discover physical loops in a network and effect a logical loop-free topology. STP creates a loopfree tree structure consisting of leaves and branches that span the entire Layer 2 network. The actual mechanics of how bridges communicate and how the STP algorithm works will be discussed at length in the following topics. Note that the terms bridge and switch are used interchangeably when discussing STP. In addition, unless otherwise indicated, connections between switches are assumed to be trunks. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301

Chapter 3 IP Connectivity

25% 3.0 IP Connectivity

3.1 Interpret the components of routing table

3.1.a Routing protocol code

3.1.b Prefix

3.1.c Network mask

3.1.d Next hop

3.1.e Administrative distance

3.1.f Metric

3.1.g Gateway of last resort

3.2 Determine how a router makes a forwarding decision by default

3.2.a Longest match

3.2.b Administrative distance

3.2.c Routing protocol metric

3.3 Configure and verify IPv4 and IPv6 static routing

3.3.a Default route

3.3.b Network route

3.3.c Host route

3.3.d Floating static

3.4 Configure and verify single area OSPFv2

3.4.a Neighbor adjacencies

3.4.b Point-to-point

3.4.c Broadcast (DR/BDR selection)

3.4.d Router ID

3.5 Describe the purpose of first hop redundancy protocol

1. Which pairing reflects a correct protocol-and-metric relationship?
 - A. EIGRP and link cost.
 - B. RIPv2 and number of hops.
 - C. OSPF and number of hops and reliability.
 - D. IS-IS and delay and reliability.

2. Which two statements describe the advantages to the use of RIP over the use of OSPF? (Choose two).
 - A. RIP has a more accurate metric.
 - B. RIP is less complex to configure.
 - C. RIP requires less time to converge.
 - D. RIP uses less bandwidth.
 - E. RIP demands fewer router resources.

3. A router receives information about network 192.168.10.0/24 from multiple sources. What will the router consider the most reliable information about the path to that network?

- A. An OSPF update for network 192.168.0.0/16.
- B. A RIP update for network 192.168.10.0/24.
- C. A default route with a next hop address of 192.168.10.1.
- D. A static route to network 192.168.10.0/24.
- E. A directly connected interface with an address of 192.168.10.254/24.
- F. A static route to network 192.168.10.0/24 with a local serial interface configured as the next hop.

4. What functions do routers perform in a network? (Choose two).

- A. Access layer security.
- B. Microsegmentation of broadcast domains.
- C. Packet switching.
- D. Path selection.
- E. VLAN membership assignment.
- F. Bridging between LAN segments.

5. Which command can you enter to set the default route for all traffic to an interface?

- A. `router(config)#ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/1`
- B. `router(config)#ip route 0.0.0.0 255.255.255.255 GigabitEthernet0/1`
- C. `router(config-router)#default-information originate`
- D. `router(config-router)#default-information originate always`

6. Which three statements about static routing are true? (Choose three).

- A. It uses consistent route determination.
- B. It is best used for small-scale deployments.
- C. Routing is disrupted when links fail.
- D. It requires more resources than other routing methods.
- E. It is best used for large-scale deployments.
- F. Routers can use update messages to reroute when links fail.

7. Some routers have been configured with default routes. What are some of the advantages of using default routes? (Choose two).

- A. They establish routes that will never go down.

- B. They keep routing tables small.
- C. They require a great deal of CPU power.
- D. They allow connectivity to remote networks that are not in the routing table.
- E. They direct traffic from the internet into corporate networks.

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

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

9. If IP routing is enabled, which two commands set the gateway of last resort to the default gateway? (Choose two).

- A. ip route 172.16.2.1 0.0.0.0 0.0.0.0
- B. ip default-gateway 0.0.0.0
- C. ip default-network 0.0.0.0
- D. ip route 0.0.0.0 0.0.0.0 172.16.2.1
- E. ip default-route 0.0.0.0 0.0.0.0 172.16.2.1

10. Which two are advantages of static routing when compared to dynamic routing? (Choose two).

- A. An efficient algorithm is used to build routing tables, using automatic updates.
- B. Routing traffic load is reduced when used in stub network links.
- C. Security increases because only the network administrator may change the routing table.
- D. Routing tables adapt automatically to topology changes.
- E. Configuration complexity decreases as network size increases.
- F. Routing updates are automatically sent to neighbors.
- G. Route summarization is computed automatically by the router.

11. Which two statements are characteristics of a distance vector routing protocol? (Choose two).

- A. Convergence is usually faster than with link state protocols.
- B. RIP is an example of distance vector routing protocols.
- C. The protocol can be useful in hub-and-spoke and hierarchical networks.

- D. Updates are periodic and include the entire routing table.
- E. Each router has its own view of the topology.
- F. Routing updates are sent only after topology changes.

12. Which parameter can be tuned to affect the selection of a static route as a backup, when a dynamic protocol is also being used?

- A. link delay
- B. administrative distance
- C. hop count
- D. link bandwidth
- E. link cost

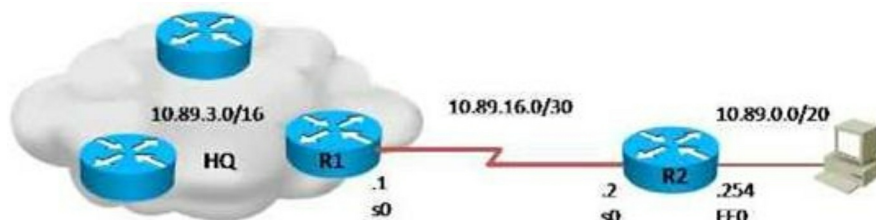
13. Which statement is true about classful or classless routing?

- A. EIGRP and OSPF are classful routing protocols and summarize routes by default.
- B. Automatic summarization at classful boundaries can cause problems on discontinuous subnets.
- C. RIPv1 and OSPF are classless routing protocols.
- D. Classful routing protocols send the subnet mask in routing updates.

14. Which three statements are correct about RIPv2? (Choose three).

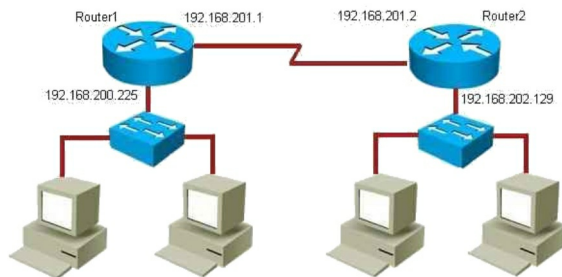
- A. It has a lower default administrative distance than RIP version 1.
- B. It is a classless routing protocol.
- C. It has the same maximum hop count as version 1.
- D. It does not send the subnet mask in updates.
- E. It supports authentication.
- F. It uses broadcasts for its routing updates.

15. 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

16. 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 no default 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

17. 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.

18. 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.

19. 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.

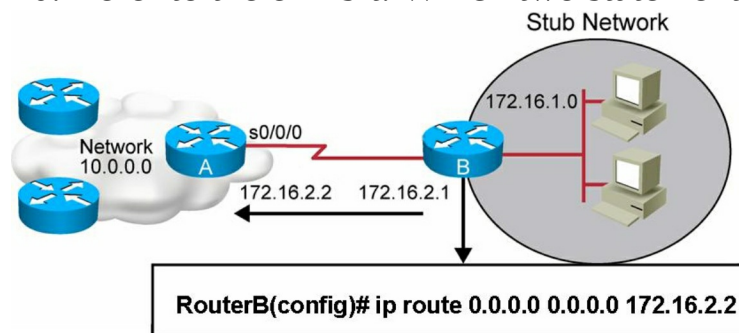
C. Examine the Layer 3 headers of inbound packets and use that information to determine the next hops for the packets.

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.

20. 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.

21. 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

22. Why will a switch never learn a broadcast address?

A. Broadcasts only use network layer addressing.

B. A broadcast frame is never forwarded by a switch.

C. A broadcast address will never be the source address of a frame.

D. Broadcast addresses use an incorrect format for the switching table.

E. Broadcast frames are never sent to switches.

23. What two things will a router do when running a distance vector routing protocol? (Choose two).

A. Send periodic updates regardless of topology changes.

B. Send entire routing table to all routers in the routing domain.

C. Use the shortest-path algorithm to determine best path.

D. Update the routing table based on updates from their neighbors.

E. Maintain the topology of the entire network in its database.

24. 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

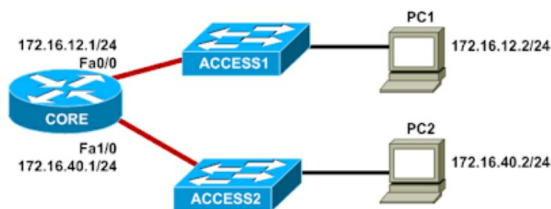
Gateway of last resort is 0.0.0.0 to network 0.0.0.0

    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.

25. Refer to the exhibit. PC1 pings PC2. What three things will CORE router do with the data that is received from PC1? (Choose three).



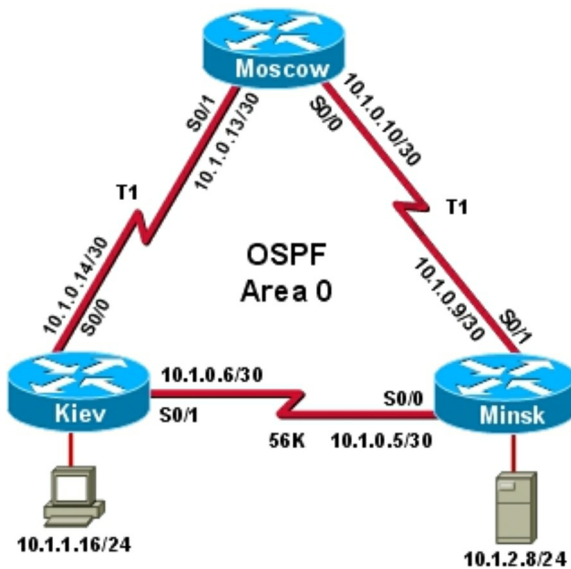
```

CORE# show arp
Protocol Address          Age (min)  Hardware Addr  Type   Interface
Internet 172.16.12.1         -          0001.4210.3BA9 ARPA   FastEthernet0/0
Internet 172.16.12.2         0          0010.111A.7A80 ARPA   FastEthernet0/0
Internet 172.16.40.1         -          00D0.FF59.4A85 ARPA   FastEthernet1/0
Internet 172.16.40.2         0          00E0.B0B7.EAB1 ARPA   FastEthernet1/0
CORE#

```

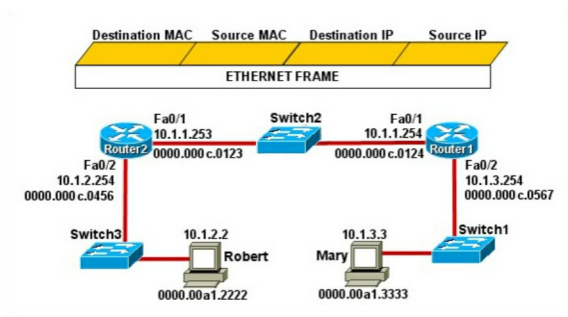
- A. The data frames will be forwarded out interface FastEthernet0/1 of CORE router.
- B. The data frames will be forwarded out interface FastEthernet1/0 of CORE router.
- C. CORE router will replace the destination IP address of the packets with the IP address of PC2.
- D. CORE router will replace the MAC address of PC2 in the destination MAC address of the frames.
- E. CORE router will put the IP address of the forwarding FastEthernet interface in the place of the source IP address in the packets.
- F. CORE router will put the MAC address of the forwarding FastEthernet interface in the place of the source MAC address.

26. 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

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



- A.

Destination MAC	Source MAC	Destination IP	Source IP
0000.00a1.2222	0000.00a1.3333	10.1.2.2	10.1.3.3
- B.

Destination MAC	Source MAC	Destination IP	Source IP
0000.000c.0123	0000.000c.0124	10.1.2.2	10.1.3.3
- C.

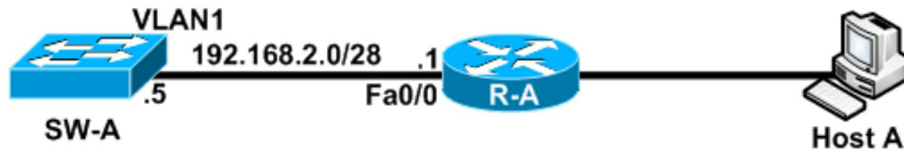
Destination MAC	Source MAC	Destination IP	Source IP
0000.000c.0123	0000.000c.0124	10.1.1.253	10.1.1.254
- D.

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

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

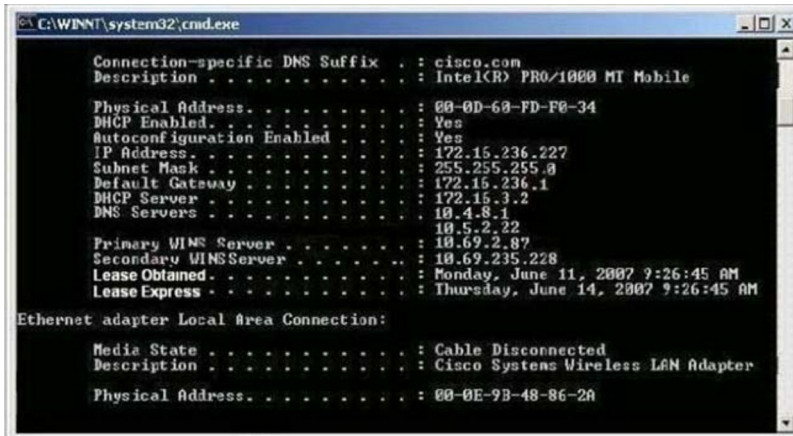
- A. Option A
- B. Option B
- C. Option C
- D. Option D
- E. Option E

28. Refer to the exhibit. What must be configured to establish a successful connection from Host A to switch SW-A through router RT-A?



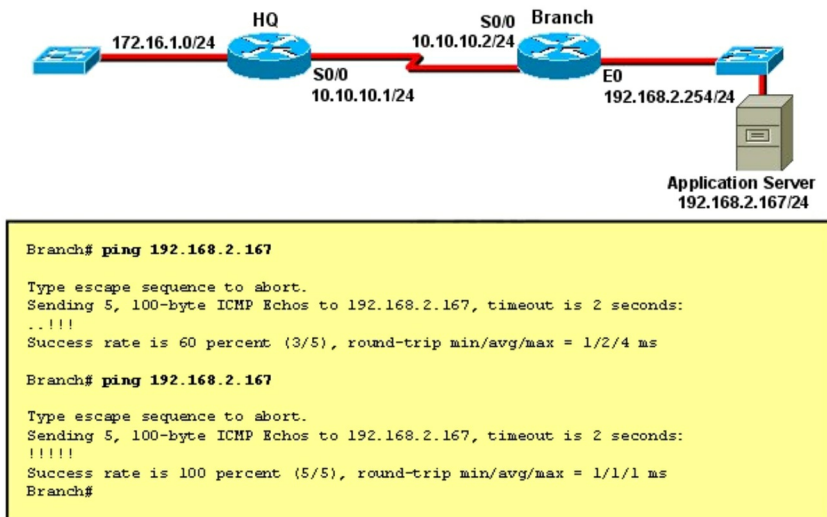
- A. VLAN 1 on RT-A
- B. IP routing on SW-A
- C. default gateway on SW-A
- D. crossover cable connecting SW-A and RT-A

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



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

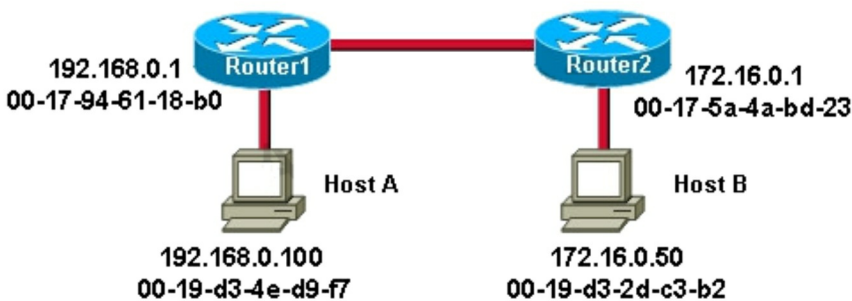
30. Refer to the exhibit. The network administrator is testing connectivity from the branch router to the newly installed application server. What is the most likely reason for the first ping having a success rate of only 60 percent?



- 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.

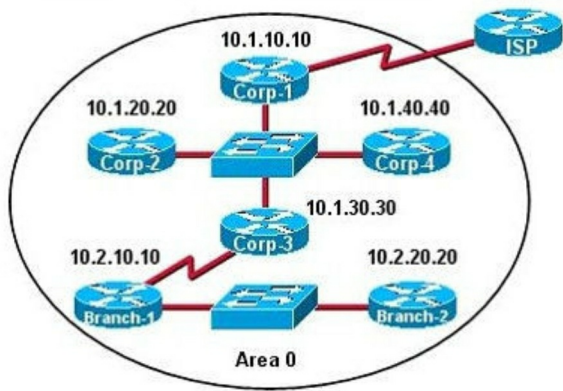
- C. There is a short delay while NAT translates the server IP address.
- D. A routing table lookup delayed forwarding on the first two ping packets.
- E. The branch router LAN interface should be upgraded to FastEthernet.

31. 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?



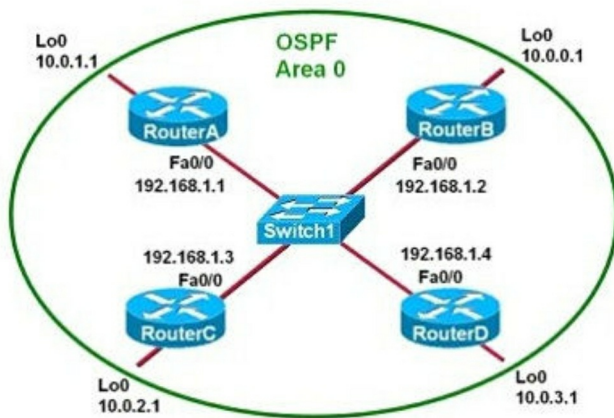
- A. 192.168.0.1
- B. 172.16.0.50
- C. 00-17-94-61-18-b0
- D. 00-19-d3-2d-c3-b2
- E. ff-ff-ff-ff-ff-ff
- F. 255.255.255.255

32. The internetwork 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 internetwork performance. As part of examining the router resources, the OSPF DRs need to be known. All the router OSPF priorities are at the default and the router IDs are shown with each router. Which routers are likely to have been elected as DR? (Choose two).



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

33. Refer to the exhibit. Which two statements are true about the loopback address that is configured on RouterB? (Choose two).



- A. It decreases the metric for routes that are advertised from RouterB.
- B. It provides stability for the OSPF process on RouterB.
- C. It specifies that the router ID for RouterB should be 10.0.0.1.
- D. It indicates that RouterB should be elected the DR for the LAN.
- E. It ensures that data will be forwarded by RouterB.

34. What are three characteristics of the OSPF routing protocol? (Choose three).

- A. It uses the DUAL algorithm to determine the best route.
- B. OSPF is a classful routing protocol.
- C. It uses cost to determine the best route.
- D. It converges quickly.
- E. OSPF routers discover neighbors before exchanging routing information.
- F. OSPF routers send the complete routing table to all directly attached routers.

35. 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

36. What is the default maximum number of equal-cost paths that can be placed into the routing table of a Cisco OSPF router?

- A. 4
- B. 16
- C. unlimited
- D. 2

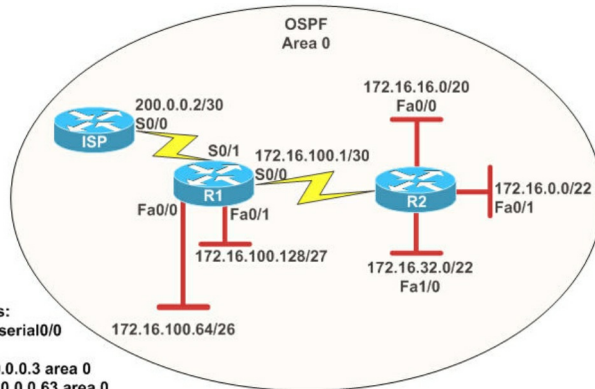
37. Which command is used to display the collection of OSPF link states?

- A. show ip ospf link-state
- B. show ip ospf neighbors
- C. show ip ospf database
- D. show ip ospf lsa database

38. Which parameter or parameters are used to calculate OSPF cost in Cisco routers?

- A. Bandwidth, MTU, Reliability, Delay, and Load
- B. Bandwidth
- C. Bandwidth, Delay, and MTU
- D. Bandwidth and Delay

39. Refer to the exhibit. Assume that all router interfaces are operational and correctly configured. In addition, assume that OSPF has been correctly configured on router R2. How will the default route configured on R1 affect the operation of R2?



R1 Routing Commands:
 ip route 0.0.0.0 0.0.0.0 serial0/0
 router ospf 1
 network 172.16.100.0 0.0.0.3 area 0
 network 172.16.100.64 0.0.0.63 area 0
 network 172.16.100.128 0.0.0.31 area 0
 default information originate

- A. Any packet destined for a network that is not referenced in the routing table of router R2 will be directed to R1. R1 will then send that packet back to R2 and a routing loop will occur.
- B. Any packet destined for a network that is not directly connected to router R2 will be dropped immediately.
- C. Any packet destined for a network that is not directly connected to router R2 will be dropped immediately because of the lack of a gateway on R1.
- D. The networks directly connected to router R2 will not be able to communicate with the 172.16.100.0, 172.16.100.128, and 172.16.100.64 subnetworks.
- E. Any packet destined for a network that is not directly connected to router R1 will be dropped.

40. Which of the following terms describe characteristics of OSPF? (Choose two).

- A. Uses hop count as its metric.
- B. Uses cost as its metric.
- C. Uses the Bellman-Ford algorithm.
- D. Has a default administrative distance of 90.

E. Elects a DR on each multiaccess network.

F. Is vendor specific.

41. OSPF routing uses the concept of areas. What are the characteristics of OSPF areas? (Choose three).

A. Each OSPF area requires a loopback interface to be configured.

B. Areas may be assigned any number from 0 to 65535.

C. Area 0 is called the backbone area.

D. Hierarchical OSPF networks do not require multiple areas.

E. Multiple OSPF areas must connect to area 0.

F. Single area OSPF networks must be configured in area 1.

42. Which items are correct about 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 RIP v2.

43. 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.

44. Refer to the exhibit. A network associate has configured OSPF with the command:

```
City(config-router)# network 192.168.12.64 0.0.0.63 area 0
```

After completing the configuration, the associate discovers that not all the interfaces are participating in OSPF. Which three of the interfaces shown in the exhibit will participate in OSPF according to this configuration statement? (Choose three).

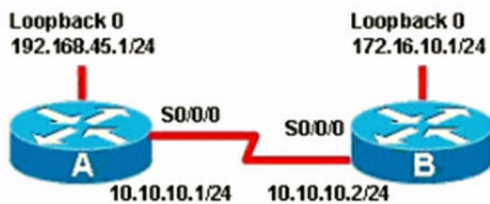
City# show ip interface brief

Interface	IP-Address	OK?	Method	Status	Protccocol
FastEthernet0/0	192.168.12.48	YES	manual	up	up
FastEthernet0/1	192.168.12.65	YES	manual	up	up
Serial0/0	192.168.12.121	YES	manual	up	up
Serial0/1	unassigned	YES	unset	up	up
Serial0/1.102	192.168.12.125	YES	manual	up	up
Serial0/1.103	192.168.12.129	YES	manual	up	up
Serial0/1.104	192.168.12.133	YES	manual	up	up

City#

- A. FastEthernet0/0
- B. FastEthernet0 /1
- C. Serial0/0
- D. Serial0/1.102
- E. Serial0/1.103
- F. Serial0/1.104

45. Refer to the exhibit. When running OSPF, what would cause two routers directly connected to not form an adjacency?



- A. The loopback addresses are on different subnets.
- B. The values of the dead timers on the routers are different.
- C. Router summarization is enabled on both routers.
- D. The process identifier on router A is different than the process identifier on router B.

46. Given the output of the show ip route command, what does the "128" refer to?

```
ROUTER#show ip route
```

```
192.168.12.0/24 is variably subnetted, 9 subnets, 3 masks
```

```
C 192.168.12.232 /30 is directly connected, Serial0
```

```
O 192.168.12.240/30 [110/128] via 192.168.12.233, 00:35:36, Serial  
0
```

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

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

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

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

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

49. A(n) _____ is an OSPF data packet containing link-state and routing information that are shared among OSPF routers.

- A. LSA
- B. TSA
- C. Hello
- D. SPF
- E. None of the above

50. If routers in a single area are configured with the same priority value, what value does a router use for the OSPF router ID in the absence of a loopback interface?

- A. The lowest IP address of any physical interface.
- B. The highest IP address of any physical interface.
- C. The lowest IP address of any logical interface.
- D. The highest IP address of any logical interface.

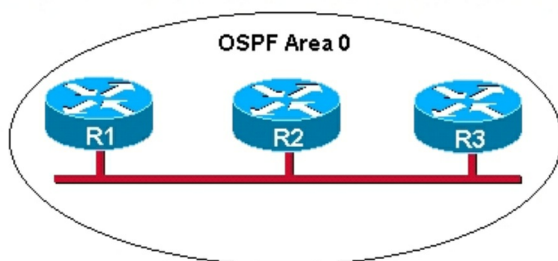
51. Updates addressed to 224.0.0.6 are destined for which type of OSPF router?

- A. DR
- B. ASBR
- C. ABR
- D. All OSPF routers

52. Why do large OSPF networks use a hierarchical design (Choose three).

- A. To speed up convergence.
- B. To decrease latency by increasing bandwidth.
- C. To reduce routing overhead.
- D. To lower costs by replacing routers with distribution layer switches.
- E. To reduce complexity of router configuration.
- F. To confine network instability to single areas of the network.

53. Refer to the graphic. 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.

54. What are two drawbacks of implementing a link-state routing protocol? (Choose two).

- A. The sequencing and acknowledgment of link-state packets.
- B. The requirement for a hierarchical IP addressing scheme for optimal functionality.
- C. The high volume of link-state advertisements in a converged network.
- D. The high demand on router resources to run the link-state routing algorithm.
- E. The large size of the topology table listing all advertised routes in the converged network.

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

```
RouterD# show ip interface brief
Interface      IP-Address      OK? Method Status Protocol
FastEthernet0/0 192.168.5.3    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
```

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

56. Which two statements describe the process identifier that is used in the

command to configure OSPF on a router? (Choose two).

Router(config)# router ospf 1

- A. All OSPF routers in an area must have the same process ID.
- B. Only one process number can be used on the same router.
- C. Different process identifiers can be used to run multiple OSPF processes.
- D. The process number can be any number from 1 to 65,535.
- E. Hello packets are sent to each neighbor to determine the processor identifier.

57. Which commands are required to properly configure a router to run OSPF and to add network 192.168.16.0/24 to OSPF area 0? (Choose two).

- A. Router(config)# router ospf 0
- B. Router(config)# router ospf 1
- C. Router(config)# router ospf area 0
- D. Router(config-router)# network 192.168.16.0 0.0.0.255 0
- E. Router(config-router)# network 192.168.16.0 0.0.0.255 area 0
- F. Router(config-router)# network 192.168.16.0 255.255.255.0 area 0

58. Refer to the exhibit. You are connected to the router as user Mike. Which command allows you to see output from the OSPF debug command?

```
Router#show users
  Line      User      Host(s)      Idle      Location
*322 vty 0   Mike      idle         00:00:00  laptop

  Interface  User      Mode      Idle      Peer Address

Router#debug ip ospf events
OSPF events debugging is on
Router#
```

- A. terminal monitor
- B. show debugging
- C. show sessions
- D. show ip ospf interface

59. A network administrator is troubleshooting the OSPF configuration of routers R1 and R2. The routers cannot establish an adjacency relationship on their common Ethernet link. The graphic shows the output of the show ip ospf interface e0 command for routers R1 and R2. Based on the information in the graphic, what is the cause of this problem?

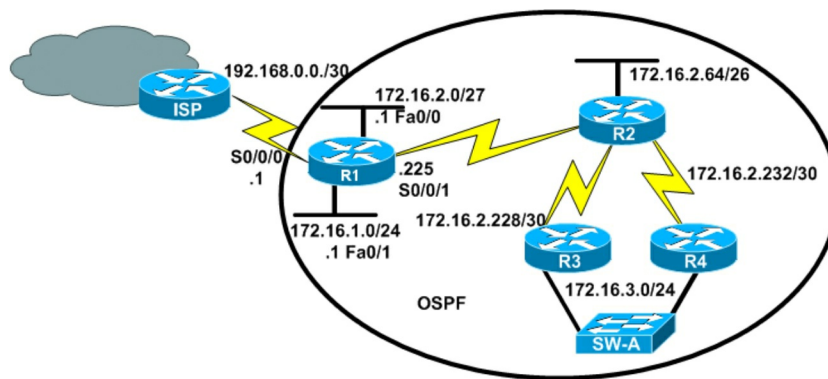
```
R1:  Ethernet0 is up, line protocol is up
      Internet address 192.168.1.2/24, Area 0
      Process ID 1, Router ID 192.168.31.33, Network Type BROADCAST, Cost: 10
      Transmit Delay is 1 sec, State DR, Priority 1
      Designated Router (ID) 192.168.31.33, Interface address 192.168.1.2
      No backup designated router on this network
      Timer intervals configured, Hello 5, Dead 20, Wait 20, Retransmit 5

-----
R2:  Ethernet0 is up, line protocol is up
      Internet address 192.168.1.1/24, Area 0
      Process ID 2, Router ID 192.168.31.11, Network Type BROADCAST, Cost: 10
      Transmit Delay is 1 sec, State DR, Priority 1
      Designated Router (ID) 192.168.31.11, Interface address 192.168.1.1
      No backup designated router on this network
      Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
```

- A. The OSPF area is not configured properly.

- B. The priority on R1 should be set higher.
- C. The cost on R1 should be set higher.
- D. The hello and dead timers are not configured properly.
- E. A backup designated router needs to be added to the network.
- F. The OSPF process ID numbers must match.

60. Refer to the exhibit. 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?



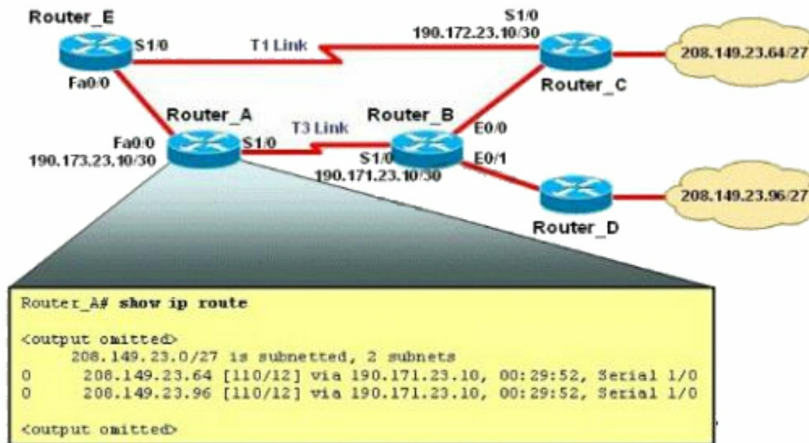
- A. 2
- B. 3
- C. 4
- D. 5
- E. 6
- F. 7

61. Which characteristics are representative of a link-state routing protocol? (Choose three).

- A. Provides common view of entire topology.
- B. Exchanges routing tables with neighbors.
- C. Calculates shortest path.
- D. Utilizes event-triggered updates.

E. Utilizes frequent periodic updates.

62. Refer to the exhibit. The network is converged. After link-state advertisements are received from Router A, what information will Router E contain in its routing table for the subnets 208.149.23.64 and 208.149.23.96?



A. 208.149.23.64[110/13] via 190.173.23.10, 00:00:07, FastEthernet0/0
208.149.23.96[110/13] via 190.173.23.10, 00:00:16, FastEthernet0/0

B. 208.149.23.64[110/1] via 190.172.23.10, 00:00:07, Serial1/0
208.149.23.96[110/3] via 190.173.23.10, 00:00:16, FastEthernet0/0

C. 208.149.23.64[110/13] via 190.173.23.10, 00:00:07, Serial1/0
208.149.23.96[110/13] via 190.173.23.10, 00:00:16, Serial1/0
208.149.23.96[110/13] via 190.173.23.10, 00:00:16, FastEthernet0/0

D. 208.149.23.64[110/3] via 190.172.23.10, 00:00:07, Serial1/0
208.149.23.96[110/3] via 190.173.23.10, 00:00:16, Serial1/0

63. Which two statements about the OSPF Router ID are true? (Choose two).

- A. It identifies the source of a Type 1 LSA.
- B. It should be the same on all routers in an OSPF routing instance.
- C. By default, the lowest IP address on the router becomes the OSPF Router ID.
- D. The router automatically chooses the IP address of a loopback as the OSPF Router ID.
- E. It is created using the MAC Address of the loopback interface.

64. What are two benefits of using a single OSPF area network design? (Choose two).

- A. It is less CPU intensive for routers in the single area.
- B. It reduces the types of LSAs that are generated.
- C. It removes the need for virtual links.
- D. It increases LSA response times.
- E. It reduces the number of required OSPF neighbor adjacencies.

65. When a router undergoes the exchange protocol within OSPF, in what order does it pass through each state?

- A. exstart state > loading state > exchange state > full state
- B. exstart state > exchange state > loading state > full state
- C. exstart state > full state > loading state > exchange state
- D. loading state > exchange state > full state > exstart state

66. Refer to the exhibit. If the router Cisco returns the given output and has not had its router ID set manually, what value will OSPF use as its router ID?

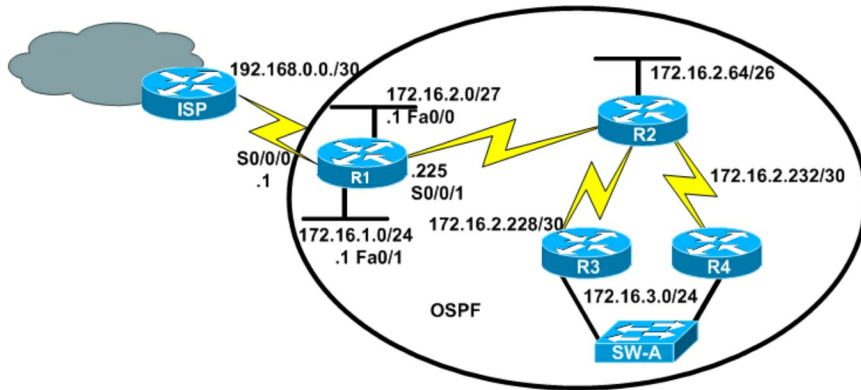
```
Cisco#show ip interface brief
Interface          IP-Address      OK? Method Status      Protocol
FastEthernet0/0    192.168.1.1     YES manual up          up
FastEthernet0/1    172.16.1.1      YES manual up          up
Loopback0          1.1.1.1         YES manual up          up
Loopback1          2.2.2.2         YES manual up          up
Vlan1              unassigned      YES unset  administratively down down
```

- A. 192.168.1.1
- B. 172.16.1.1
- C. 1.1.1.1
- D. 2.2.2.2

67. What OSPF command, when configured, will include all interfaces into area 0?

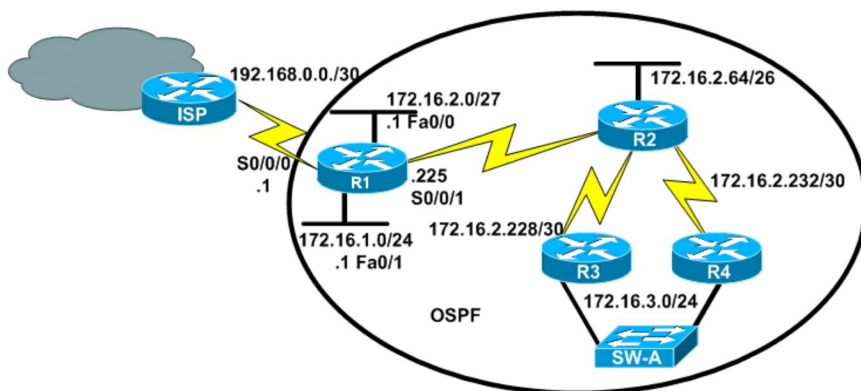
- A. network 0.0.0.0 255.255.255.255 area 0
- B. network 0.0.0.0 0.0.0.0 area 0
- C. network 255.255.255.255 0.0.0.0 area 0
- D. network all-interfaces area 0

68. Refer to the exhibit. 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).



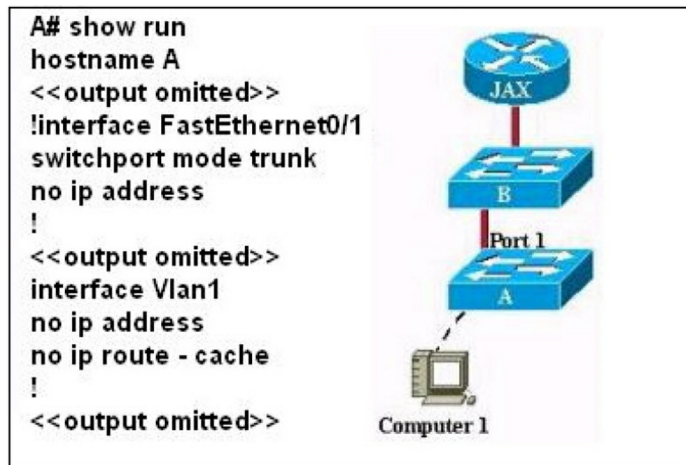
- A. R2(config-if)#clock rate
- B. R2(config-if)#bandwidth
- C. R2(config-if)#ip ospf cost
- D. R2(config-if)#ip ospf priority
- E. R2(config-router)#distance ospf

69. Refer to the exhibit. 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.

70. Refer to the exhibit. Computer 1 is consoled into Switch A. Telnet connections and pings run from the command prompt on Switch A fail. Which of the following could cause this problem?



By looking at the output, there is no IP address associated with interface VLAN1. To remote access to a Switch, it must have a management IP address on a VLAN on that switch. Traditionally, we often use VLAN 1 as the management VLAN.

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

71. Which protocol is the Cisco proprietary implementation of FHRP?

- A. HSRP
- B. VRRP
- C. GLBP
- D. CARP

72. What are two requirements for an HSRP group? (Choose two).

- A. Exactly one active router.
- B. One or more standby routers.
- C. One or more backup virtual routers.
- D. Exactly one standby active router.
- E. Exactly one backup virtual router.

73. Which standards-based First Hop Redundancy Protocol is a Cisco supported alternative to Hot Standby Router Protocol?

- A. VRRP
- B. GLBP
- C. TFTP
- D. DHCP

74. Which value to use in HSRP protocol election process?

- A. Interface
- B. Virtual IP address
- C. Priority
- D. Router ID

75. Which keyword enables an HSRP router to take the active role immediately when it comes online?

- A. preempt
- B. priority
- C. version
- D. IP address

76. Which three statements about HSRP operation are true? (Choose three).

- A. The virtual IP address and virtual address are active on the HSRP Master router.
- B. The HSRP default timers are a 3 second hello interval and a 10 second dead interval.
- C. HSRP supports only clear-text authentication.

- D. The HSRP virtual IP address must be on a different subnet than the routers' interfaces on the same LAN.
- E. The HSRP virtual IP address must be the same as one of the router's interface addresses on the LAN.
- F. HSRP supports up to 255 groups per interface, enabling an administrative form of load balancing.

77. Which configuration command can you apply to a HSRP router so that its local interface becomes active if all other routers in the group fail?

- A. No additional config is required.
- B. standby 1 track ethernet
- C. standby 1 preempt
- D. standby 1 priority 250

78. Which HSRP feature was new in HSRPv2?

- A. VLAN group numbers that are greater than 255.
- B. Virtual MAC addresses.
- C. Tracking.
- D. Preemption.

79. Which value is used to determine the active router in an HSRP default configuration?

- A. Router loopback address
- B. Router IP address
- C. Router priority
- D. Router tracking number

80. Which one of these is a valid HSRP Virtual Mac Address?

- A. 0000.0C07.AC15
- B. 0000.5E00.01A3
- C. 0007.B400.AE01
- D. 0007.5E00.B301

81. Which protocol advertises a virtual IP address to facilitate transparent failover of a Cisco routing device?

- A. FHRP
- B. DHCP
- C. RSMLT
- D. ESRP

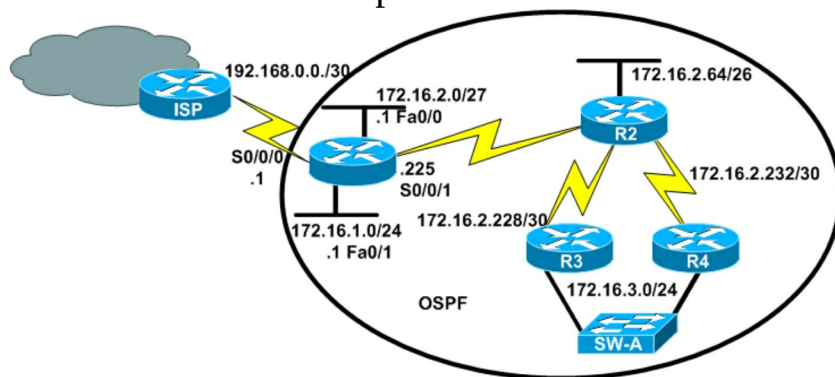
82. Which two options describe benefits of aggregated chassis technology? (Choose two).

- A. It requires only three IP addresses per VLAN.
- B. It supports HSRP, VRRP, and GLBP.
- C. It requires only one IP address per VLAN.
- D. It reduces management overhead.
- E. It supports redundant configuration files.
- F. Switches can be located anywhere regardless of their physical distance from one another.

83. Which protocol is the Cisco proprietary implementation of FHRP?

- A. HSRP
- B. VRRP
- C. GLBP
- D. CARP

84. Refer to the exhibit. 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?

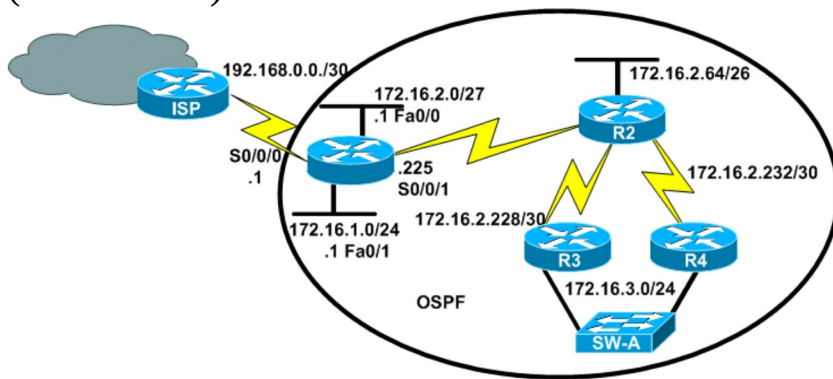


- A. 192.168.0.1
- B. 172.16.1.1
- C. 172.16.2.1
- D. 172.16.2.225

85. Which standards-based First Hop Redundancy Protocol is a Cisco supported alternative to Hot Standby Router Protocol?

- A. VRRP
- B. GLBP
- C. TFTP
- D. DHCP

86. Refer to the exhibit. 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

87. Which keyword enables an HSRP router to take the active role immediately when it comes online?

- A. preempt
- B. priority

- C. version
- D. IP address

88. Which three statements about HSRP operation are true? (Choose three).

- A. The virtual IP address and virtual address are active on the HSRP Master router.
- B. The HSRP default timers are a 3 second hello interval and a 10 second dead interval.
- C. HSRP supports only clear-text authentication.
- D. The HSRP virtual IP address must be on a different subnet than the routers' interfaces on the same LAN.
- E. The HSRP virtual IP address must be the same as one of the router's interface addresses on the LAN.
- F. HSRP supports up to 255 groups per interface, enabling an administrative form of load balancing.

89. Which configuration command can you apply to a HSRP router so that its local interface becomes active if all other routers in the group fail?

- A. No additional config is required.
- B. standby 1 track ethernet
- C. standby 1 preempt
- D. standby 1 priority 250

90. Which HSRP feature was new in HSRPv2?

- A. VLAN group numbers that are greater than 255.
- B. Virtual MAC addresses.
- C. Tracking.
- D. Preemption.

91. Which value is used to determine the active router in an HSRP default configuration?

- A. Router loopback address
- B. Router IP address
- C. Router priority
- D. Router tracking number

92. Which one of these is a valid HSRP Virtual Mac Address?

- A. 0000.0C07.AC15
- B. 0000.5E00.01A3

- C. 0007.B400.AE01
- D. 0007.5E00.B301

93. Which protocol advertises a virtual IP address to facilitate transparent failover of a Cisco routing device?

- A. FHRP
- B. DHCP
- C. RSMLT
- D. ESRP

94. Which two options describe benefits of aggregated chassis technology? (Choose two).

- A. It requires only three IP addresses per VLAN.
- B. It supports HSRP, VRRP, and GLBP.
- C. It requires only one IP address per VLAN.
- D. It reduces management overhead.
- E. It supports redundant configuration files.
- F. Switches can be located anywhere regardless of their physical distance from one another.

95. Running both IPv4 and IPv6 on a router simultaneously is known as what?

- A. 4to6 routing
- B. dual-stack routing
- C. 6to4 routing
- D. binary routing
- E. NextGen routing

96. Which command enables IPv6 forwarding on a Cisco router?

- A. ipv6 local
- B. ipv6 unicast-routing
- C. ipv6 host
- D. ipv6 neighbor

97. Which statement about RIPng is true?

- A. There can be only one RIPng process per router.
- B. RIPng allows for routes with up to 30 hops.
- C. RIPng is enabled on each interface separately.
- D. RIPng uses broadcasts to exchange routes.

98. Which IPV6 routing protocol uses multicast group FF02::8 to send updates?

- A. RIPng
- B. IS-IS
- C. OSPFv3
- D. static

99. Which three approaches can be used while migrating from an IPv4 addressing scheme to an IPv6 scheme? (Choose three).

- A. Enable dual-stack routing.
- B. Configure IPV6 directly.
- C. Use proxying and translation to translate IPV6 packets into IPV4 packets.
- D. Use DHCPv6 to map IPV4 addresses to IPV6 addresses.
- E. Statically map IPV4 address to IPV6 addresses.
- F. Configure IPv4 tunnels between IPv6 islands.

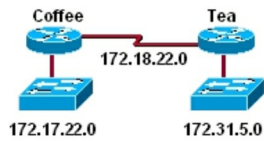
100. Which two statements about IPv6 and routing protocols are true? (Choose two).

- A. Link-local addresses are used to form routing adjacencies.
- B. OSPFv3 was developed to support IPv6 routing.
- C. EIGRP, OSPF, and BGP are the only routing protocols that support IPv6.
- D. Loopback addresses are used to form routing adjacencies.
- E. EIGRPv3 was developed to support IPv6 routing.

101. A static route of 10.1.1.0 255.255.255.0 fa0/0 was configured on a router. During your connectivity testing, routes are not being learned by the router. What command will remove this configuration?

- A. erase ip route 10.1.1.0 255.255.255.0 fa0/0
- B. rem ip route 10.1.1.0 255.255.255.0 fa0/0
- C. del ip route 10.1.1.0 255.255.255.0 fa0/0
- D. no ip route 10.1.1.0 255.255.255.0 fa0/0

102. Users on the 172.17.22.0 network cannot reach the server located on the 172.31.5.0 network. The network administrator connected to router Coffee via the console port, issued the show ip route command, and was able to ping the server. Based on the output of the show ip route command and the topology shown in the graphic, what is the cause of the failure?



```
Coffee#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 172.19.22.2 to network 0.0.0.0

C 172.17.22.0 is directly connected, FastEthernet0/0
C 172.18.22.0 is directly connected, Serial0/0
S* 0.0.0.0 [1/0] via 172.19.22.2
```

- A. The network has not fully converged.
- B. IP routing is not enabled.
- C. A static route is configured incorrectly.
- D. The FastEthernet interface on Coffee is disabled.
- E. The neighbor relationship table is not correctly updated.
- F. The routing table on Coffee has not updated .

103. Why did the device return this message?

```
Router1#show lo
% Ambiguous command: "show lo"
Router1#
```

- A. The command requires additional options or parameters
- B. There is no show command that starts with lo.
- C. The command is being executed from the wrong router mode.
- D. There is more than one show command that starts with the letters lo.

104. Refer to the exhibit. A network administrator is troubleshooting a connectivity problem on the serial interfaces. The output from the show interfaces command on both routers shows that the serial interface is up, line protocol is down. Given the partial output for the show running-config in the exhibit, what is the most likely cause of this problem?

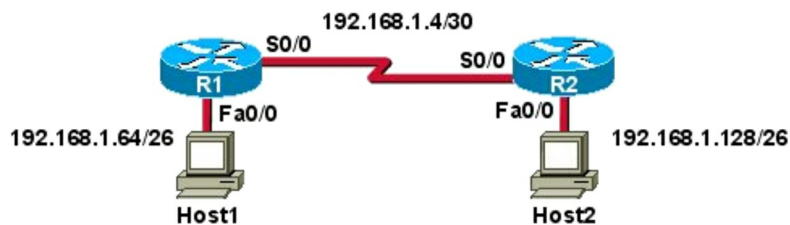


```
Rtr3# show run
Building configuration...
<output omitted>
interface Serial0/0
ip address 172.16.5.2 255.255.255.252
no ip proxy-arp
encapsulation ppp
mtu 1496
<output omitted>
Rtr3#
```

```
Rtr1# show run
Building configuration
<output omitted>
interface Serial1/1
ip address 172.16.5.1 255.255.255.252
no ip proxy-arp
mtu 1496
<output omitted>
Rtr1#
```

- A. The serial cable is bad.
- B. The MTU is incorrectly configured.
- C. The Layer 2 framing is misconfigured.
- D. The IP addresses are not in the same subnet.

105. Refer to the exhibit. A technician pastes the configurations in the exhibit into the two new routers shown. Otherwise, the routers are configured with their default configurations. A ping from Host1 to Host2 fails, but the technician is able to ping the S0/0 interface of R2 from Host1. The configurations of the hosts have been verified as correct. What is the cause of the problem?



```
Configuration for R1:
interface fa0/0
ip address 192.168.1.65 255.255.255.192
no shutdown
interface serial 0/0
ip address 192.168.1.5 255.255.255.252
no shutdown
```

```
Configuration for R2:
interface fa0/0
ip address 192.168.1.129 255.255.255.192
no shutdown
interface serial 0/0
ip address 192.168.1.6 255.255.255.252
no shutdown
ip route 192.168.1.64 255.255.255.192 s0/0
```

- A. The serial cable on R1 needs to be replaced.
- B. The interfaces on R2 are not configured properly.
- C. R1 has no route to the 192.168.1.128 network.
- D. The IP addressing scheme has overlapping subnetworks.
- E. The ip subnet-zero command must be configured on both routers.

106. Refer to the exhibit. The network administrator has found the following problem. The remote networks 172.16.10.0, 172.16.20.0, and 172.16.30.0 are accessed through the Central router's serial 0/0 interface. No users are able to access 172.16.20.0. After reviewing the command output shown in the graphic, what is the most likely cause of the problem?

```
Central# debug ip rip
```

```
<some output text omitted>
```

```
Central#debug ip rip
```

```
1d00h: RIP: received v1 update from 172.16.100.2 on Serial0/0
```

```
1d00h: 172.16.10.0 in 1 hops
```

```
1d00h: 172.16.20.0 in 1 hops
```

```
1d00h: 172.16.30.0 in 1 hops
```

```
Central# show ip route
```

```
Gateway of last resort is not set
```

```
172.16.0.0/24 is subnetted, 8 subnets
```

```
C 172.16.150.0 is directly connected, FastEthernet0/0
```

```
C 172.16.220.0 is directly connected, Loopback2
```

```
C 172.16.210.0 is directly connected, Loopback1
```

```
C 172.16.200.0 is directly connected, Loopback0
```

```
R 172.16.30.0 [120/1] via 172.16.100.2, 00:00:07, Serial0/0
```

```
S 172.16.20.0 [1/0] via 172.16.150.15
```

```
R 172.16.10.0 [120/1] via 172.16.100.2, 00:00:07, Serial0/0
```

```
C 172.16.100.0 is directly connected, Serial0/0
```

A. No gateway of last resort on Central.

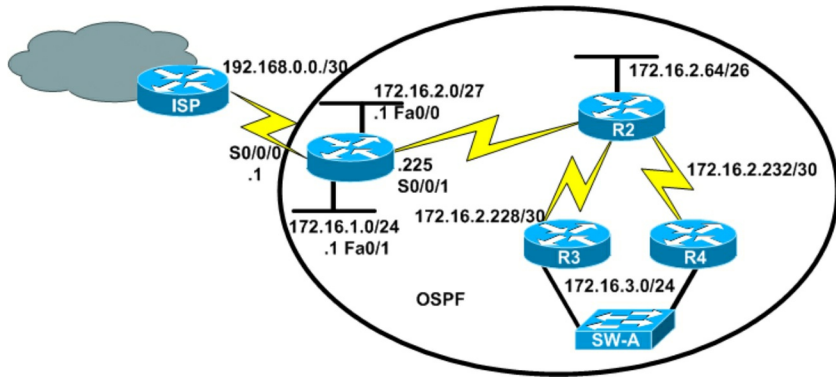
- B. Central router's not receiving 172.16.20.0 update.
- C. Incorrect static route for 172.16.20.0.
- D. 172.16.20.0 not located in Central's routing table.

107. Refer to the exhibit. A packet with a source IP address of 192.168.2.4 and a destination IP address of 10.1.1.4 arrives at the AcmeB router. What action does the router take?

```
AcmeB# show ip route
!
!
Gateway of last resort is not set
 192.168.3.0/28 is variably subnetted, 6 subnets
D   192.168.3.64 [90/20625671] via 192.168.0.6, 03:17:05, Serial0/01
D   192.168.3.80 [90/20625671] via 192.168.0.6, 03:17:05, Serial0/1
D   192.168.3.32 [90/20625671] via 192.168.9.2, 03:17:05, Serial0/0
D   192.168.3.48 [90/20625671] via 192.168.9.2, 03:17:05, Serial0/0
D   192.168.3.0 [90/30830] via 192.168.2.10, 03:17:05, FastEthernet0/0
D   192.168.3.16 [90/175250] via 192.168.2.10, 03:17:06, FastEthernet0/0
 192.168.9.0/30 is subnetted, 1 subnets
C   192.168.9.0 is directly connected, Serial0/0
 192.168.0.0/30 is subnetted, 1 subnets
C   192.168.0.4 is directly connected, Serial0/1
 192.168.2.0/30 is subnetted, 1 subnets
C   192.168.2.8 is directly connected, FastEthernet0/0
AcmeB#
```

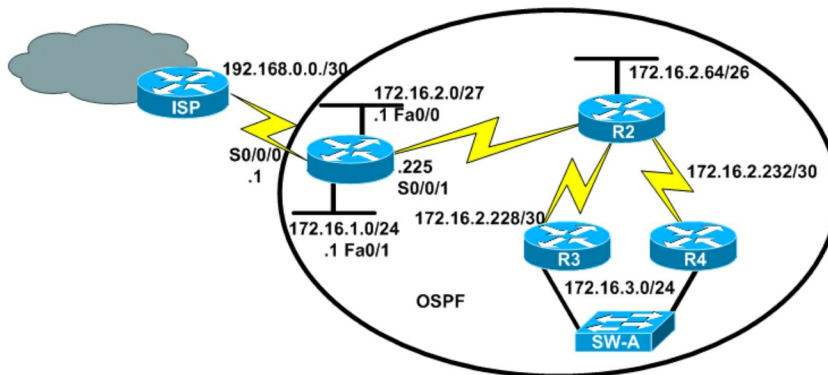
- A. Forwards the received packet out the Serial0/0 interface.
- B. Forwards a packet containing an EIGRP advertisement out the Serial0/1 interface.
- C. Forwards a packet containing an ICMP message out the FastEthernet0/0 interface.
- D. Forwards a packet containing an ARP request out the FastEthernet0/1 interface.

108. Refer to the exhibit. 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

109. Refer to the exhibit. 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.

Chapter 3 Answers

1. Which pairing reflects a correct protocol-and-metric relationship?

B. RIPv2 and number of hops.

The Routing Information Protocol ('RIP') which uses the hop count as a routing metric. RIP prevents routing loops by implementing a limit on the number of hops (15) allowed in a path from source to destination.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 5

2. Which two statements describe the advantages to the use of RIP over the use of OSPF? (Choose two).

B. RIP is less complex to configure.

E. RIP demands fewer router resources.

RIP is widely used in smaller networks, thus, is less intrusive to configure than OSPF. RIP also uses less resources in that it sends a routing table on a regular interval.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

3. A router receives information about network 192.168.10.0/24 from multiple sources. What will the router consider the most reliable information about the path to that network?

E. A directly connected interface with an address of 192.168.10.254/24.

The router will usually compare administrative distances to determine which protocol has the lowest value. Directly connected interfaces have an AD of 0, Static Routes have an AD of 1, therefore the route using the directly connected interface will be placed into the routing table.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

4. What functions do routers perform in a network? (Choose two).

C. Packet switching.

D. Path selection.

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

5. Which command can you enter to set the default route for all traffic to an interface?

A. router(config)#ip route 0.0.0.0 0.0.0.0 GigabitEthernet0/1

The correct configuration for a default route is the IP address and subnet mask of all zeros, followed by the interface.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

6. Which three statements about static routing are true? (Choose three).

- A. It uses consistent route determination.**
- B. It is best used for small-scale deployments.**
- C. Routing is disrupted when links fail.**

The static routing specifies a fixed destination so it is “consistent”. It is best used for small-scaled places where there are a few routers only. When links fail, static route cannot automatically find an alternative path like dynamic routing so routing is disrupted.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

7. Some routers have been configured with default routes. What are some of the advantages of using default routes? (Choose two).

- B. They keep routing tables small.**
- D. They allow connectivity to remote networks that are not in the routing table.**

A default route can help if there are no pre-defined routes in the routing table. Traffic with an unknown destination in the routing table, is sent via the default route. It is useful for small networks with a single inbound and exit interface. It also keeps the routing table small, so CPU load is minimal.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

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

- A. It switches the packet to the appropriate outgoing interfaces.**
- C. It determines the next hop on the path.**

The primary function of a router is to forward packets toward their

destination. This is accomplished by using a switching function, which is the process used by a router to accept a packet on one interface and forward it out of another interface. A key responsibility of the switching function is to encapsulate packets in the appropriate data link frame type for the outgoing data link and determining the next hop device to send the frame to.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 5

9. If IP routing is enabled, which two commands set the gateway of last resort to the default gateway? (Choose two).

C. ip default-network 0.0.0.0

D. ip route 0.0.0.0 0.0.0.0 172.16.2.1

Default routes are used to direct packets addressed to networks not explicitly listed in the routing table. Commands used to configure include ip default-gateway, ip default-network, and ip route 0.0.0.0 0.0.0.0.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 5

10. Which two are advantages of static routing when compared to dynamic routing? (Choose two).

B. Routing traffic load is reduced when used in stub network links.

C. Security increases because only the network administrator may change the routing table.

Since static routing is a manual process, since the network administrator will need to make changes to the routing table directly. In networks where there is only a single uplink connection, the load is reduced as routers just need a single static default route, instead of many routes that all have the same next hop IP address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 5

11. Which two statements are characteristics of a distance vector routing protocol? (Choose two).

B. RIP is an example of distance vector routing protocols.

D. Updates are periodic and include the entire routing table.

A typical distance vector routing protocol uses a routing algorithm in which routers periodically send routing updates to all neighbors by broadcasting their entire route tables. Examples of Distant Vector routing protocols include RIP and IGRP.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

12. Which parameter can be tuned to affect the selection of a static route as a backup, when a dynamic protocol is also being used?

B. Administrative distance

By default, the administrative distance of a static route is 1, meaning it will be preferred over all dynamic routing protocols. If you want to have the dynamic routing protocol used and have the static route be used only as a backup, you need to increase the AD of the static route so that it is higher than the dynamic routing protocol.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

13. Which statement is true about classful or classless routing?

B. Automatic summarization at classful boundaries can cause problems on discontinuous subnets.

RIPv1, RIPv2, IGRP, and EIGRP all auto-summarize classful boundaries by default (OSPF does not). To make discontinuous networks work, meaning you don't want classful boundaries to summarize, you need to turn off auto-summary.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

14. Which three statements are correct about RIPv2? (Choose three).

B. It is a classless routing protocol.

C. It has the same maximum hop count as version 1.

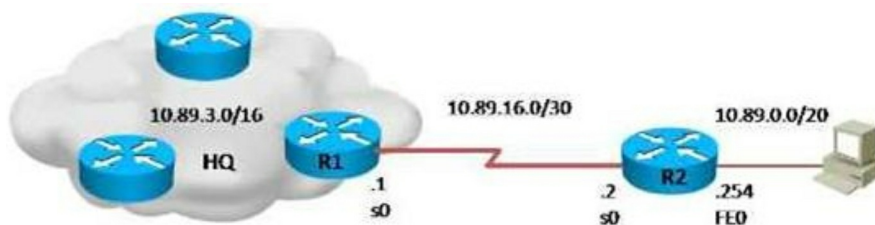
E. It supports authentication.

RIPv1 and RIPv2 have similar and dis-similar characteristics. RIPv2 is a

classless protocol, it will send the subnet mask information, it supports authentication, and has a max hop count of 15 and administrative distance, the same as RIPv1.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

15. 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?

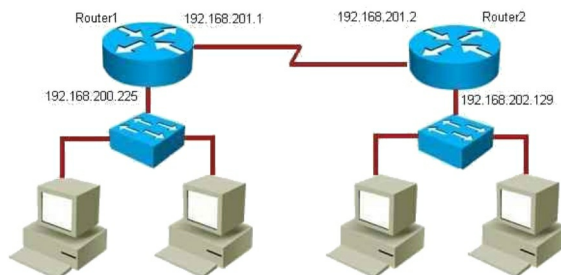


D. router2(config)#ip route 0.0.0.0 0.0.0.0 10.89.16.1

The next hop IP address for router R1 is 10.89.16.1. The simplest thing to do is to configure a static default route to the HQ network.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

16. 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 no default administrative distance?



**D. router1(config)#ip route 192.168.202.0 255.255.255.0
192.168.201.2 5**

The default AD for a static route is 1. To change this, configure a different value to be used as the AD at the very end of the “ip route” statement.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 5

17. What does administrative distance refer to?

D. A measure of the trustworthiness of a routing information source.

Administrative distance is the feature that routers use in order to select the best path when there are two or more different routes to the same destination from two different routing protocols. Administrative distance is a measure of the trustworthiness of the source of the routing information. The smaller the Administrative distance value, the more reliable the protocol.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 5

18. 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?

C. Packets that are destined for host 192.168.100.160 will be sent to 192.168.10.2.

The IP address 192.168.100.160 is actually network address of /27, so any address within the range of .161-.190 network will be sent to 192.168.10.2.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 5

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

B. Update the Layer 2 headers of outbound packets with the MAC addresses of the next hops.

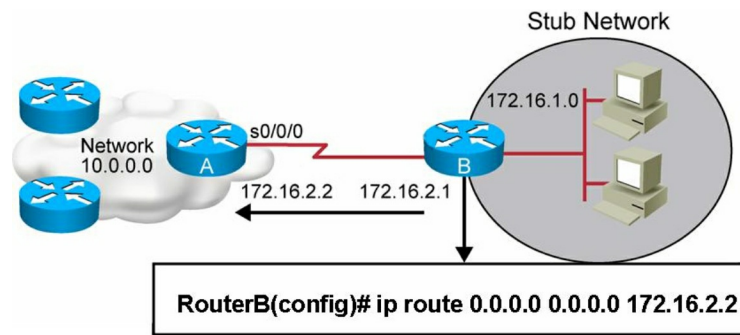
C. Examine the Layer 3 headers of inbound packets and use that information to determine the next hops for the packets.

The basic function of a router is to receive incoming packets and then forward them to their required destination. This is done by reading layer 3 headers of inbound packets and update the info to layer 2 for further hopping.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301

Chapter 5

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



A. This is a default route.

C. This will allow any host on the 172.16.1.0 network to reach all known destinations beyond RouterA.

This is obviously the default route which is set between the routers and since it is entered in such a manner, it ensures connectivity between the stub network and any host lying beyond RouterA.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

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

D. router(config-if)# ip address 10.10.80.1 255.255.224.0

A /19 is CIDR notation for the 255.255.224.0 subnet mask. To configure this address on a router interface, you must be in interface mode (config-if).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

22. Why will a switch never learn a broadcast address?

C. A broadcast address will never be the source address of a frame.

Switches dynamically learn MAC addresses based on the source MAC addresses that it sees, and since a broadcast is never the source, it will never learn the broadcast address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 5

23. What two things will a router do when running a distance vector routing protocol? (Choose two).

- A. Send periodic updates regardless of topology changes.**
- D. Update the routing table based on updates from their neighbors.**

Distance means how far Vector means in which direction. Distance Vector routing protocols pass periodic copies of routing table to neighbor routers and accumulate distance vectors. In distance vector routing protocols, routers discover the best path to destination from each neighbor. The routing updates proceed step by step from router to router.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 5

24. 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#
```

D. Remote stub router at a remote site.

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

25. Refer to the exhibit. PC1 pings PC2. What three things will CORE router do with the data that is received from PC1? (Choose three).



```
CORE# show arp
Protocol Address          Age (min) Hardware Addr  Type   Interface
-----
Internet 172.16.12.1        -          0001.4210.3BA9 ARPA   FastEthernet0/0
Internet 172.16.12.2        0          0010.111A.7AB0 ARPA   FastEthernet0/0
Internet 172.16.40.1        -          00D0.FF59.4A85 ARPA   FastEthernet1/0
Internet 172.16.40.2        0          00E0.B0B7.EAB1 ARPA   FastEthernet1/0
CORE#
```

B. The data frames will be forwarded out interface FastEthernet1/0 of CORE router.

D. CORE router will replace the MAC address of PC2 in the destination MAC address of the frames.

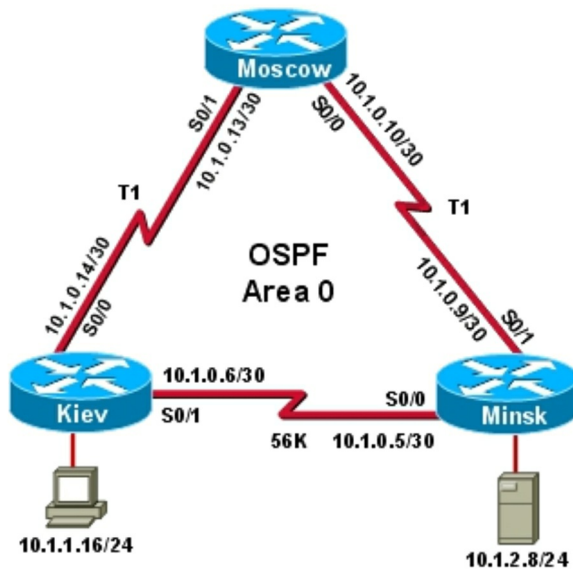
F. CORE router will put the MAC address of the forwarding FastEthernet interface in the place of the source MAC address.

The router will forward the frames out the interface toward the destination, B is correct. Since the Router will have the end station already in its MAC table as seen by the “show arp” command, it will replace the destination MAC

address to that of PC2 – D is correct. The router will then replace the source IP address to 172.16.40.1 – E is correct.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 5

26. 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?

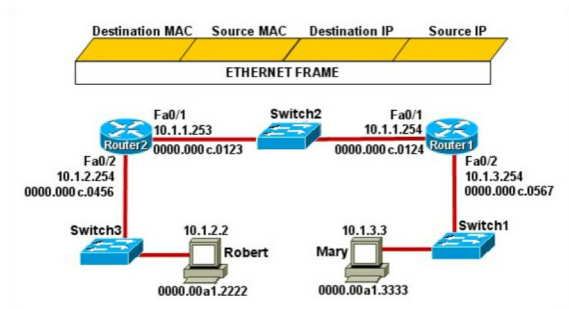


E. 10.1.1.16

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 5

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



- A.

Destination MAC	Source MAC	Destination IP	Source IP
0000.00a1.2222	0000.00a1.3333	10.1.2.2	10.1.3.3
- B.

Destination MAC	Source MAC	Destination IP	Source IP
0000.000c.0123	0000.000c.0124	10.1.2.2	10.1.3.3
- C.

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

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

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

B. Option B

The Source and Destination IP address is not going to change. Host 1 IP address will stay as being the source IP and the Host 2 IP address will stay the destination IP address. The MAC address it is going to change each time it goes from one hop to another. A frame leaving the Mary PC is going to have a source MAC of the Mary PC, and a destination MAC of Router 1. Router 1 is going to strip that info off and then will make the source MAC address of Router1's exiting interface, and make Router2's interface as the destination MAC address. Router2 is going to change the source/destination MAC address to the Router2 interface that it is going out, and the destination will be Robert's MAC address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 5

28. Refer to the exhibit. What must be configured to establish a successful connection from Host A to switch SW-A through router RT-A?

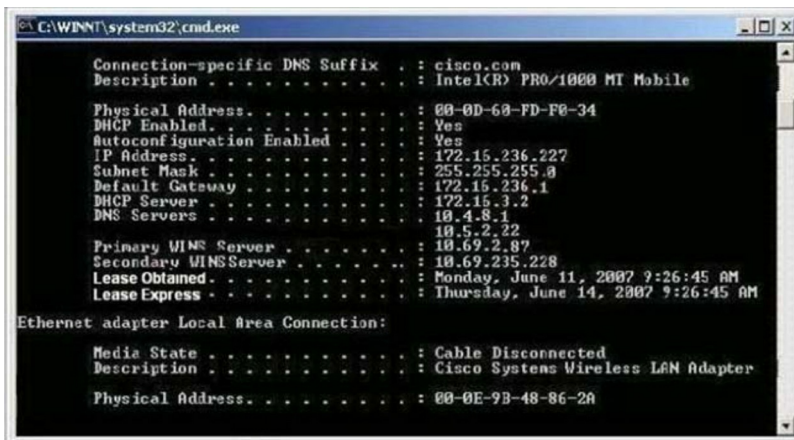


C. default gateway on SW-A

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

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

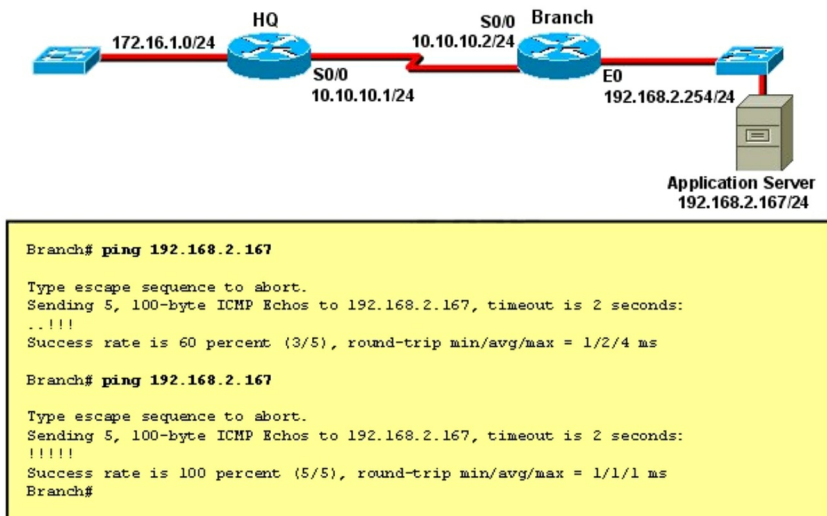


- A. The network card on the computer is functioning correctly.
- D. The device with the IP address 172.16.236.1 is reachable over the network.

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

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

30. 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?

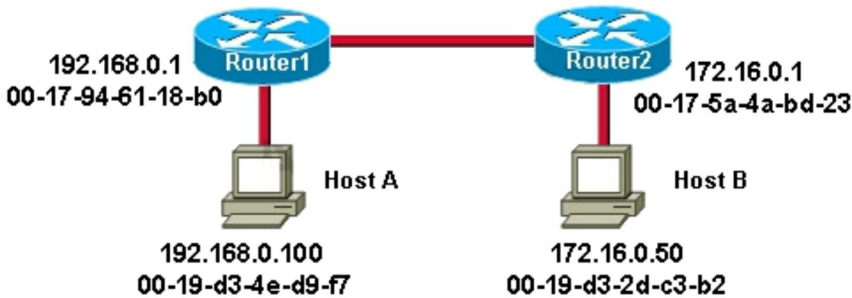


- B. The branch router had to resolve the application server MAC address.

Initially the MAC address had to be resolved, but once it is resolved and is in the ARP table of the router, ping s go through immediately.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

31. 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?



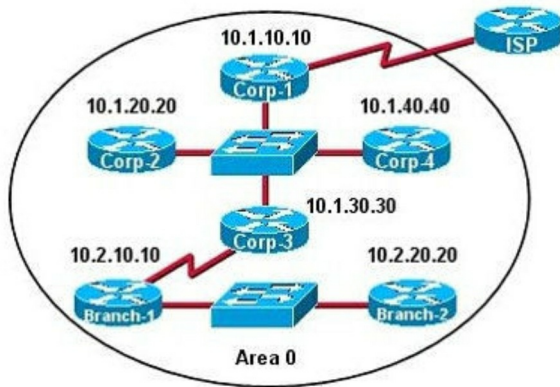
C. 00-17-94-61-18-b0

For the initial communication, Host A will send a broadcast ARP to determine the correct address to use to reach the destination. ARP sends an Ethernet frame called an ARP request to every host on the shared link-layer segment. The Ethernet header includes the source host MAC address and a destination address of all Fs representing a broadcast frame. The ARP request contains the sender's MAC and IP address and the target (destination) IP address. The target's MAC address is set to all 0s.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 5

32. The internetwork 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 internetwork performance. As part of examining the router resources, the OSPF DRs need to be known. All the router OSPF priorities are at the default and the router IDs are shown with each router.

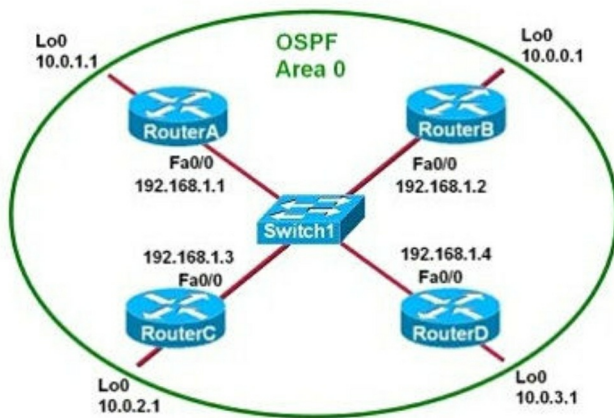
Which routers are likely to have been elected as DR? (Choose two).



- A. Corp-4**
- E. Branch-2**

There are 2 segments on the topology above which are separated by the Corp-3 router. Each segment will have a DR, so we have 2 DRs. To select which router will become the DR, they will compare their router-ID's. The router with highest router-ID will become the DR. The router-ID is chosen with 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. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

33. Refer to the exhibit. Which two statements are true about the loopback address that is configured on RouterB? (Choose two).



- B. It provides stability for the OSPF process on RouterB.**
- C. It specifies that the router ID for RouterB should be 10.0.0.1.**

A loopback interface never comes down even if the link is broken so it provides stability for the OSPF process. The router-ID is chosen in the order of 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 loopback interface will be chosen as the router ID of Router B, C is the correct answer.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

34. What are three characteristics of the OSPF routing protocol? (Choose three).

- C. It uses cost to determine the best route.**

D. It converges quickly.

E. OSPF routers discover neighbors before exchanging routing information.

The OSPF protocol is a non-proprietary Internal Gateway Protocol (IGP) based on link-state technology, and shortest path first algorithm in order to build and calculate the shortest path to all known destinations based on cost of the link. Routers that share a common segment become neighbors on that segment prior to forming an adjacency and exchanging routing information. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

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

A. hello packets

C. LSAs from other routers

Link-state routing protocols generate routing updates (using hello packets) only when a change occurs in the network topology. When a link changes state, the device that detected the change creates a link-state advertisement (LSA) concerning that link and sends to all neighboring devices using a special multicast address. Each routing device takes a copy of the LSA, updates its link-state database (LSDB), and forwards the LSA to all neighboring devices.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

36. What is the default maximum number of equal-cost paths that can be placed into the routing table of a Cisco OSPF router?

A. 4

4 is the default number of routes that OSPF will install in routing table if more than 4 equal cost routes exist for the same subnet. OSPF can include up to 16 equal cost routes in the routing table and perform load balancing. In order to configure this feature, use the OSPF subcommand "maximum-paths".

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

37. Which command is used to display the collection of OSPF link states?

C. show ip ospf database

The show ip ospf database command shows all the entries in the OSPF link-state database and the information taken from the LSAs that have been received. It can be tailored to show specific information from the database, such as the Type 2 LSAs.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

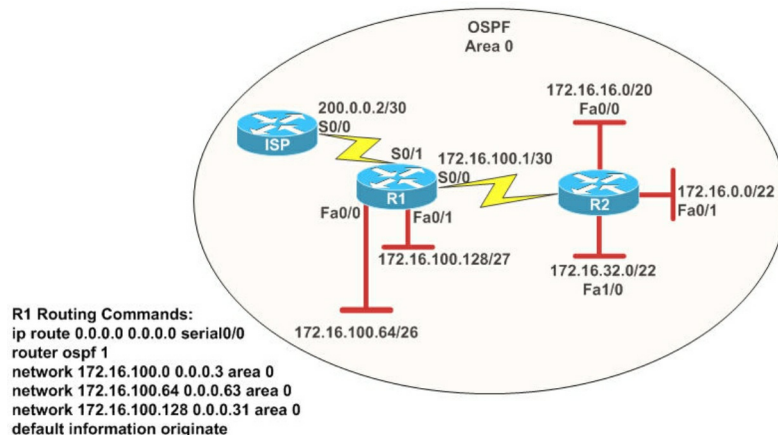
38. Which parameter or parameters are used to calculate OSPF cost in Cisco routers?

B. Bandwidth

The cost (also called metric) of an interface in OSPF is an indication of the overhead required to send packets across a certain interface. The cost of an interface is inversely proportional to the bandwidth of that interface. A higher bandwidth indicates a lower cost. There is more overhead (higher cost) and time delays involved in crossing a 56k serial line than crossing a 10M Ethernet line.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

39. Refer to the exhibit. Assume that all router interfaces are operational and correctly configured. In addition, assume that OSPF has been correctly configured on router R2. How will the default route configured on R1 affect the operation of R2?



A. Any packet destined for a network that is not referenced in the routing table of router R2 will be directed to R1. R1 will then send that packet back to R2 and a routing loop will occur.

More-specific routes will always be favored over less-specific routes regardless of the administrative distance set for a protocol. In this case, because we use OSPF for three networks (172.16.100.0 0.0.0.3, 172.16.100.64 0.0.0.63, 172.16.100.128 0.0.0.31) so the packets destined for these networks will not be affected by the default route. The default route configured on R1 "ip route 0.0.0.0 0.0.0.0 serial0/0 will send any packet whose destination network is not referenced in the routing table of router R1 to R2, it doesn't drop anything so answer A, B and C are not correct. D is not correct too because these routes are declared in R1 and the question says that "OSPF has been correctly configured on router R2, so network directly connected to router R2 can communicate with those three subnetworks.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

40. Which of the following terms describe characteristics of OSPF? (Choose two).

- B. Uses cost as its metric.**
- E. Elects a DR on each multiaccess network.**

The cost (also called metric) of an interface in OSPF is an indication of the overhead required to send packets across a certain interface. DR and BDR election is done via the Hello protocol. Hello packets are exchanged via IP multicast packets on each multiaccess segment. The router with the highest OSPF priority on a segment will become the DR for that segment.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

41. OSPF routing uses the concept of areas. What are the characteristics of OSPF areas? (Choose three).

- C. Area 0 is called the backbone area.**
- D. Hierarchical OSPF networks do not require multiple areas.**
- E. Multiple OSPF areas must connect to area 0.**

Definition of OSPF areas: An OSPF network may be structured, or subdivided, into routing areas to simplify administration and optimize traffic and resource utilization. Areas are identified by 32-bit numbers, expressed either simply in decimal, or often in octet-based dot-decimal notation, familiar from IPv4 address notation.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

42. Which items are correct about the routing protocol OSPF? (Choose three).

- A. It supports VLSM.**
- C. It confines network instability to one area of the network.**
- E. It allows extensive control of routing updates.**

OSPF can carry multiple subnet information for the same major network

whereas other protocols such as RIP and IGRP cannot. An OSPF network can be divided into areas that are logical groupings of hosts and networks. Each area maintains a separate link-state database whose information may be summarized towards the rest of the network by the connecting router. Thus, the topology of an area is unknown outside the area. This reduces the routing traffic between parts of an autonomous system. OSPF uses IP multicast to send link-state updates. This ensures less processing on routers that are not listening to OSPF packets. Also, updates are only sent in case routing changes occur instead of periodically. This ensures a better use of bandwidth. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

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

A. It is locally significant.

C. It is needed to identify a unique instance of an OSPF database.

The OSPF process-id is a numeric value local to the router. It is locally assigned and can be any positive integer from 1 to 65,535. A unique value is assigned for each OSPF routing process.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

44. Refer to the exhibit. A network associate has configured OSPF with the command:

```
City(config-router)# network 192.168.12.64 0.0.0.63 area 0
```

After completing the configuration, the associate discovers that not all the interfaces are participating in OSPF. Which three of the interfaces shown in the exhibit will participate in OSPF according to this configuration statement? (Choose three).

City# show ip interface brief

Interface	IP-Address	OK?	Method	Status	Protccocol
FastEthernet0/0	192.168.12.48	YES	manual	up	up
FastEthernet0/1	192.168.12.65	YES	manual	up	up
Serial0/0	192.168.12.121	YES	manual	up	up
Serial0/1	unassigned	YES	unset	up	up
Serial0/1.102	192.168.12.125	YES	manual	up	up
Serial0/1.103	192.168.12.129	YES	manual	up	up
Serial0/1.104	192.168.12.133	YES	manual	up	up

City#

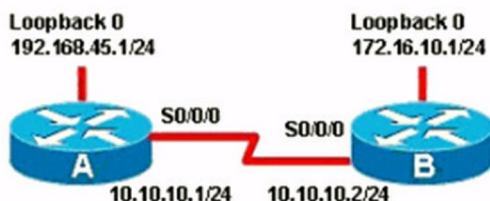
B. FastEthernet0 /1

C. Serial0/0

D. Serial0/1.102

The network 192.168.12.64 0.0.0.63 equals to network 192.168.12.64/26. This network has a block size of 64 in the fourth octet. The network address is 192.168.12.64, the broadcast address is 192.168.12.127. Interfaces in the range of this network will join OSPF. Answers B, C, and D are correct. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

45. Refer to the exhibit. When running OSPF, what would cause two routers directly connected to not form an adjacency?



B. The values of the dead timers on the routers are different.

To form an adjacency (become neighbor), router A & B must have the same Hello interval, Dead interval, and AREA numbers.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

46. Given the output of the show ip route command, what does the "128" refer to?

```
ROUTER#show ip route
192.168.12.0/24 is variably subnetted, 9 subnets, 3 masks
C 192.168.12.232 /30 is directly connected, Serial0
O 192.168.12.240/30 <b>[110/128]</b> via 192.168.12.233, 00:35:36, Serial
0
```

A. OSPF cost

The first parameter is the Administrative Distance of OSPF (110) while the second parameter is the cost of OSPF.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

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

C. 110

Administrative distance is a measure of the trustworthiness of the source of the routing information. The smaller the administrative distance value, the more reliable the protocol. The default Administrative distance for OSPF is 110.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

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

D. 224.0.0.5

OSPF hello packets have a destination address of 224.0.0.5 (The "all ospf routers" multicast address).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

49. A(n) _____ is an OSPF data packet containing link-state and routing information that are shared among OSPF routers.

A. LSA

Link-state advertisements (LSA) are basic communications for the OSPF routing protocol. It communicates the router's local routing topology to all other local routers in the same OSPF area. OSPF is designed for scalability, so some LSAs are not flooded out on all interfaces, but only on those that belong to the appropriate area.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

50. If routers in a single area are configured with the same priority value, what value does a router use for the OSPF router ID in the absence of a loopback interface?

B. The highest IP address of any physical interface.

At the moment of OSPF process startup, the highest IP address on any active interface will be the router ID (RID) of the router. If you have a loopback interface configured (logical interface), then that will override the interface IP address and become the RID of the router automatically.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

51. Updates addressed to 224.0.0.6 are destined for which type of OSPF router?

A. DR

OSPF traffic is multicast either to address 224.0.0.5 (All OSPF routers) or 224.0.0.6 (All Designated Routers).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

52. Why do large OSPF networks use a hierarchical design (Choose three).

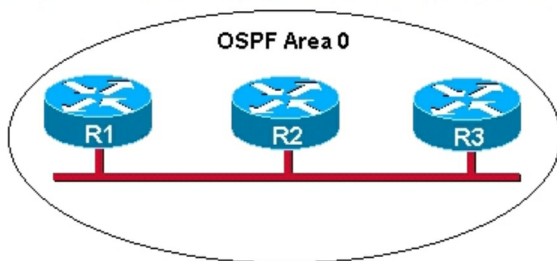
- A. To speed up convergence.**
- C. To reduce routing overhead.**

F. To confine network instability to single areas of the network.

OSPF implements a two-tier hierarchical routing model that uses a core or backbone tier known as area zero. Attached to that backbone via area border routers (ABRs) are a number of secondary tier areas. The hierarchical approach is used to achieve rapid convergence because of link and/or switch failures, deterministic traffic recovery, and scalable and manageable routing hierarchy, reduced routing overhead.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

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



D. The hello and dead interval timers are not set to the same values on R1 and R3.

F. R1 and R3 are configured in different areas.

This question is to examine the conditions for OSPF to create a neighborhood. To make the two routers become neighbors, each router must be matched with the area ID and its types, the Hello and failure time interval timers, an OSPF Password (if configured).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

54. What are two drawbacks of implementing a link-state routing protocol?

(Choose two).

B. the requirement for a hierarchical IP addressing scheme for optimal functionality.

D. the high demand on router resources to run the link-state routing algorithm.

Link State routing protocols, such as OSPF and IS-IS, converge more quickly than their distance vector routing protocols such as RIPv1, RIPv2, EIGRP and so on, through the use of flooding and triggered updates. These updates increase the amount of CPU overhead involved in calculating route changes and memory resources that are required to store neighbor tables, route tables and a complete topology table. A hierarchical network allows for the division of networks when dealing with different network and geographical locations and may hinder your ability to manage and troubleshoot.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

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

```
RouterD# show ip interface brief
Interface      IP-Address      OK? Method Status Protocol
FastEthernet0/0 192.168.5.3     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
```

C. 172.16.5.1

When determining the Router ID (RID) of an OSPF-enabled router, OSPF will always use the numerically highest IP address on the router's loopback interfaces, regardless of whether the loopback is OSPF-enabled. If there is no loopback address, OSPF will then use the numerically highest IP address of the physical interfaces, regardless of whether that interface is OSPF-enabled.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

56. Which two statements describe the process identifier that is used in the

command to configure OSPF on a router? (Choose two).

```
Router(config)# router ospf 1
```

C. Different process identifiers can be used to run multiple OSPF processes.

D. The process number can be any number from 1 to 65,535.

The process identifier used in OSPF is required and locally significant, which means it does not need to be the same on other OSPF routers and is not passed between routers. It is a unique instance that ranges from 1 to 65,535.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

57. Which commands are required to properly configure a router to run OSPF and to add network 192.168.16.0/24 to OSPF area 0? (Choose two).

B. Router(config)# router ospf 1

E. Router(config-router)# network 192.168.16.0 0.0.0.255 area 0

In the router ospf command, the ranges from 1 to 65535, 0 is an invalid number. To configure OSPF, a wildcard in the “network” statement is used, not a subnet mask. The OSPF process also needs to be assigned to an area.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

58. Refer to the exhibit. You are connected to the router as user Mike. Which command allows you to see output from the OSPF debug command?

```
Router#show users
  Line      User      Host(s)      Idle      Location
*322 vty 0   Mike      idle        00:00:00  laptop

  Interface  User      Mode      Idle      Peer Address

Router#debug ip ospf events
OSPF events debugging is on
Router#
```

A. terminal monitor

By default terminal sessions do not display syslog or debug messages. The function of logging monitor is to be able to control the severity level of

messages displayed to a terminal session. The terminal monitor command will display syslog and debug messages.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

59. A network administrator is troubleshooting the OSPF configuration of routers R1 and R2. The routers cannot establish an adjacency relationship on their common Ethernet link. The graphic shows the output of the show ip ospf interface e0 command for routers R1 and R2. Based on the information in the graphic, what is the cause of this problem?

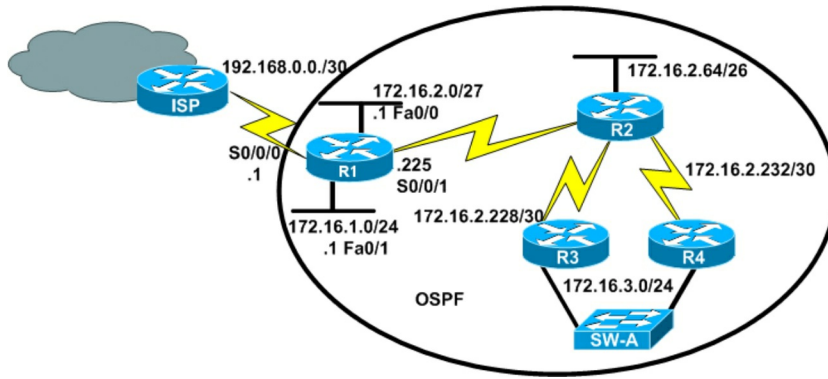
```
R1:  Ethernet0 is up, line protocol is up
      Internet address 192.168.1.2/24, Area 0
      Process ID 1, Router ID 192.168.31.33, Network Type BROADCAST, Cost: 10
      Transmit Delay is 1 sec, State DR, Priority 1
      Designated Router (ID) 192.168.31.33, Interface address 192.168.1.2
      No backup designated router on this network
      Timer intervals configured, Hello 5, Dead 20, Wait 20, Retransmit 5
-----
R2:  Ethernet0 is up, line protocol is up
      Internet address 192.168.1.1/24, Area 0
      Process ID 2, Router ID 192.168.31.11, Network Type BROADCAST, Cost: 10
      Transmit Delay is 1 sec, State DR, Priority 1
      Designated Router (ID) 192.168.31.11, Interface address 192.168.1.1
      No backup designated router on this network
      Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
```

D. The hello and dead timers are not configured properly.

In OSPF, the hello and dead intervals must match and here we can see the hello interval is set to 5 on R1 and 10 on R2. The dead interval is also set to 20 on R1 but it is 40 on R2.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

60. Refer to the exhibit. 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?



C. 4

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 complete subnets. The four networks will be in the routing table of R1 - 172.16.2.64/30, 172.16.2.228/30, 172.16.2.232/30, and 172.16.3.0/24. Other networks will be learned as “Directly connected” networks (marked with letter “C”).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

61. Which characteristics are representative of a link-state routing protocol?
(Choose three).

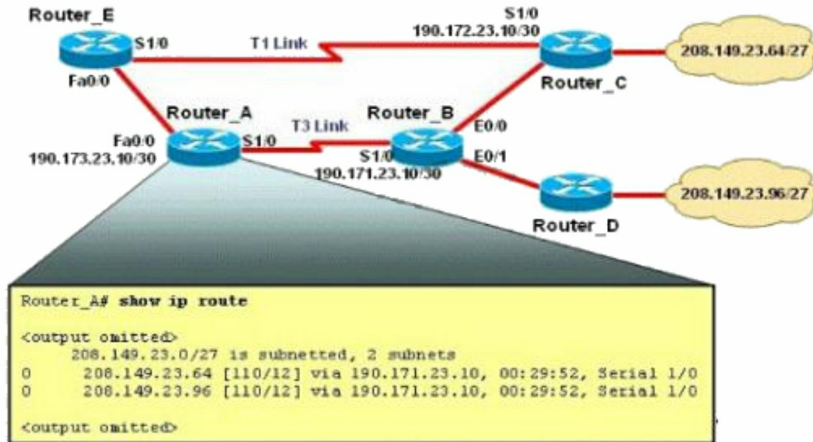
- A. Provides common view of entire topology.**
- C. Calculates shortest path.**
- D. Utilizes event-triggered updates.**

Routers running link-state routing protocol learns paths to all the destinations, generate routing updates only when a change occurs in the network, and a link-state protocol like OSPF uses a Dijkstra algorithm to calculate the shortest path.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301

Chapter 6

62. Refer to the exhibit. The network is converged. After link-state advertisements are received from Router A, what information will Router E contain in its routing table for the subnets 208.149.23.64 and 208.149.23.96?



- A. 208.149.23.64[110/13] via 190.173.23.10, 00:00:07, FastEthernet0/0**
- 208.149.23.96[110/13] via 190.173.23.10, 00:00:16, FastEthernet0/0**

Router E learns two subnets 208.149.23.64 and 208.149.23.96 via Routers A through FastEthernet interface. The interface cost is calculated with the formula $108 / \text{Bandwidth}$. For FastEthernet it is $108 / 100 \text{ Mbps} = 108 / 100,000,000 = 1$. Therefore, the cost is 12 (learned from Routers A) + 1 = 13 for both subnets - B is not correct. The cost through T1 link is much higher than through T3 link (T1 cost = $108 / 1.544 \text{ Mbps} = 64$; T3 cost = $108 / 45 \text{ Mbps} = 2$) so OSPF will choose the path through T3 link. Router E will choose the path from Router A through FastEthernet0/0, not Serial1/0 - C & D are not correct. Eliminate answers B, C and D because they contain at least one subnet learned from Serial1/0.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

63. Which two statements about the OSPF Router ID are true? (Choose two).

A. It identifies the source of a Type 1 LSA.

D. The router automatically chooses the IP address of a loopback as the OSPF Router ID.

LSA Type 1 advertisements are generated by each router for each area it belongs to. They describe the states of the router's link to the area. These are only flooded within a particular area. OSPF routers will choose the highest loopback interface as its OSPF router ID (if available).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

64. What are two benefits of using a single OSPF area network design? (Choose two).

B. It reduces the types of LSAs that are generated.

C. It removes the need for virtual links.

OSPF uses a LSDB (link state database) and fills this with LSAs (link state advertisement). If all routers are in the same area, then many of these LSA types (Summary ASBR LSA, external LSA, etc.) will not be used and will not be generated by any router. All areas in an Open Shortest Path First (OSPF) autonomous system must be physically connected to the backbone area (Area 0). In some cases, where this is not possible, you can use a virtual link to connect to the backbone through a non-backbone area. If all locations are in a single OSPF area this is not needed.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

65. When a router undergoes the exchange protocol within OSPF, in what order does it pass through each state?

B. exstart state > exchange state > loading state > full state

OSPF states for adjacency formation are Down, Init, Attempt, 2-way, Exstart, Exchange, Loading and Full.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

66. Refer to the exhibit. If the router Cisco returns the given output and has not had its router ID set manually, what value will OSPF use as its router ID?

```
Cisco#show ip interface brief
Interface          IP-Address      OK? Method Status  Protocol
FastEthernet0/0    192.168.1.1     YES manual up      up
FastEthernet0/1    172.16.1.1      YES manual up      up
Loopback0          1.1.1.1         YES manual up      up
Loopback1          2.2.2.2         YES manual up      up
Vlan1              unassigned      YES unset  administratively down down
```

D. 2.2.2.2

The Router ID (RID) is an IP address used to identify the router and is chosen using 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, and can be manually assigned. The Router ID uniquely identifies a router in an autonomous system, no two routers in an OSPF autonomous system can have the same router-id.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 6

67. What OSPF command, when configured, will include all interfaces into area 0?

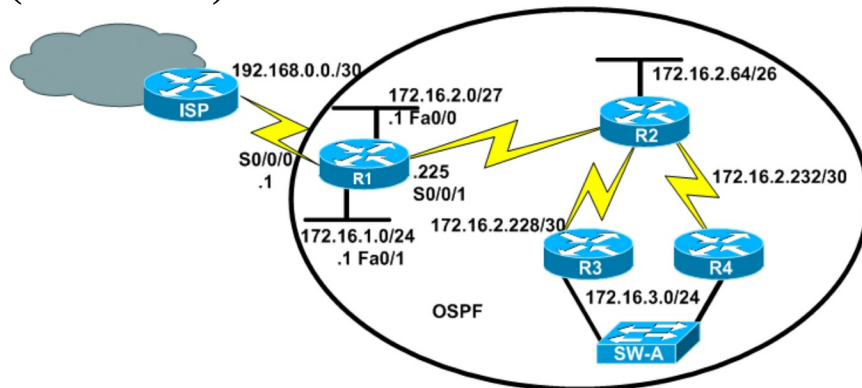
A. network 0.0.0.0 255.255.255.255 area 0

The network command `network 0.0.0.0 255.255.255.255 area 0` dictates that you do not care (255.255.255.255) what the IP address is, but if an IP address is enabled on any interface, place it in area 0.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301

Chapter 6

68. Refer to the exhibit. 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).

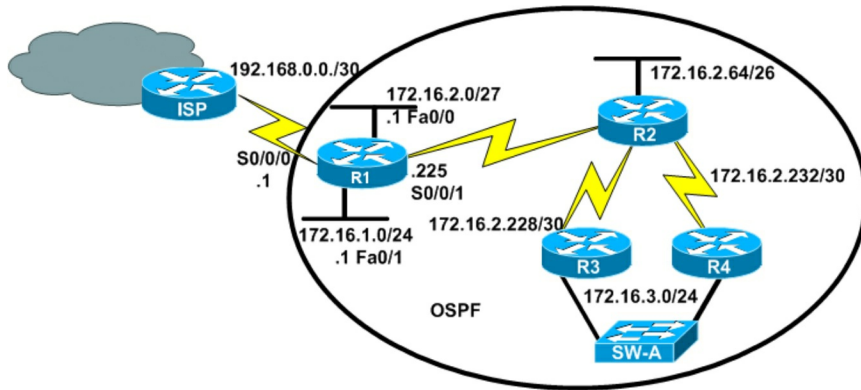


- B. R2(config-if)#bandwidth
- C. R2(config-if)#ip ospf cost

The cost (also called metric) of an interface in OSPF is an indication of the overhead required to send packets across a certain interface. The cost of an interface is inversely proportional to the bandwidth of that interface. A higher bandwidth indicates a lower cost. There is more overhead (higher cost) and time delays involved in crossing a 56k serial line than crossing a 10M Ethernet line. By default, the cost of an interface is calculated based on the bandwidth. You can force the cost of an interface with the `ip ospf cost <value>` interface sub configuration mode command.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

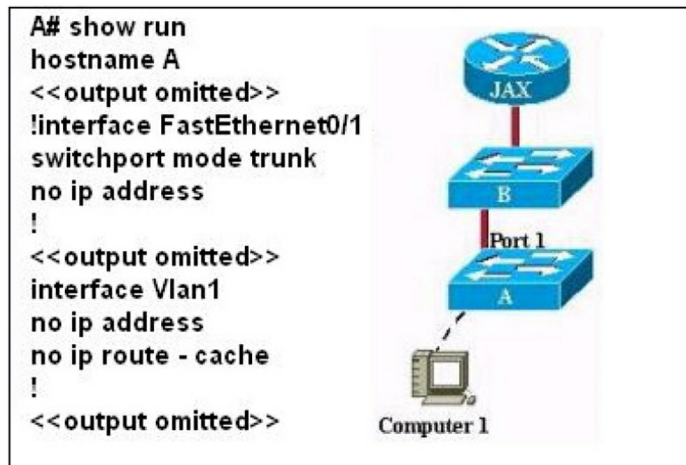
69. Refer to the exhibit. After the network has converged, what type of messaging, if any, occurs between R3 and R4?



B. Hellos are sent every 10 seconds.

HELLO messages are used to maintain adjacent neighbors. When the network is converted, 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 the full database from each router is sent every 30 minutes (not seconds) therefore, C and D are not correct. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 6

70. Refer to the exhibit. Computer 1 is consoled into Switch A. Telnet connections and pings run from the command prompt on Switch A fail. Which of the following could cause this problem?



B. Switch A does not have an IP address

By looking at the output, there is no IP address associated with interface VLAN1. To remote access to a Switch, it must have a management IP address on a VLAN on that switch. Traditionally, we often use VLAN 1 as the management VLAN.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 9

71. Which protocol is the Cisco proprietary implementation of FHRP?

A. HSRP

First Hop Redundancy Protocol (FHRP) is a Cisco routing redundancy designed to allow for transparent fail-over at the first-hop IP router. In HSRP, one router is elected to handle all requests sent to the virtual IP address. With HSRP, this is the active router. An HSRP group has one active router, at least one standby router, and perhaps many listening routers.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

72. What are two requirements for an HSRP group? (Choose two).

- A. Exactly one active router**
- B. One or more standby routers**

In order for two routers to join an HSRP group, one active router and one standby router must be configured.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

73. Which standards-based First Hop Redundancy Protocol is a Cisco supported alternative to Hot Standby Router Protocol?

- A. VRRP**

Virtual Router Redundancy Protocol (VRRP) is one of the First Hop Redundancy Protocols that is supported by Cisco. Unlike HSRP and GLBP (which are Cisco proprietary protocols), VRRP is an industry standard protocol.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

74. Which value to use in HSRP protocol election process?

- C. Priority**

HSRP election is based on a priority value (0 to 255) that is configured on each router in the group. By default, the priority is 100. The router with the highest priority value (255 is highest) becomes the active router for the group. If all router priorities are equal or set to the default value, the router with the highest IP address on the HSRP interface becomes the active router.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

75. Which keyword enables an HSRP router to take the active role immediately when it comes online?

- A. preempt**

If a router in a HSRP group fails, the standby router will become active. If the failing router comes back online, it will become the standby router in the

group. In order to have this router return to the active role, the preempt command is used.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

76. Which three statements about HSRP operation are true? (Choose three).

A. The virtual IP address and virtual address are active on the HSRP Master router.

B. The HSRP default timers are a 3 second hello interval and a 10 second dead interval.

F. HSRP supports up to 255 groups per interface, enabling an administrative form of load balancing.

The virtual MAC address of HSRP version 1 is 0000.0C07.ACxx, where xx is the HSRP group number in hexadecimal based on the respective interface. For example, HSRP group 10 uses the HSRP virtual MAC address of 0000.0C07.AC0A. HSRP version 2 uses a virtual MAC address of 0000.0C9F.FXXX (XXX: HSRP group in hexadecimal).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

77. Which configuration command can you apply to a HSRP router so that its local interface becomes active if all other routers in the group fail?

A. No additional config is required.

When all other routers in the group fail, the local router will not receive any HSRP Hello messages so it will become “active”. The “preempt” command is only useful when the local router receives a HSRP Hello message from the active HSRP router with a lower priority, then the local router will decide to take over the active role.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

78. Which HSRP feature was new in HSRPv2?

A. VLAN group numbers that are greater than 255.

Both HSRP version 1 & version 2 support the preempt command. In HSRP version 1, group numbers are restricted to the range from 0 to 255. HSRP version 2 expands the group number range from 0 to 4095.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

79. Which value is used to determine the active router in an HSRP default configuration?

B. Router IP address

Basic HSRP configuration consists of configuring an IP address on interface (cannot be the same as HSRP virtual IP), enabling the interface, and configure the HSRP group and virtual IP address using the standby command.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

80. Which one of these is a valid HSRP Virtual Mac Address?

A. 0000.0C07.AC15

With HSRP, two or more devices support a virtual router with a fictitious MAC address and unique IP address. There are two version of HSRP. With

HSRP version 1, the virtual routers MAC address is 0000.0c07.ACxx , in which xx is the HSRP group. With HSRP version 2, the virtual MAC address is 0000.0c9f.Fxxx, in which xxx is the HSRP group.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

81. Which protocol advertises a virtual IP address to facilitate transparent failover of a Cisco routing device?

A. FHRP

First Hop Redundancy Protocol (FHRP) is a protocol that enables two or more devices to work together in a group, sharing a single IP address, the virtual IP address. One router is elected to handle all requests sent to the virtual IP address. With HSRP, this is the active router. An HSRP group has one active router and at least one standby router.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

82. Which two options describe benefits of aggregated chassis technology? (Choose two).

C. It requires only one IP address per VLAN.

D. It reduces management overhead.

VSS is a chassis aggregation technology but it is dedicated for Cisco Catalyst 6500 Series Switches. VSS increases operational efficiency by simplifying the network, reducing switch management overhead by at least 50%. It is also a single point of management, IP address, and routing instance for the Cisco Catalyst 6500 virtual switch. Only one gateway IP address is required per VLAN, instead of the three IP addresses per VLAN used today.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

83. Which protocol is the Cisco proprietary implementation of FHRP?

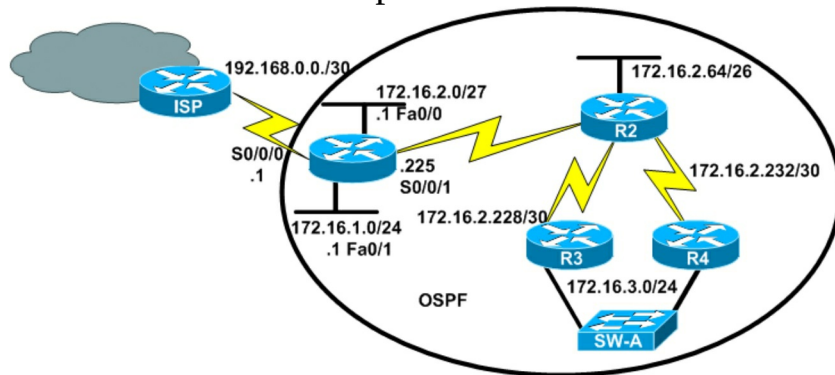
A. HSRP

First Hop Redundancy Protocol (FHRP) is a Cisco routing redundancy designed to allow for transparent fail-over at the first-hop IP router. In HSRP

, one router is elected to handle all requests sent to the virtual IP address. With HSRP, this is the active router. An HSRP group has one active router, at least one standby router, and perhaps many listening routers.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 14

84. Refer to the exhibit. 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

The Router ID (RID) is an IP address used to identify the router, and is chosen using 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.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

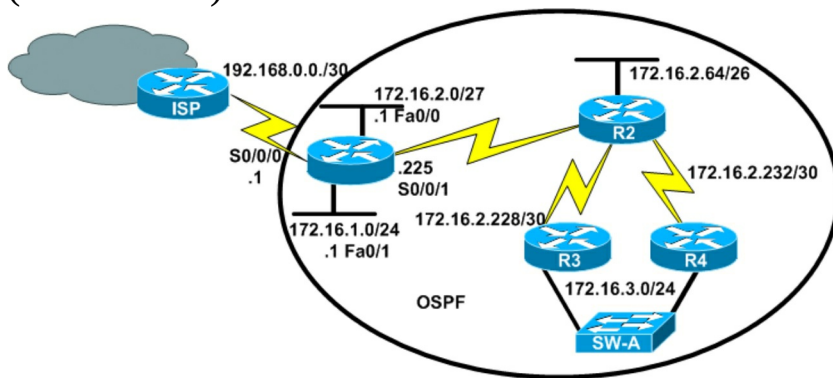
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A. VRRP

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Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 14

86. Refer to the exhibit. 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).



B. R2(config-if)#bandwidth

C. R2(config-if)#ip ospf cost

The cost (also called metric) of an interface in OSPF is an indication of the overhead required to send packets across a certain interface. The cost of an interface is inversely proportional to the bandwidth of that interface. A higher bandwidth indicates a lower cost. There is more overhead (higher cost) and time delays involved in crossing a 56k serial line than crossing a 10M Ethernet line. By default, the cost of an interface is calculated based on the bandwidth. You can force the cost of an interface with the `ip ospf cost <value>` interface sub configuration mode command.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 18

87. Which keyword enables an HSRP router to take the active role immediately when it comes online?

A. preempt

If a router in a HSRP group fails, the standby router will become active. If the failing router comes back online, it will become the standby router in the group. In order to have this router return to the active role, the preempt command is used.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

88. Which three statements about HSRP operation are true? (Choose three).

A. The virtual IP address and virtual address are active on the HSRP Master router.

B. The HSRP default timers are a 3 second hello interval and a 10 second dead interval.

F. HSRP supports up to 255 groups per interface, enabling an administrative form of load balancing.

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Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

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When all other routers in the group fail, the local router will not receive any HSRP Hello messages so it will become “active”. The “preempt” command is only useful when the local router receives a HSRP Hello message from the

active HSRP router with a lower priority, then the local router will decide to take over the active role.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

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Both HSRP version 1 & version 2 support the preempt command. In HSRP version 1, group numbers are restricted to the range from 0 to 255. HSRP version 2 expands the group number range from 0 to 4095.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

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B. Router IP address

Basic HSRP configuration consists of configuring an IP address on interface (cannot be the same as HSRP virtual IP), enabling the interface, and configure the HSRP group and virtual IP address using the standby command.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

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Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

93. Which protocol advertises a virtual IP address to facilitate transparent failover of a Cisco routing device?

A. FHRP

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Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

94. Which two options describe benefits of aggregated chassis technology? (Choose two).

C. It requires only one IP address per VLAN.

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VSS is a chassis aggregation technology but it is dedicated for Cisco Catalyst 6500 Series Switches. VSS increases operational efficiency by simplifying the network, reducing switch management overhead by at least 50%. It is also a single point of management, IP address, and routing instance for the Cisco Catalyst 6500 virtual switch. Only one gateway IP address is required per VLAN, instead of the three IP addresses per VLAN used today.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 14

95. Running both IPv4 and IPv6 on a router simultaneously is known as what?

B. dual-stack routing

Dual stack involves running IPv4 and IPv6 at the same time. End nodes and routers/switches run both protocols, and if IPv6 communication is possible, it is the preferred protocol.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

96. Which command enables IPv6 forwarding on a Cisco router?

B. ipv6 unicast-routing

The first step of enabling IPv6 on a Cisco router is the activation of IPv6

traffic forwarding to forward unicast IPv6 packets between network interfaces. By default, IPv6 traffic forwarding is disabled on Cisco routers. The `ipv6 unicast-routing` command is used to enable the forwarding of IPv6 packets between interfaces on the router. The `ipv6 unicast-routing` command is enabled on a global basis.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

97. Which statement about RIPng is true?

C. RIPng is enabled on each interface separately

The Routing Information Protocol next generation (RIPng) is an interior gateway protocol (IGP) that uses a distance-vector algorithm to determine the best route to a destination, using the hop count as the metric. RIPng is a routing protocol that exchanges routing information used to compute routes and is intended for Internet Protocol version 6 (IPv6)-based networks. RIPng is enabled on each interface separately.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

98. Which IPV6 routing protocol uses multicast group FF02::8 to send updates?

B. IS-IS

IPv6 uses the multicast group FF02::8 for IS-IS routers.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 17

99. Which three approaches can be used while migrating from an IPv4 addressing scheme to an IPv6 scheme? (Choose three).

A. Enable dual-stack routing.

C. Use proxying and translation to translate IPV6 packets into IPV4 packets.

F. Configure IPv4 tunnels between IPv6 islands.

An IPv6 island is a network made of IPv6 links directly connected by IPv6 routers. In the early days of IPv6 deployment, there are many IPv6 islands.

IPv6 in IPv4 tunnels are used to connect those islands together. In each island, one (or more) dual stack routers are designated to encapsulate and decapsulate IPv6 packets within IPv4 packets.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 17

100. Which two statements about IPv6 and routing protocols are true? (Choose two).

- A. Link-local addresses are used to form routing adjacencies.**
- B. OSPFv3 was developed to support IPv6 routing.**

Link-local addresses can be used to form an adjacency. OSPF is an open source routing protocol, v3 was included to support IPv6.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 17

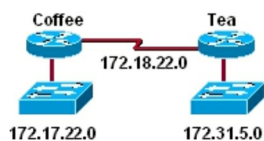
101. A static route of 10.1.1.0 255.255.255.0 fa0/0 was configured on a router. During your connectivity testing, routes are not being learned by the router. What command will remove this configuration?

- D. no ip route 10.1.1.0 255.255.255.0 fa0/0**

To remove a configuration from a Cisco device, use "no" followed by the configuration to be removed.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

102. Users on the 172.17.22.0 network cannot reach the server located on the 172.31.5.0 network. The network administrator connected to router Coffee via the console port, issued the show ip route command, and was able to ping the server. Based on the output of the show ip route command and the topology shown in the graphic, what is the cause of the failure?



```
Coffee#show ip route
Codes: C - connected, S - static, I - IGRP, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is 172.19.22.2 to network 0.0.0.0

C 172.17.22.0 is directly connected, FastEthernet0/0
C 172.18.22.0 is directly connected, Serial0/0
S* 0.0.0.0 [1/0] via 172.19.22.2
```

C. A static route is configured incorrectly.

The default route or the static route was configured with incorrect next-hop ip address 172.19.22.2 The correct ip address will be 172.18.22.2 to reach server located on 172.31.5.0 network. Ip route 0.0.0.0 0.0.0.0 172.18.22.2
Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

103. Why did the device return this message?

```
Router1#show lo
% Ambiguous command: "show lo"
Router1#
```

D. There is more than one show command that starts with the letters lo.

Answer D is correct because when you type the incomplete command it will not autocomplete if there is more than one option for completing the command. In this case, there is another command that also starts with “show lo”.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

104. Refer to the exhibit. A network administrator is troubleshooting a connectivity problem on the serial interfaces. The output from the show interfaces command on both routers shows that the serial interface is up, line protocol is down. Given the partial output for the show running-config in the exhibit, what is the most likely cause of this problem?



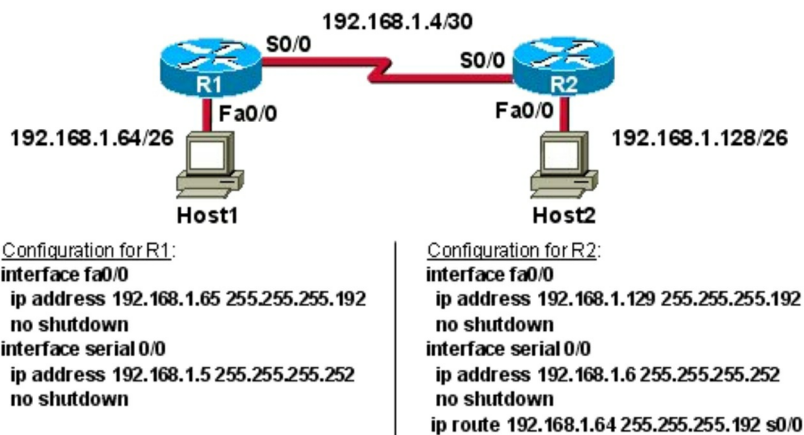
```
Rtr3# show run
Building configuration...
<output omitted>
interface Serial0/0
 ip address 172.16.5.2 255.255.255.252
 no ip proxy-arp
 encapsulation ppp
 mtu 1496
<output omitted>
Rtr3#
```

```
Rtr1# show run
Building configuration...
<output omitted>
interface Serial1/1
 ip address 172.16.5.1 255.255.255.252
 no ip proxy-arp
 mtu 1496
<output omitted>
Rtr1#
```

C. The Layer 2 framing is misconfigured.

Rtr3 is configured to use PPP encapsulation, but, Rtr1 has not been configured for any kind of encapsulation. The default on Cisco router serial interfaces is HDLC, not PPP, so there is an encapsulation mismatch. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

105. Refer to the exhibit. A technician pastes the configurations in the exhibit into the two new routers shown. Otherwise, the routers are configured with their default configurations. A ping from Host1 to Host2 fails, but the technician is able to ping the S0/0 interface of R2 from Host1. The configurations of the hosts have been verified as correct. What is the cause of the problem?



C. R1 has no route to the 192.168.1.128 network.

When a node needs to send data to another node on a network, it must first know where to send it. If the node cannot directly connect to the destination

node, it has to send it via other nodes along a proper route to the destination node. A remote network is a network that can only be reached by sending the packet to another router. Remote networks are added to the routing table using either a dynamic routing protocol or by configuring static routes. Static routes are routes to networks that a network administrator manually configured. Router R1 should have static route for the 192.168.1.128. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

106. Refer to the exhibit. The network administrator has found the following problem. The remote networks 172.16.10.0, 172.16.20.0, and 172.16.30.0 are accessed through the Central router's serial 0/0 interface. No users are able to access 172.16.20.0. After reviewing the command output shown in the graphic, what is the most likely cause of the problem?

```
Central# debug ip rip
```

```
<some output text omitted>
```

```
Central#debug ip rip
```

```
1d00h: RIP: received v1 update from 172.16.100.2 on Serial0/0
```

```
1d00h: 172.16.10.0 in 1 hops
```

```
1d00h: 172.16.20.0 in 1 hops
```

```
1d00h: 172.16.30.0 in 1 hops
```

```
Central# show ip route
```

```
Gateway of last resort is not set
```

```
172.16.0.0/24 is subnetted, 8 subnets
```

```
C 172.16.150.0 is directly connected, FastEthernet0/0
```

```
C 172.16.220.0 is directly connected, Loopback2
```

```
C 172.16.210.0 is directly connected, Loopback1
```

```
C 172.16.200.0 is directly connected, Loopback0
```

```
R 172.16.30.0 [120/1] via 172.16.100.2, 00:00:07, Serial0/0
```

```
S 172.16.20.0 [1/0] via 172.16.150.15
```

```
R 172.16.10.0 [120/1] via 172.16.100.2, 00:00:07, Serial0/0
```

```
C 172.16.100.0 is directly connected, Serial0/0
```

C. incorrect static route for 172.16.20.0

If we use 172.16.20.0 to route to 172.16.150.15, then the packet will route back. To clear this error, we have to use `#no ip route 172.16.20.0 255.255.255.0 172.16.150.15` command in configuration mode.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

107. Refer to the exhibit. A packet with a source IP address of 192.168.2.4 and a destination IP address of 10.1.1.4 arrives at the AcmeB router. What action does the router take?

```
AcmeB# show ip route
!
!
Gateway of last resort is not set
 192.168.3.0/28 is variably subnetted, 6 subnets
D   192.168.3.64 [90/20625671] via 192.168.0.6, 03:17:05, Serial0/01
D   192.168.3.80 [90/20625671] via 192.168.0.6, 03:17:05, Serial0/1
D   192.168.3.32 [90/20625671] via 192.168.9.2, 03:17:05, Serial0/0
D   192.168.3.48 [90/20625671] via 192.168.9.2, 03:17:05, Serial0/0
D   192.168.3.0 [90/30830] via 192.168.2.10, 03:17:05, FastEthernet0/0
D   192.168.3.16 [90/175250] via 192.168.2.10, 03:17:06, FastEthernet0/0
 192.168.9.0/30 is subnetted, 1 subnets
C   192.168.9.0 is directly connected, Serial0/0
 192.168.0.0/30 is subnetted, 1 subnets
C 192.168.0.4 is directly connected, Serial0/1
 192.168.2.0/30 is subnetted, 1 subnets
C 192.168.2.8 is directly connected, FastEthernet0/0
AcmeB#
```

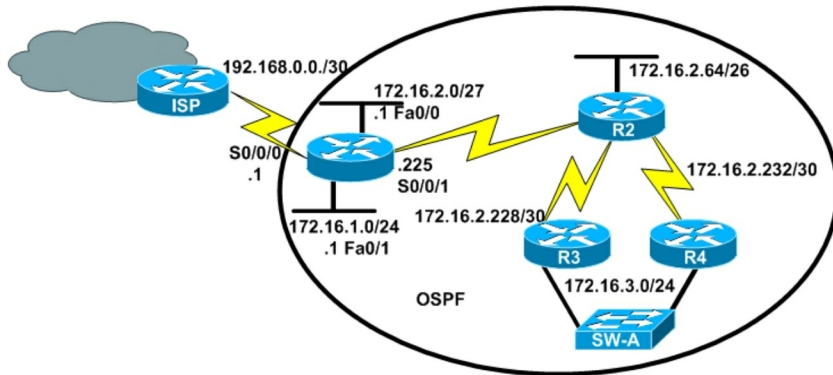
C. forwards a packet containing an ICMP message out the FastEthernet0/0 interface

Looking at the output above, there is no IP route for 10.1.1.4 address on AcmeB routing table. If the router cannot find a specific path in its routing table to a particular route, the router will inform the source host with an

ICMP message that the destination is unreachable and this will be through the same interface it has received the packet.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 18

108. Refer to the exhibit. 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?

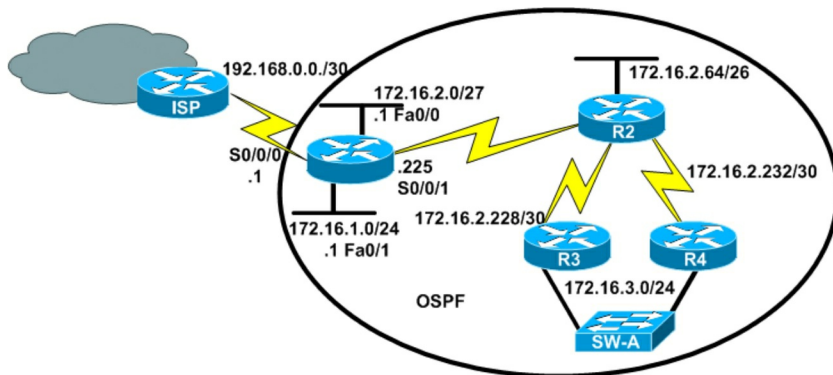


C. 4

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 complete subnets. The four networks will be in the routing table of R1 - 172.16.2.64/30, 172.16.2.228/30, 172.16.2.232/30, and 172.16.3.0/24. Other networks will be learned as “Directly connected” networks (marked with letter “C”).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 18

109. Refer to the exhibit. After the network has converged, what type of messaging, if any, occurs between R3 and R4?



B. Hellos are sent every 10 seconds.

HELLO messages are used to maintain adjacent neighbors. When the network is converted, 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 the full database from each router is sent every 30 minutes (not seconds) therefore, C and D are not correct. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 18

Chapter 4 IP Services

10% 4.0 IP Services

4.1 Configure and verify inside source NAT using static and pools

4.2 Configure and verify NTP operating in a client and server mode

4.3 Explain the role of DHCP and DNS within the network

4.4 Explain the function of SNMP in network operations

4.5 Describe the use of syslog features including facilities and levels

4.6 Configure and verify DHCP client and relay

4.7 Explain the forwarding per-hop behavior (PHB) for QoS such as classification, marking, queuing, congestion, policing, shaping

4.8 Configure network devices for remote access using SSH

4.9 Describe the capabilities and function of TFTP/FTP in the network

1. Which network protocols does DNS use? (Choose two).
 - A. TCP
 - B. TFTP
 - C. FTP
 - D. SCP
 - E. UDP

2. DNS servers provide what service?

- A. They map individual hosts to their specific IP addresses.
- B. Given an IP address, they determine the name of the host that is sought.
- C. They run a spell check on host names to ensure accurate routing.
- D. They convert domain names into IP addresses.

3. Which protocol should be used to establish a secure terminal connection to a remote network device?

- A. SSH
- B. ARP
- C. Telnet
- D. SNMPv2
- E. SNMPv1
- f. WEP

4. Which statement is correct regarding the operation of DHCP?

- A. A DHCP server uses a gratuitous ARP to detect DHCP clients.
- B. If an address conflict is detected, the address is removed from the pool for an amount of time configurable by the administrator.
- C. A DHCP client uses a ping to detect address conflicts.
- D. A DHCP client uses a gratuitous ARP to detect DHCP server.
- E. If an address conflict is detected, the address is removed from the pool and will not be reused until server is rebooted.
- F. If an address conflict is detected, the address is removed from the pool and an administrator must resolve the conflict.

5. Which statement describes the process of dynamically assigning IP addresses by the DHCP server?

- A. Addresses are assigned for a fixed period of time, at the end of the period, a new request for an address must be made.
- B. Addresses are leased to hosts, which periodically contact the DHCP server to renew the lease.
- C. Addresses are permanently assigned so that the hosts use the same address at all time.
- D. Addresses are allocated after a negotiation between the server and the host to determine the length of the agreements.

6. When a DHCP server is configured, which two IP addresses should never be assignable to hosts? (Choose two).

- A. Broadcast address on the network.
- B. Manually assigned address to the clients.
- C. IP address used by the interfaces.
- D. Designated IP address to the DHCP server.
- E. IP address leased to the LAN.
- F. Network or subnetwork IP address.

7. Which two tasks does the Dynamic Host Configuration Protocol perform? (Choose two).

- A. Configure IP address parameters from a DHCP server to a host.
- B. Set the IP gateway to be used by the network.
- C. Perform host discovery by using DHCPDISCOVER messages.
- D. Assign and renew IP addresses from the default pool.
- E. Monitor IP performance using the DHCP server.
- F. Provide an easy management of layer 3 devices.

8. What is the first step in the NAT configuration process?

- A. Define inside and outside interfaces.
- B. Define public and private IP addresses.
- C. Define IP address pools.
- D. Define global and local interfaces.

9. Which of the following are true statements regarding the NAT definition? (Choose two).

- A. Inside local = Name of the inside source address before translation
- B. Outside local = Name of the outside interface address after translation
- C. Inside global = Name of the inside DMZ address host after translation
- D. Outside global = Name of the outside destination host before translation

10. Which two statements about static NAT translations are true? (Choose two).

- A. They are always present in the NAT table
- B. They allow connections to be initiated from the outside
- C. They require no inside or outside interface marking because addresses are statically defined
- D. They can be configured with access-lists, to allow two or more connections to be initiated from the outside

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

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

12. What will happen if a private IP address is assigned to a public interface connected to an ISP?

- A. Addresses in a private range will be not routed on the internet backbone.
- B. Only the ISP router will have the capability to access the public network.
- C. The NAT process will be used to translate this address into a valid IP address.
- D. A conflict of IP addresses happens, because other public routers can use the same range.

13. When is it necessary to use a public IP address on a routing interface?

- A. Connect a router on a local network.
- B. Connect a router to another router.
- C. Allow distribution of routes between networks.
- D. Translate a private IP address.
- E. Connect a network to the internet.

14. What are two benefits of using NAT? (Choose two).

- A. NAT facilitates end-to-end communication when IPsec is enabled.
- B. NAT protects network security because private networks are not advertised.
- C. NAT eliminates the need to re-address all hosts that require external access.
- D. NAT conserves addresses through host MAC-level multiplexing.
- E. NAT accelerates the routing process because no modifications are made on the packets.
- F. Dynamic NAT facilitates connections from the outside network.

15. Identify the advantages of using NAT. (Choose four).

- A. Conserves legally registered addresses.
- B. Translation introduces switching path delays.
- C. Remedies address overlap occurrence.

- D. Causes loss of end-to-end IP traceability.
- E. Increases flexibility when connecting to the internet.
- F. Certain applications will not function with NAT enabled.
- G. Eliminates address renumbering as network changes.

16. Identify the disadvantages of using NAT. (Choose three).

- A. Conserves legally registered addresses.
- B. Translation introduces switching path delays.
- C. Remedies address overlap occurrence.
- D. Causes loss of end-to-end IP traceability.
- E. Increases flexibility when connecting to the internet.
- F. Certain applications will not function with NAT enabled.
- G. Eliminates address renumbering as network changes.

17. Identify the different types of NAT. (Choose three).

- A. Dynamic
- B. Auto-configure
- C. Global
- D. Static
- E. Overload

18. Which of the following are true statements regarding the NAT definition? (Choose two).

- A. Inside global = Name of the inside host after translation.
- B. Inside local = Name of the inside DMZ address before translation.
- C. Outside local = Name of the destination host after translation.
- D. Outside global = Name of the outside DMZ address before translation.

19. When using NAT Overload (PAT), all inside hosts get translated into what?

- A. One single IP address
- B. Outside global IP address
- C. Inside local IP address
- D. One private IP address

20. Identify the correct static NAT configuration.

- A. ip nat inside static source 10.1.1.1 170.46.2.2
- B. ip nat inside source static 10.1.1.1 170.46.2.2
- C. ip nat static 10.1.1.1 170.46.2.2

D. ip nat inside source 10.1.1.1 170.46.2.2 static

21. What command will display NAT translations on your router?

- A. show ip nat
- B. show ip nat /all
- C. show ip nat translations
- D. show ip nat transactions

22. What command will display a summary of the NAT configuration and number of active translation types on your router?

- A. show ip nat
- B. debug ip nat translations
- C. debug ip nat
- D. show ip nat statistics

23. Which command can you enter to display the hits counter for NAT traffic?

- A. show ip nat statistics
- B. debug ip nat
- C. show ip debug nat
- D. clear ip nat statistics

24. Which NAT function can map multiple inside addresses to a single outside address?

- A. PAT
- B. SFTP
- C. RARP
- D. ARP
- E. TFTP

25. What command will clear your NAT entries from the translation table?

- A. clear ip nat
- B. clear ip nat /all
- C. clear ip nat translations
- D. clear ip nat translations *

26. What statement can you use instead of the *netmask* command?

- A. mask
- B. prefix-length

- C. subnet
- D. subnetmask

27. Which of the following would be a good starting point for troubleshooting if your router is not translating?

- A. Reload
- B. Run debug
- C. Check the interfaces for the correct configuration.
- D. Change the pool name.

28. What does the asterisk (*) represent in the following output?

```
NAT*: s=172.16.2.2, d=192.168.2.1->10.1.1.1 [1]
```

- A. The packet was destined for a local interface on the router
- B. The packet was translated and fast switched to the destination
- C. The packet attempted to be translated but failed
- D. The packet was translated but there was no response from the remote host

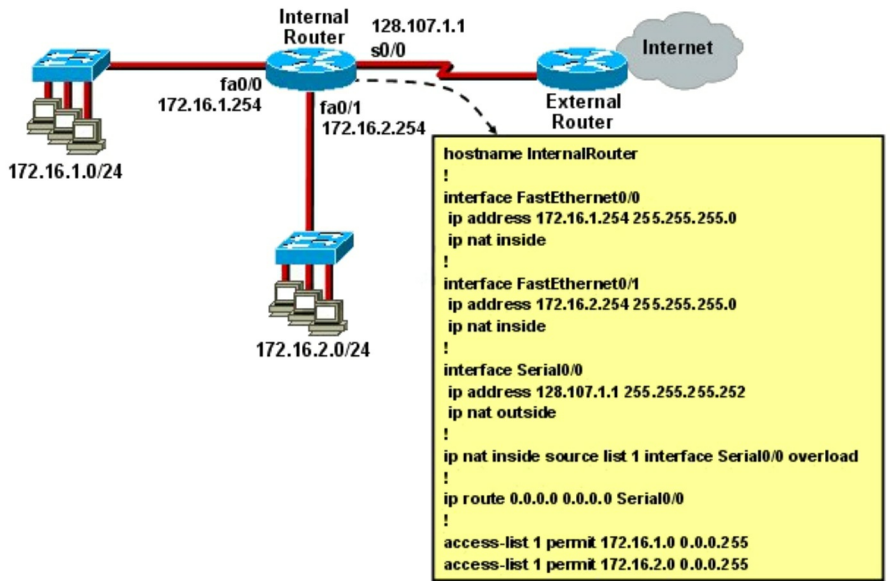
29. What happens when computers on a private network attempt to connect to the Internet through a Cisco router running PAT?

- 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.

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

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

31. Refer to the exhibit. What statement is true of the configuration for this network?



- A. The configuration that is shown provides inadequate outside address space for translation of the number of inside addresses that are supported.
- B. Because of the addressing on interface FastEthernet0/1, the Serial0/0 interface address will not support the NAT configuration as shown.
- C. The number 1 referred to in the ip nat inside source command references access-list number 1.
- D. External Router must be configured with static routes to networks 172.16.1.0/24 and 172.16.2.0/24.

32. How many addresses will be available for dynamic NAT translation when a router is configured with the following commands?

Router(config)#ip nat pool TAME 209.165.201.23 209.165.201.30 netmask

255.255.255.224

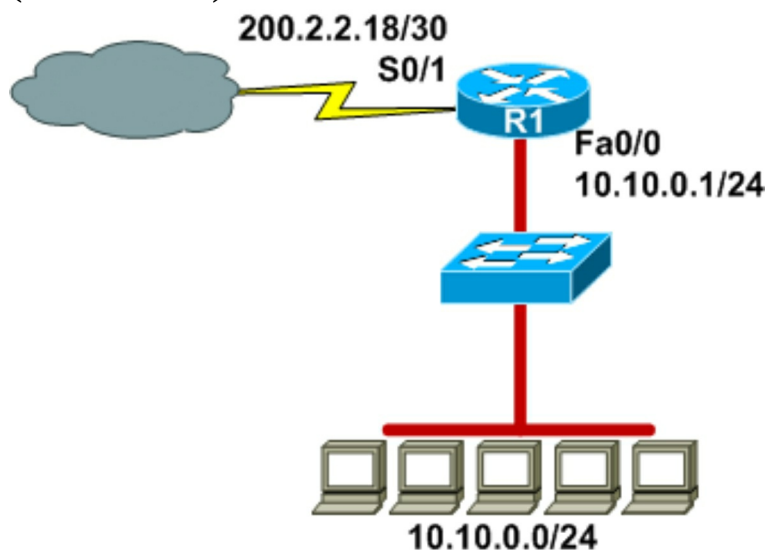
Router(config)#ip nat inside source list 9 pool TAME

- A. 7
- B. 8
- C. 9
- D. 10
- E. 24
- f. 32

33. What does the "Inside Global" address represent in the configuration of NAT?

- A. The summarized address for all of the internal subnetted addresses.
- B. The MAC address of the router used by inside hosts to connect to the Internet.
- C. A globally unique, private IP address assigned to a host on the inside network.
- D. A registered address that represents an inside host to an outside network.

34. Refer to the exhibit. A company wants to use NAT in the network shown. Which commands will apply the NAT configuration to the proper interfaces? (Choose two).



A. R1(config)# interface serial0/1
R1(config-if)# ip nat inside

B. R1(config)# interface serial0/1
R1(config-if)# ip nat outside

C. R1(config)# interface fastethernet0/0
R1(config-if)# ip nat inside

D. R1(config)# interface fastethernet0/0
R1(config-if)# ip nat outside

E. R1(config)# interface serial0/1
R1(config-if)# ip nat outside source pool 200.2.2.18 255.255.255.252

F. R1(config)# interface fastethernet0/0
R1(config-if)# ip nat inside source 10.10.0.0 255.255.255.0

35. Which technology allows a large number of private IP addresses to be represented by a smaller number of public IP addresses?

- A. NAT
- B. NTP
- C. RFC 1631
- D. RFC 1918

36. What is the effect of the overload keyword in a static NAT translation configuration?

- A. It enables port address translation.
- B. It enables the use of a secondary pool of IP addresses when the first pool is depleted.
- C. It enables the inside interface to receive traffic.
- D. It enables the outside interface to forward traffic.

37. Which two types of NAT addresses are used in a Cisco NAT device? (Choose two).

- A. inside local
- B. inside global
- C. inside private
- D. outside private
- E. external global

F. external local

38. What is the danger of the permit any entry in a NAT access list?

- A. It can lead to overloaded resources on the router.
- B. It can cause too many addresses to be assigned to the same interface.
- C. It can disable the overload command.
- D. It prevents the correct translation of IP addresses on the inside network.

39. Which type of address is the public IP address of a NAT device?

- A. outside global
- B. outside local
- C. inside global
- D. inside local
- E. outside public
- F. inside public

40. Of the following, identify the term that is a collection of information that's organized hierarchically and can be accessed by protocols like SNMP.

- A. Management database (MDB)
- B. Information management database (IMD)
- C. Management Information Base (MIB)
- D. Management database information (MDI)

41. You want to send a console message to a syslog server, but you only want to send status messages of 6 and lower. Which of the following commands will you use?

- A. logging trap alerts
- B. logging trap errors
- C. logging trap debugging
- D. logging trap notifications
- E. logging trap informational

42. What are three components that comprise the SNMP framework?
(Choose three).

- A. MIB
- B. agent
- C. set
- D. AES
- E. supervisor

F. manager

43. What SNMP message alerts the manager to a condition on the network?

- A. response
- B. get
- C. trap
- D. capture

44. What authentication type is used by SNMPv2?

- A. HMAC-MD5
- B. HMAC-SHA
- C. CBC-DES
- D. community strings

45. Which three statements about the features of SNMPv2 and SNMPv3 are true? (Choose three).

- A. SNMPv3 enhanced SNMPv2 security features.
- B. SNMPv3 added the Inform protocol message to SNMP.
- C. SNMPv2 added the Inform protocol message to SNMP.
- D. SNMPv3 added the GetBulk protocol messages to SNMP.
- E. SNMPv2 added the GetBulk protocol message to SNMP.
- F. SNMPv2 added the GetNext protocol message to SNMP.

46. Which three statements about Syslog utilization are true? (Choose three).

- A. Utilizing Syslog improves network performance.
- B. The Syslog server automatically notifies the network administrator of network problems.
- C. A Syslog server provides the storage space necessary to store log files without using router disk space.
- D. There are more Syslog messages available within Cisco IOS than there are comparable SNMP trap messages.
- E. Enabling Syslog on a router automatically enables NTP for accurate time stamping.
- F. A Syslog server helps in aggregation of logs and alerts.

47. What is the default Syslog facility level?

- A. local4
- B. local5
- C. local6

D. local7

48. What command instructs the device to timestamp Syslog debug messages in milliseconds?

- A. service timestamps log datetime localtime
- B. service timestamps debug datetime msec
- C. service timestamps debug datetime localtime
- D. service timestamps log datetime msec

```
*Mar 01, 00:37:57.3737: %SYS-5-CONFIG_I: Configured from console by console
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 10.10.11.2 (FastEthernet0/1) is down: interface down
```

49. Refer to the exhibit. What is the cause of the Syslog output messages?

- A. The EIGRP neighbor on Fa0/1 went down due to a failed link.
- B. The EIGRP neighbor connected to Fa0/1 is participating in a different EIGRP process, causing the adjacency to go down.
- C. A shut command was executed on interface Fa0/1, causing the EIGRP adjacency to go down.
- D. Interface Fa0/1 has become error disabled, causing the EIGRP adjacency to go down.

50. What are the popular destinations for syslog messages to be saved? (Choose three).

- A. Flash
- B. The logging buffer .RAM
- C. The console terminal
- D. Other terminals
- E. Syslog server

51. Which protocol can cause overload on a CPU of a managed device?

- A. Netflow
- B. WCCP
- C. IP SLA
- D. SNMP

52. What is the alert message generated by SNMP agents called? (Choose two).

- A. TRAP
- B. INFORM
- C. GET
- D. SET

53. Which three features are added in SNMPv3 over SNMPv2? (Choose three).

- A. Message Integrity
- B. Compression
- C. Authentication
- D. Encryption
- E. Error Detection

54. Syslog was configured with a level 3 trap. Which types of logs would be generated? (Choose four).

- A. Emergencies
- B. Warnings
- C. Alerts
- D. Errors
- E. Critical

55. Refer to the exhibit. What three actions will the switch take when a frame with an unknown source MAC address arrives at the interface? (Select three).

```
Switch# show port-security interface fa0/20
Port Security           : Enabled
Port Status             : Secure-up
Violation Mode          : Restrict
Aging Time              : 3 mins
Aging Type               : Inactivity
SecureStatic Address Aging : Disabled
Maximum MAC Addresses   : 2
Total MAC Addresses     : 2
Configured MAC Addresses : 0
Sticky MAC Addresses    : 2
Last Source Address:Vlan : 0009.7C10.8E8C:50
Security Violation Count : 1
```

- A. Send an SNMP trap.
- B. Send a syslog message.
- C. Increment the Security Violation counter.
- D. Forward the traffic.
- E. Write the MAC address to the startup-config.
- F. Shut down the port.

Chapter 4 Answers

1. Which network protocols does DNS use? (Choose two).

- A. TCP**
- E. UDP**

DNS can use either the User Datagram Protocol (UDP) or Transmission Control Protocol (TCP) with a destination port of 53.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 3

2. DNS servers provide what service?

- D. They convert domain names into IP addresses.**

DNS, which stands for domain name system, is an Internet service that translates domains names into IP addresses.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 3

3. Which protocol should be used to establish a secure terminal connection to a remote network device?

- A. SSH**

Telnet sends everything in clear text, so Secure Shell (port22) is recommended instead.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 3

4. Which statement is correct regarding the operation of DHCP?

F. If an address conflict is detected, the address is removed from the pool and an administrator must resolve the conflict.

An address conflict occurs when two hosts use the same IP address. During address assignment, DHCP checks for conflicts using ping and gratuitous ARP. If a conflict is detected, the address is removed from the pool. The address will not be assigned until the administrator resolves the conflict. Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301 Chapter 3

5. Which statement describes the process of dynamically assigning IP addresses by the DHCP server?

B. Addresses are leased to hosts, which periodically contact the DHCP server to renew the lease.

After a host receives a lease from a DHCP server, the host will contact the server every 33% of the lease time to renew the lease.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301 Chapter 3

6. When a DHCP server is configured, which two IP addresses should never be assignable to hosts? (Choose two).

A. Broadcast address on the network.

Your subnet and broadcast addresses can never be valid hosts, which is why we always minus two (-2) when calculating the number of hosts for a subnet.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301 Chapter 3

7. Which two tasks does the Dynamic Host Configuration Protocol perform? (Choose two).

A. Configure IP address parameters from a DHCP server to a host.

F. Provide an easy management of layer 3 devices.

The Dynamic Host Configuration Protocol (DHCP) is a network protocol

used to configure devices that are connected to a network so they can communicate on that network using the Internet Protocol (IP). It involves clients and a server operating in a client-server model. DHCP servers assigns IP addresses from a pool of addresses and also assigns other parameters such as DNS and default gateways to hosts.

Reference: CCNA Certification Study Guide, Volume 1: Exam 200-301
Chapter 3

8. What is the first step in the NAT configuration process?

A. Define inside and outside interfaces.

The first step in configuring NAT is to designate the inside and outside interfaces. The next configuration depends on whether you are configuring static NAT, dynamic NAT, or NAT Overload (PAT).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

9. Which of the following are true statements regarding the NAT definition? (Choose two).

A. Inside local = Name of the inside source address before translation.

D. Outside global = Name of the outside destination host before translation.

Cisco defines these terms as:

Inside local address—The IP address assigned to a host on the inside network. This is the address configured as a parameter of the computer OS or received via dynamic address allocation protocols such as DHCP. The address is likely not a legitimate IP address assigned by the Network Information Center (NIC) or service provider.

Inside global address—A legitimate IP address assigned by the NIC or service provider that represents one or more inside local IP addresses to the outside world.

Outside local address—The IP address of an outside host as it appears to the inside network. Not necessarily a legitimate address, it is allocated from an

address space routable on the inside.

Outside global address—The IP address assigned to a host on the outside network by the host owner. The address is allocated from a globally routable address or network space.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

10. Which two statements about static NAT translations are true? (Choose two).

A. They are always present in the NAT table.

B. They allow connections to be initiated from the outside.

With static NAT, translations exist in the NAT translation table as soon as you configure the static NAT command(s), and they remain in the translation table until you delete the static NAT command(s). With dynamic NAT, translations do not exist in the NAT table until the router receives traffic that requires translation. Dynamic translations have a timeout period after which they are purged from the translation table. Because static NAT translations are always present in the NAT table so outside hosts can initiate the connection without being dropped.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

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

C. Multiple internal hosts will use one IP address to access external network resources.

By adding the keyword “overload” at the end of a NAT statement, NAT becomes PAT (Port Address Translation). This is also a kind of dynamic NAT that maps multiple private IP addresses to a single public IP address (many-to-one) by using different ports.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

12. What will happen if a private IP address is assigned to a public interface connected to an ISP?

A. addresses in a private range will be not routed on the internet backbone.

By default, routers do not forward any traffic from the private IP range as defined by RFC 1918. Addresses in the 10/8, 172.16/12, and 192.16/16 will not be routed to an interface with a public IP address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

13. When is it necessary to use a public IP address on a routing interface?

E. Connect a network to the internet.

Private IP addresses were designed to conserve global IP address, provide privacy for corporate/home networks, but they cannot be routed through the internet, which was the idea, so NAT needs to be configured to allow access to the Internet from the private network. However, with that said, you need to have at least one public address on your router interface to your ISP in order to perform NAT.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

14. What are two benefits of using NAT? (Choose two).

B. NAT protects network security because private networks are not advertised.

C. NAT eliminates the need to re-address all hosts that require external access.

By not revealing the internal IP addresses, NAT adds some security to the inside network. By allocating specific public IP addresses to inside hosts, NAT eliminates the need to re-address the inside hosts.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

15. Identify the advantages of using NAT. (Choose four).

A. Conserves legally registered addresses.

C. Remedies address overlap occurrence.

E. Increases flexibility when connecting to the internet.

G. Eliminates address renumbering as network changes.

The main advantage of NAT (Network Address Translation) is that it can prevent the depletion of IPv4 addresses. NAT (Network Address Translation) can provide an additional layer of security by making the original source and destination addresses hidden. NAT (Network Address Translation) provides increased flexibility when connecting to the public Internet. NAT (Network Address Translation) allows to use your own private IPv4 addressing system and prevent the internal address changes if you change the service provider.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

16. Identify the disadvantages of using NAT. (Choose three).

B. Translation introduces switching path delays.

D. Causes loss of end-to-end IP traceability.

F. Certain applications will not function with NAT enabled.

NAT (Network Address Translation) is a processor and memory resource consuming technology, since NAT (Network Address Translation) need to translate IPv4 addresses for all incoming and outgoing IPv4 datagrams and to keep the translation details in memory. NAT (Network Address Translation) may cause delay in IPv4 communication, and loss of end-device to end-device IP traceability. Some technologies and network applications will not function as expected in a NAT (Network Address Translation) configured network.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

17. Identify the different types of NAT. (Choose three).

A. Dynamic

D. Static

E. Overload

Dynamic NAT - private IP addresses are mapped to the pool of public IP addresses. Static NAT - translates one private IP address to a public one. The public IP address is always the same. NAT Overload – one public IP address is used for all internal devices, but a different port is assigned to each private IP address.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

18. Which of the following are true statements regarding the NAT definition?
(Choose two).

- A. Inside global = Name of the inside host after translation.**
- C. Outside local = Name of the destination host after translation.**

Cisco defines these terms as:

Inside local address—The IP address assigned to a host on the inside network. This is the address configured as a parameter of the computer OS or received via dynamic address allocation protocols such as DHCP. The address is likely not a legitimate IP address assigned by the Network Information Center (NIC) or service provider.

Inside global address—A legitimate IP address assigned by the NIC or service provider that represents one or more inside local IP addresses to the outside world.

Outside local address—The IP address of an outside host as it appears to the inside network. Not necessarily a legitimate address, it is allocated from an address space routable on the inside.

Outside global address—The IP address assigned to a host on the outside network by the host owner. The address is allocated from a globally routable address or network space.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

19. When using NAT Overload (PAT), all inside hosts get translated into what?

- A. One single IP address**

NAT Overloading or Port Address Translation (PAT) is a modified form of dynamic NAT where the number of inside local addresses is greater than the number of inside global addresses. Mostly, there is just a single inside global IP address providing Internet access to all inside hosts.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301

Chapter 11

20. Identify the correct static NAT configuration.

B. ip nat inside source static 10.1.1.1 170.46.2.2

The correct syntax to configure static NAT - switch(config)# ip nat inside source static local-ip-address global-ip-address [group group-id], which will configure static NAT to translate the inside global address to the inside local address or to translate the inside local traffic to the inside global traffic.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

21. What command will display NAT translations on your router?

C. show ip nat translations

To determine that NAT is working correctly, use the "show ip nat translation" command to verify that translations exist in the translation table.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

22. What command will display a summary of the NAT configuration and number of active translation types on your router?

D. show ip nat statistics

The "show ip nat statistics" command displays a summary of the NAT configuration as well as counts of active translation types, hits to an existing mapping, misses (causing an attempt to create a mapping), and expired translations.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

23. Which command can you enter to display the hits counter for NAT traffic?

A. show ip nat statistics

The command show ip statistics will display information on which interfaces use NAT, how many entries are in the NAT table, how often they have been used, and, most importantly, how often packets have bypassed NAT.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

24. Which NAT function can map multiple inside addresses to a single outside address?

A. PAT

PAT (Port Address Translation) is a kind of dynamic NAT that maps multiple private IP addresses to a single public IP address (many-to-one) by using different ports.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

25. What command will clear your NAT entries from the translation table?

D. clear ip nat translations *

The command "clear ip nat translations *" will clear all the active NAT entries in your translation table.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

26. What statement can you use instead of the *netmask* command?

B. prefix-length

If a subnet mask is in dotted decimal version of the binary subnet mask, the prefix length is a shorthand way of expressing the subnet mask. The prefix length is the number of bits set in the subnet mask. If the subnet mask is 255.255.255.0, there are 24 bits in the binary version of the subnet mask, so the prefix length is 24 bits.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

27. Which of the following would be a good starting point for troubleshooting if your router is not translating?

C. check the interfaces for the correct configuration

In order for NAT to provide translation services, you must have IP NAT inside and IP NAT outside configured on the router's interfaces.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

28. What does the asterisk (*) represent in the following output?

```
NAT*: s=172.16.2.2, d=192.168.2.1->10.1.1.1 [1]
```

B. The packet was translated and fast switched to the destination.

Fast switching allows higher throughput by switching a packet using a cache created by the initial packet sent to a particular destination. Destination addresses are stored in the high-speed cache to expedite forwarding.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

29. 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.

Static PAT translations allow a specific UDP or TCP port on a global address to be translated to a specific port on a local address. Static PAT is the same as static NAT, except that it enables you to specify the protocol (TCP or UDP) and port for the real and mapped addresses. Static PAT enables you to identify the same mapped address across many different static statements, provided that the port is different for each statement. You cannot use the same mapped address for multiple static NAT statements. Port Address Translation makes the PC connect to the Internet but using different TCP source port.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

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

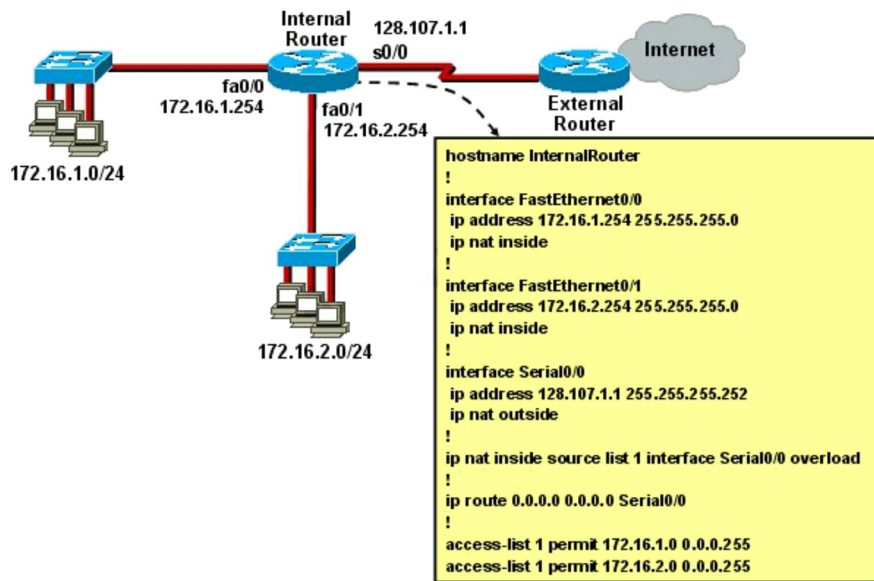
D. outside

A local address is any address that appears on the inside portion of the company network. —A global address is any address that appears on the

outside portion of the network (Internet).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

31. Refer to the exhibit. What statement is true of the configuration for this network?



C. The number 1 referred to in the ip nat inside source command references access-list number 1.

The “list 1” refers to the access-list number 1.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

32. How many addresses will be available for dynamic NAT translation when a router is configured with the following commands?

```
Router(config)#ip nat pool TAME 209.165.201.23 209.165.201.30 netmask  
255.255.255.224
```

```
Router(config)#ip nat inside source list 9 pool TAME
```

B. 8

The address range of 209.165.201.23 to 209.165.201.30 provides for 8 addresses.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 11

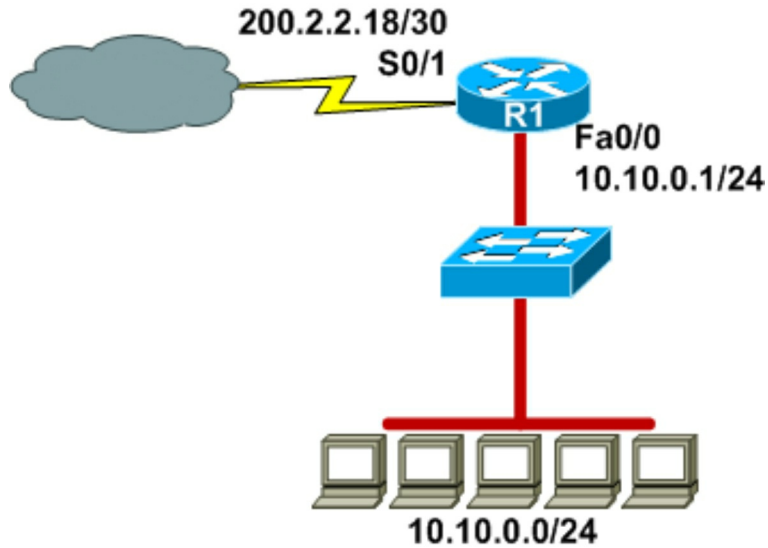
33. What does the "Inside Global" address represent in the configuration of NAT?

D. A registered address that represents an inside host to an outside network.

Cisco defines these address types - Inside local address—The IP address assigned to a host on the inside network. Inside global address—A legitimate IP address assigned by the NIC or service provider that represents one or more inside local IP addresses to the outside world. Outside local address—The IP address of an outside host as it appears to the inside network. Outside global address—The IP address assigned to a host on the outside network by the host owner. The address is allocated from a globally routable address or network space.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 11

34. Refer to the exhibit. A company wants to use NAT in the network shown. Which commands will apply the NAT configuration to the proper interfaces? (Choose two).



**B. R1(config)# interface serial0/1
R1(config-if)# ip nat outside**

**C. R1(config)# interface fastethernet0/0
R1(config-if)# ip nat inside**

For NAT, you need to define which interfaces are inside and which are outside. The outside interface is the one that connects to the external network, and the one that will be used for translating addresses. The inside interface is for the internal network, and defines the network IP addresses that will get translated to the one specified in the outside network.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

35. Which technology allows a large number of private IP addresses to be represented by a smaller number of public IP addresses?

A. NAT

Network Address Translation (NAT) is the process where a network device assigns a public address to a computer (or group of computers) inside a private network.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

36. What is the effect of the overload keyword in a static NAT translation configuration?

A. It enables port address translation.

NAT Overload (aka Port Address Translation) takes a Static or Dynamic IP Address that is bound to the public interface of the gateway (this could be a PC, router or firewall appliance) and allows all PCs within the private network to access the Internet. NAT Overload overcomes this limitation by using one public IP Address for all private hosts, but utilizing the thousands of ports available in order to identify each private host's session.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

37. Which two types of NAT addresses are used in a Cisco NAT device? (Choose two).

A. inside local

B. inside global

Cisco defines these address types - Inside local address—The IP address assigned to a host on the inside network. Inside global address—A legitimate IP address assigned by the NIC or service provider that represents one or more inside local IP addresses to the outside world. Outside local address—The IP address of an outside host as it appears to the inside network. Outside global address—The IP address assigned to a host on the outside network by the host owner. The address is allocated from a globally routable address or network space.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

38. What is the danger of the permit any entry in a NAT access list?

A. It can lead to overloaded resources on the router.

Using permit any can result in NAT consuming too many router resources, which can cause network problems. You should only limit the NAT access list to a specific range of IP addresses.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

39. Which type of address is the public IP address of a NAT device?

C. inside global

Cisco defines these address types - Inside local address—The IP address assigned to a host on the inside network. Inside global address—A legitimate IP address assigned by the NIC or service provider that represents one or more inside local IP addresses to the outside world. Outside local address—The IP address of an outside host as it appears to the inside network. Outside global address—The IP address assigned to a host on the outside network by the host owner. The address is allocated from a globally routable address or network space.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 11

40. Of the following, identify the term that is a collection of information that's organized hierarchically and can be accessed by protocols like SNMP.

C. Management Information Base (MIB)

The Management Information Base (MIB) collects information such as Loss of Signal Alarm Thresholds, about the network. MIBs consist of managed objects that are identified by object identifiers (OIDs). An MIB supplies the pertinent attributes of a device. Some attributes are fixed in the MIB while others are dynamic values calculated by the agent software running on the device.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

41. You want to send a console message to a syslog server, but you only want to send status messages of 6 and lower. Which of the following commands will you use?

E. logging trap informational

The syslog levels and descriptions are as follows:

- 0-Emergency system is unusable
- 1-Alert action must be taken immediately
- 2-Critical Critical conditions
- 3-Error Error conditions
- 4-Warning Warning conditions
- 5-Notice normal but significant condition
- 6-Informational Informational message
- 7-Debug Debug-level message

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

42. What are three components that comprise the SNMP framework?
(Choose three).

- A. MIB**
- B. agent**
- F. manager**

The SNMP framework consists of three parts, the SNMP manager - The system used to control and monitor the activities of network devices, An SNMP agent - the software component within the managed device that maintains the data for the device and reports these data, as needed, to managing systems, and the managed information base (MIB) - the collection of managed objects on the SNMP agent.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

43. What SNMP message alerts the manager to a condition on the network?

C. trap

Traps are messages alerting the SNMP manager to a condition on the network. Traps can mean improper user authentication, restarts, link status (up or down), MAC address tracking, closing of a TCP connection, loss of connection to a neighbor, or other significant events.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

44. What authentication type is used by SNMPv2?

D. community strings

Cisco IOS software supports the following versions of SNMP:

SNMPv1 - The Simple Network Management Protocol: A Full Internet Standard, defined in RFC 1157. (RFC 1157 replaces the earlier versions that were published as RFC 1067 and RFC 1098.) Security is based on community strings.

SNMPv2c - The community-string based Administrative Framework for SNMPv2. SNMPv2c (the "c" stands for "community") is an Experimental Internet Protocol defined in RFC 1901, RFC 1905, and RFC 1906. SNMPv2c is an update of the protocol operations and data types of SNMPv2p (SNMPv2 Classic), and uses the community-based security model of SNMPv1.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 12

45. Which three statements about the features of SNMPv2 and SNMPv3 are true? (Choose three).

A. SNMPv3 enhanced SNMPv2 security features.

C. SNMPv2 added the Inform protocol message to SNMP.

E. SNMPv2 added the GetBulk protocol message to SNMP.

SNMPv1/v2 can neither authenticate the source of a management message nor provide encryption. Without authentication, it is possible for nonauthorized users to exercise SNMP network management functions. It is also possible for nonauthorized users to eavesdrop on management information as it passes from managed systems to the management system. Because of these deficiencies, many SNMPv1/v2 implementations are limited to simply a read-only capability, reducing their utility to that of a network monitor; no network control applications can be supported.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 12

46. Which three statements about Syslog utilization are true? (Choose three).

C. A Syslog server provides the storage space necessary to store log files without using router disk space.

D. There are more Syslog messages available within Cisco IOS

than there are comparable SNMP trap messages.

F. A Syslog server helps in aggregation of logs and alerts.

The Syslog sender sends a small (less than 1KB) text message to the Syslog receiver. Syslog messages can be sent via UDP (port 514) and/or TCP (typically, port 5000). A Syslog server provides the storage space necessary to store log files without using router disk space. In general, there are significantly more Syslog messages available within IOS as compared to SNMP Trap messages. Logging to a central syslog server helps in aggregation of logs and alerts. Cisco devices can send their log messages to a UNIX-style syslog service. A syslog service accepts messages and stores them in files, or prints them according to a simple configuration file. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 12

47. What is the default Syslog facility level?

D. local7

The facility to which the message refers (for example, SNMP, SYS, and so forth). A facility can be a hardware device, a protocol, or a module of the system software. It denotes the source or the cause of the system message. The default is local7.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 12

48. What command instructs the device to timestamp Syslog debug messages in milliseconds?

B. service timestamps debug datetime msec

Enable millisecond (msec) timestamps using the service timestamps command: `router(config)#service timestamps debug datetime msec`
`router(config)#service timestamps log datetime msec`

The `service timestamps debug` command configures the system to apply a time stamp to debugging messages. The time-stamp format for `datetime` is `MMM DD HH:MM:SS`, where `MMM` is the month, `DD` is the date, `HH` is the hour (in 24-hour notation), `MM` is the minute, and `SS` is the second. With the additional keyword `msec`, the system includes milliseconds in the time stamp, in the format `HH:DD:MM:SS.mmm`, where `.mmm` is milliseconds.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

```
*Mar 01, 00:37:57.3737: %SYS-5-CONFIG_I: Configured from console by console
%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to administratively down
%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to down
%DUAL-5-NBRCHANGE: IP-EIGRP 1: Neighbor 10.10.11.2 (FastEthernet0/1) is down: interface down
```

49. Refer to the exhibit. What is the cause of the Syslog output messages?

C. A shut command was executed on interface Fa0/1, causing the EIGRP adjacency to go down.

The first lines of the message show that a configuration change was made, and that the fa0/1 interface changed to a state of administratively down. This can only be done by issuing the shutdown command. The last line indicates that this caused an EIGRP neighbor adjacency to go down.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

50. What are the popular destinations for syslog messages to be saved? (Choose three).

- B. The logging buffer .RAM**
- C. The console terminal**
- E. Syslog server**

By default, switches send the output from system messages and debug privileged EXEC commands to a logging process. The logging process controls the distribution of logging messages to various destinations, such as the logging buffer (on RAM), terminal lines (console terminal), or a UNIX syslog server, depending on your configuration. The process also sends messages to the console. Syslog messages can also be written to a file in Flash memory.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

51. Which protocol can cause overload on a CPU of a managed device?

D. SNMP

The SNMP agent on a device can take too much time to process a request. You can determine the cause of high CPU use in a router by using the output of the show process cpu command.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

52. What is the alert message generated by SNMP agents called? (Choose two).

- A. TRAP**
- B. INFORM**

A TRAP is a SNMP message sent from one application to another which is merely to notify the other application that something has happened, or an issue has been observed. The INFORM message acknowledges a TRAP message.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

53. Which three features are added in SNMPv3 over SNMPv2? (Choose three).

- A. Message Integrity**
- C. Authentication**
- D. Encryption**

SNMPv3 provides secure access to devices by a combination of authenticating and encrypting packets over the network. Security features include:

Message integrity: Ensuring that a packet has not been tampered with in transit.

Authentication: Determining that the message is from a valid source.

Encryption: Scrambling the contents of a packet prevent it from being learned by an unauthorized source.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

54. Syslog was configured with a level 3 trap. Which types of logs would be generated? (Choose four).

- A. Emergencies**
- C. Alerts**
- D. Errors**
- E. Critical**

The syslog levels and descriptions are as follows:

- 0 Emergency system is unusable
- 1-Alert action must be taken immediately
- 2-Critical Critical conditions
- 3-Error Error conditions
- 4-Warning Warning conditions
- 5-Notice normal but significant condition
- 6-Informational Informational message
- 7-Debug Debug-level message

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 12

55. Refer to the exhibit. What three actions will the switch take when a frame with an unknown source MAC address arrives at the interface? (Select three).

```
Switch# show port-security interface fa0/20
Port Security          : Enabled
Port Status            : Secure-up
Violation Mode         : Restrict
Aging Time             : 3 mins
Aging Type             : Inactivity
SecureStatic Address Aging : Disabled
Maximum MAC Addresses : 2
Total MAC Addresses   : 2
Configured MAC Addresses : 0
Sticky MAC Addresses  : 2
Last Source Address:Vlan : 0009.7C10.8E8C:50
Security Violation Count : 1
```

- A. Send an SNMP trap.**
- B. Send a syslog message.**
- C. Increment the Security Violation counter.**

A switchport violation occurs in one of two situations. When the maximum number of secure MAC addresses has been reached, and an address learned or configured on one secure interface, is seen on another secure interface in the same VLAN. The action that the device takes when one of these violations occurs can be configured is Protect — This mode permits traffic from known MAC addresses to continue to be forwarded while dropping traffic from unknown MAC addresses. When configured, no notification action is taken when traffic is dropped. Restrict — This mode permits traffic from known MAC addresses to continue to be forwarded while dropping traffic from unknown MAC addresses when over the limit. When configured, a syslog message is logged, a SNMP trap is sent, and a violation counter is incremented when traffic is dropped. Shutdown — This mode is the default violation mode. In this mode, the switch will automatically force the switchport into an error disabled (err-disable) state when a violation occurs. While in this state, the switchport forwards no traffic. The switchport can be brought out of this error disabled state by issuing the err-disable recovery cause CLI command or by disabling and re-enabling the switchport. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 12

Chapter 5 Security Fundamentals

15% 5.0 Security Fundamentals

5.1 Define key security concepts (threats, vulnerabilities, exploits, and mitigation techniques)

5.2 Describe security program elements (user awareness, training, and physical access control)

5.3 Configure device access control using local passwords

5.4 Describe security password policies elements, such as management, complexity, and password alternatives (multifactor authentication, certificates, and biometrics)

5.5 Describe remote access and site-to-site VPNs

5.6 Configure and verify access control lists

5.7 Configure Layer 2 security features (DHCP snooping, dynamic ARP inspection, and port security)

5.8 Differentiate authentication, authorization, and accounting concepts

5.9 Describe wireless security protocols (WPA, WPA2, and WPA3)

5.10 Configure WLAN using WPA2 PSK using the GUI

1. An inbound access list has been configured on a serial interface to deny packet entry for TCP and UDP ports 21, 23, and 25. What types of packets will be permitted by this ACL? (Choose three).

- A. FTP
- B. HTTP

- C. Telnet
- D. POP3
- E. SMTP
- F. DNS

2. 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.

3. What is the purpose of the switchport command?

```
Switch(config-if)#switchport port-security maximum 1
```

```
Switch(config-if)#switchport port-security mac-address 0018.DE8B.4BF8
```

- A. It ensures that only the device with the MAC address 0018.DE8B.4BF8 will be able to connect to the port that is being configured.
- B. It informs the switch that traffic destined for MAC address 0018.DE8B.4BF8 should only be sent to the port that is being configured.
- C. It will act like an access list and the port will filter packets that have a source or destination MAC of 0018.DE8B.4BF8.
- D. The switch will shut down the port of any traffic with source MAC address of 0018.DE8B.4BF8.

4. 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.

5. 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.

6. 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.

7. Which two commands correctly verify whether port security has been configured on port FastEthernet 0/12 on a switch? (Choose two).

A. SW1#show port-secure interface FastEthernet 0/12

B. SW1#show switchport port-secure interface FastEthernet 0/12

C. SW1#show running-config

D. SW1#show port-security interface FastEthernet 0/12

E. SW1#show switchport port-security interface FastEthernet 0/12

8. What will be the result if the following configuration commands are implemented on a Cisco switch?

```
Switch(config-if)#switchport port-security
```

```
Switch(config-if)# switchport port-security mac-address sticky
```

A. A dynamically learned MAC address is saved in the startup-configuration file.

B. A dynamically learned MAC address is saved in the running-configuration

file.

C. A dynamically learned MAC address is saved in the VLAN database.

D. Statically configured MAC addresses are saved in the startup-configuration file if frames from that address are received.

E. Statically configured MAC addresses are saved in the running-configuration file if frames from that address are received.

9. A network administrator needs to configure port security on a switch. Which two statements are true? (Choose two).

A. The network administrator can apply port security to dynamic access ports.

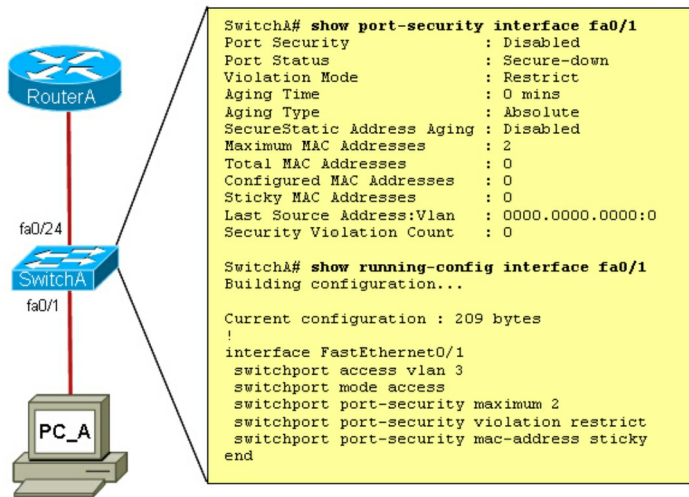
B. The network administrator can apply port security to EtherChannels.

C. When dynamic MAC address learning is enabled on an interface, the switch can learn new addresses, up to the maximum defined.

D. The sticky learning feature allows the addition of dynamically learned addresses to the running configuration.

E. The network administrator can configure static secure or sticky secure MAC addresses in the voice VLAN.

10. Refer to the exhibit. A junior network administrator was given the task of configuring port security on SwitchA to allow only PC_A to access the switched network through port fa0/1. If any other device is detected, the port is to drop frames from this device. The administrator configured the interface and tested it with successful pings from PC_A to RouterA, and then observes the output from these two show commands. Which two of these changes are necessary for SwitchA to meet the requirements? (Choose two).



- A. Port security needs to be globally enabled.
- B. Port security needs to be enabled on the interface.
- C. Port security needs to be configured to shut down the interface in the event of a violation.
- D. Port security needs to be configured to allow only one learned MAC address.
- E. Port security interface counters need to be cleared before using the show command.
- F. The port security configuration needs to be saved to NVRAM before it can become active.

11. Which set of commands is recommended to prevent the use of a hub in the access layer?

- A. switch(config-if)#switchport mode trunk
switch(config-if)#switchport port-security maximum 1

B. switch(config-if)#switchport mode trunk
switch(config-if)#switchport port-security mac-address 1

C. switch(config-if)#switchport mode access
switch(config-if)#switchport port-security maximum 1

D. switch(config-if)#switchport mode access
switch(config-if)#switchport port-security mac-address 1

12. Refer to the exhibit. The following commands are executed on interface fa0/1 of 2950Switch.

```
2950Switch(config-if)#switchport port-security  
2950Switch(config-if)#switchport port-security mac-address sticky  
2950Switch(config-if)#switchport port-security maximum 1
```

The Ethernet frame that is shown arrives on interface fa0/1. What two functions will occur when this frame is received by 2950Switch? (Choose two).

```
SwitchA# show mac-address-table  
< non-essential output omitted >  
Destination Address  Address Type  VLAN  Destination Port  
-----  
00b0.d056.fe4d      Dynamic      1     FastEthernet0/3  
00b0.d043.ac2e      Dynamic      1     FastEthernet0/4  
00b0.d0fe.ac32      Dynamic      1     FastEthernet0/5  
00b0.d0da.cb56      Dynamic      1     FastEthernet0/6
```

Frame received by SwitchA:

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

- A. The MAC address table will now have an additional entry of fa0/1 FFFF.FFFF.FFFF.
- B. Only host A will be allowed to transmit frames on fa0/1.
- C. This frame will be discarded when it is received by 2950Switch.
- D. All frames arriving on 2950Switch with a destination of 0000.00aa.aaaa will be forwarded out fa0/1.
- E. Hosts B and C may forward frames out fa0/1 but frames arriving from other switches will not be forwarded out fa0/1.
- F. Only frames from source 0000.00bb.bbbb, the first learned MAC address

of 2950Switch, will be forwarded out fa0/1.

13. What are two recommended ways of protecting network device configuration files from outside network security threats? (Choose two).

- A. Allow unrestricted access to the console or VTY ports.
- B. Use a firewall to restrict access from the outside to the network devices.
- C. Always use Telnet to access the device command line because its data is automatically encrypted.
- D. Use SSH or another encrypted and authenticated transport to access device configurations.
- E. Prevent the loss of passwords by disabling password encryption.

14. What is the effect of this configuration?

```
line vty 0 4  
password todd  
login  
transport input ssh
```

- A. It configures SSH globally for all logins.
- B. It tells the router or switch to try to establish an SSH connection first and if that fails to use Telnet.
- C. It configures a Cisco network device to use the SSH protocol on incoming communications via the VTY lines.
- D. It configures the device to only use only Telnet on the VTY lines.

15. On which options are standard access lists based?

- A. destination address and wildcard mask
- B. destination address and subnet mask
- C. source address and subnet mask
- D. source address and wildcard mask

16. Refer to the exhibit. Statements A, B, C, and D of ACL 10 have been entered in the shown order and applied to interface E0 inbound, to prevent all hosts (except those whose addresses are the first and last IP of subnet 172.21.1.128/28) from accessing the network. But as is, the ACL does not restrict anyone from the network. How can the ACL statements be re-arranged so that the system works as intended?

ACL 10

Statements are written in this order:

- A. permit any
- B. deny 172.21.1.128 0.0.0.15
- C. permit 172.21.1.129 0.0.0.0
- D. permit 172.21.1.142 0.0.0.0

- A. ACDB
- B. BADC
- C. DBAC
- D. CDBA

17. Refer to the exhibit. An attempt to deny web access to a subnet blocks all traffic from the subnet. Which interface command immediately removes the effect of ACL 102?

ACL 102

```
access-list 102 deny tcp 172.21.1.1 0.0.0.255 any eq 80
access-list 102 deny ip any any
```

RouterA#sho ip int

```
FastEthernet0/0 is up, line protocol is up
Internet address is 192.168.1.144/20
Broadcast address is 255.255.255.255
Address determined by DHCP
MTU is 1500 bytes
Helper address is not set
Directed broadcast forwarding is enabled
Outgoing access list is 102
Inbound access list is not set
Proxy ARP is enabled
```

- A. no ip access-class 102 in

- B. no ip access-class 102 out
- C. no ip access-group 102 in
- D. no ip access-group 102 out
- E. no ip access-list 102 in

18. Which statement about access lists that are applied to an interface is true?

- A. You can place as many access lists as you want on any interface.
- B. You can apply only one access list on any interface.
- C. You can configure one access list, per direction, per Layer 3 protocol.
- D. You can apply multiple access lists with the same protocol or in different directions.

19. Which item represents the standard IP ACL?

- A. access-list 110 permit ip any any
- B. access-list 50 deny 192.168.1.1 0.0.0.255
- C. access list 101 deny tcp any host 192.168.1.1
- D. access-list 2500 deny tcp any host 192.168.1.1 eq 22

20. A network administrator is configuring ACLs on a Cisco router, to allow traffic from hosts on networks 192.168.146.0, 192.168.147.0, 192.168.148.0, and 192.168.149.0 only. Which two ACL statements, when combined, would you use to accomplish this task? (Choose two).

- A. access-list 10 permit ip 192.168.146.0 0.0.1.255
- B. access-list 10 permit ip 192.168.147.0 0.0.255.255
- C. access-list 10 permit ip 192.168.148.0 0.0.1.255
- D. access-list 10 permit ip 192.168.149.0 0.0.255.255
- E. access-list 10 permit ip 192.168.146.0 0.0.0.255
- F. access-list 10 permit ip 192.168.146.0 255.255.255.0

21. What can be done to secure the virtual terminal interfaces on a router? (Choose two).

- A. Administratively shut down the interface.
- B. Physically secure the interface.
- C. Create an access list and apply it to the virtual terminal interfaces with the access-group command.
- D. Configure a virtual terminal password and login process.
- E. Enter an access list and apply it to the virtual terminal interfaces using the access-class command.

22. Which of the following statements are TRUE regarding Cisco access lists? (Choose two).

- A. In an inbound access list, packets are filtered as they enter an interface.
- B. In an inbound access list, packets are filtered before they exit an interface.
- C. Extended access lists are used to filter protocol-specific packets.
- D. You must specify a deny statement at the end of each access list to filter unwanted traffic.
- E. When a line is added to an existing access list, it is inserted at the beginning of the access list.

23. Which statement about ACLs is true?

- A. An ACL have must at least one permit action, else it just blocks all traffic.
- B. ACLs go bottom-up through the entries looking for a match
- C. An ACL has an implicit permit at the end of ACL.
- D. ACLs will check the packet against all entries looking for a match.

24. A Host is able to ping a web server, but it is not able to do HTTP request. What could be the problem?

- A. ACL blocking port 23
- B. ACL blocking All ports
- C. ACL blocking port 80
- D. ACL blocking port 443
- E. None of the above

25. Which of the following are the valid numbers of standard ACL? (Choose two).

- A. 50
- B. 1550
- C. 150
- D. 1250
- E. 2050

26. Which command can you enter to block HTTPS traffic from the whole class A private network range to a host?

- A. R1(config)#access-list 105 deny tcp 10.1.0.0 0.0.255.255 40.0.0.2 0.0.0.0 eq 443
- B. R1(config)#access-list 105 deny tcp 10.1.0.0 0.0.255.255 40.0.0.2 0.0.0.0 eq 53
- C. R1(config)#access-list 105 deny tcp 10.0.0.0 0.255.255.255 40.0.0.2

0.0.0.0 eq 53

D. R1(config)#access-list 105 deny tcp 10.0.0.0 0.255.255.255 40.0.0.2
0.0.0.0 eq 443

27. Which range represents the standard access list?

- A. 99
- B. 150
- C. 299
- D. 2000

28. Which command is necessary to permit SSH or Telnet access to a cisco switch that is otherwise configured for these vty line protocols?

- A. transport type all
- B. transport output all
- C. transport preferred all
- D. transport input all

29. Which action can change the order of entries in a named access-list?

- A. Removing an entry
- B. Opening the access-list in notepad
- C. Adding an entry
- D. Resequencing

30. If you wanted to deny all Telnet connections to only network 192.168.10.0, which command could you use?

- A. access-list 100 deny tcp 192.168.10.0 255.255.255.0 eq telnet
- B. access-list 100 deny tcp 192.168.10.0 0.255.255.255 eq telnet
- C. access-list 100 deny tcp any 192.168.10.0 0.0.0.255 eq 23
- D. access-list 100 deny 192.168.10.0 0.0.0.255 any eq 23

31. You want to create an extended access list that denies the subnet of the following host: 172.16.50.172/20. Which of the following would you start your list with?

- A. access-list 110 deny ip 172.16.192.0 0.0.31.255 any
- B. access-list 110 deny ip 172.16.50.0 0.0.16.255 any
- C. access-list 10 deny ip 172.16.172.0 0.0.31.255 any
- D. access-list 110 deny ip 172.16.48.0 0.0.15.255 any

32. The following access list has been applied to an interface on a router:

```
access-list 101 deny tcp 199.111.16.32 0.0.0.31 host 199.168.5.60
```

Which of the following IP addresses will be blocked because of this single rule in the list? (Choose two).

- A. 199.111.16.67
- B. 199.111.16.38
- C. 199.111.16.65
- D. 199.11.16.54

33. What are two recommended ways of protecting network device configuration files from outside network security threats? (Choose two).

- A. Allow unrestricted access to the console or VTY ports.
- B. Use a firewall to restrict access from the outside to the network devices.
- C. Always use Telnet to access the device command line because its data is automatically encrypted.
- D. Use SSH or another encrypted and authenticated transport to access device configurations.
- E. Prevent the loss of passwords by disabling password encryption.

34. What should be part of a comprehensive network security plan?

- A. Allow users to develop their own approach to network security.
- B. Physically secure network equipment from potential access by unauthorized individuals.
- C. Encourage users to use personal information in their passwords to minimize the likelihood of passwords being forgotten.
- D. Delay deployment of software patches and updates until their effect on end-user equipment is well known and widely reported.
- E. Minimize network overhead by deactivating automatic antivirus client updates.

35. Which type of attack is characterized by a flood of packets that are requesting a TCP connection to a server?

- A. denial of service
- B. brute force
- C. reconnaissance
- D. Trojan horse

36. The maximum size of a TCP/IP packet is 65,535 bytes. What type of attack is characterized by oversized packets, causing a device to reboot

incessantly, freeze up, or totally crash?

A. denial of service

B. brute force

C. ping of death

D. trojan horse

37. Refer to the exhibit. Identify the security threats on RouterA (Choose three).

```
RouterA
!
no service password-encryption
!
enable password cisco
!
username ciscouser privilege 15 password 0 cisco
!
banner motd ^CWelcome! If you encountered any problem,
please consult the administrator^C
!
line vty 0 4
password 4t&34rkf
login local
transport input telnet ssh
!
```

- A. unencrypted password set
- B. unsecured message on banner
- C. remote access can only be made through telnet or SSH
- D. user gets level 15 automatically by default

38. Refer to the exhibit. Which two of the following are true regarding the configuration of RouterA (Choose two).

```

RouterA
!
no service password-encryption
!
enable password cisco
!
username cisouser privilege 15 password 0 cisco
!
banner motd ^CWelcome! If you encountered any problem,
please consult the administrator^C
!
line vty 0 4
password 4t&34rkf
login local
transport input telnet ssh
!

```

- A. At least 5 simultaneous remote connect are possible.
- B. Only telnet protocol connections to Router A are supported.
- C. Remotely connection to RouterA using telnet will succeed.
- D. Console line connection will never time out due to inactivity.
- E. Since DHCP is not used on Fa0/1 there is not a need to use the NAT protocol.

39. Of the following, identify the numerous kinds of security threats. (Choose three).

- A. Hardware threats
- B. Access attacks
- C. IDS/IPS
- D. Password attacks

40. To prevent users from plugging a host into a Switch port, which command is used to enable port security on a Switch?

- A. Switch#switchport port-security

- B. Switch(config)#switchport port-security
- C. Switch(config-if)#switchport port-security enable
- D. Switch(config-if)#switchport port-security

41. In order to allow only one host to use a specific port on a Switch, what command will accomplish this?

- A. Switch(config-if)#switchport port-security maximum 1
- B. Switch(config-if)#switchport port-security 1
- C. Switch(config-if)#switchport port-security mac-address 1
- D. Switch(config-if)#switchport port-security mac-address sticky

42. By default, ports on a Cisco Switch are?

- A. shutdown
- B. enabled
- C. secured
- D. trunks

43. 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.

44. What is the effect of this configuration?

```
line vty 0 4
password todd
login
transport input ssh
```

- A. It configures SSH globally for all logins.
- B. It tells the router or switch to try to establish an SSH connection first and if that fails to use Telnet.
- C. It configures a Cisco network device to use the SSH protocol on incoming communications via the VTY lines.
- D. It configures the device to only use only Telnet on the VTY lines.

45. What are two characteristics of Telnet?

- A. It sends data in clear text.
- B. It is no longer supported on Cisco network devices.
- C. Is it more secure than SSH.
- D. It requires that the destination device be configured to support Telnet connections.

46. A company has placed a networked PC in a lobby so guests can have access to the internet. A security concern is that someone will disconnect the Ethernet cable from the PC and re-connect it to 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.

47. From which of the following attacks can Message Authentication Code (MAC) shield your network?

- A. DoS
- B. DDoS
- C. spoofing
- D. SYN floods

Chapter 5 Answers

1. An inbound access list has been configured on a serial interface to deny packet entry for TCP and UDP ports 21, 23, and 25. What types of packets

will be permitted by this ACL? (Choose three).

B. HTTP

D. POP3

F. DNS

These are well-known port numbers. Port 21 is FTP, 23 is telnet, and SMTP is 25. The question is saying that these ports will be denied and asking what will be permitted, so DNS (53), HTTP (80), and POP3 (110) will be permitted.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

2. 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.

One can configure MAC addresses to be sticky. These can be dynamically learned or manually configured, stored in the address table, and added to the running configuration. If these addresses are saved in the configuration file, the interface does not need to dynamically relearn them when the switch restarts, hence, enabling security as desired.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

3. What is the purpose of the switchport command?

```
Switch(config-if)#switchport port-security maximum 1
```

```
Switch(config-if)#switchport port-security mac-address 0018.DE8B.4BF8
```

A. It ensures that only the device with the MAC address 0018.DE8B.4BF8 will be able to connect to the port that is being configured.

The first command configures the maximum number of secure MAC addresses on a port to one. The next command specifies that MAC addresses that are allowed with port security; in this case it is just the one single device MAC. If any other device connects on that port the port will be shut down by

the port security feature.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 7

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

B. To prevent unauthorized hosts from accessing the LAN.

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.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 7

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

B. Configure the server MAC address as a static entry of port security.

When the MAC address is configured as static entry, no other address is allowed.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 7

6. 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.

C. Create the port as an access port.

F. Statically assign the MAC address to the address table.

If port security is enabled and the port is only designated as an access port, and a static MAC address is assigned, it ensures that even if a physical

connection is done by taking out the directory PC and inserting personal laptop or device, the connection cannot be made to the corporate network, ensuring network security.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

7. Which two commands correctly verify whether port security has been configured on port FastEthernet 0/12 on a switch? (Choose two).

C. SW1#show running-config

D. SW1#show port-security interface FastEthernet 0/12

We can verify whether port security has been configured by using the show running-config or show port-security interface for more detail.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

8. What will be the result if the following configuration commands are implemented on a Cisco switch?

```
Switch(config-if)#switchport port-security
```

```
Switch(config-if)#switchport port-security mac-address sticky
```

B. A dynamically learned MAC address is saved in the running-configuration file.

In the interface configuration mode, the command switchport port-security mac-address sticky enables sticky learning. When entering this command, the interface converts all the dynamic secure MAC addresses to sticky secure MAC addresses

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

9. A network administrator needs to configure port security on a switch. Which two statements are true? (Choose two).

C. When dynamic MAC address learning is enabled on an interface, the switch can learn new addresses, up to the maximum defined.

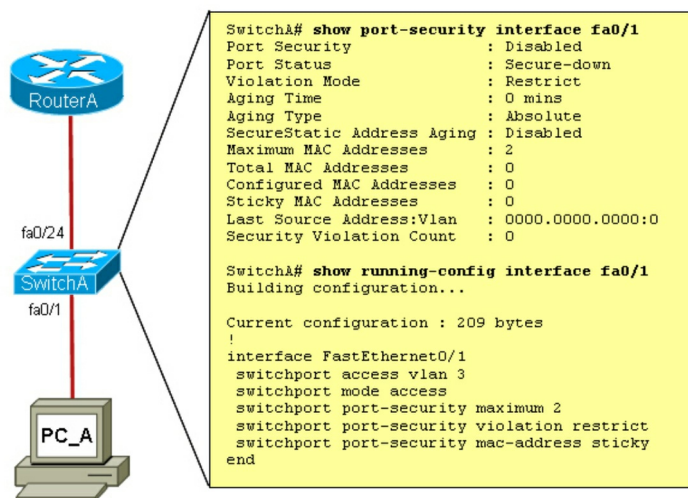
D. The sticky learning feature allows the addition of dynamically

learned addresses to the running configuration.

Port security can only be configured on static access ports, trunk ports, or 802.1Q tunnel ports. When the sticky feature is configured on an interface, it adds the learned MAC address of the device connected, up to a defined maximum.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

10. Refer to the exhibit. A junior network administrator was given the task of configuring port security on SwitchA to allow only PC_A to access the switched network through port fa0/1. If any other device is detected, the port is to drop frames from this device. The administrator configured the interface and tested it with successful pings from PC_A to RouterA, and then observes the output from these two show commands. Which two of these changes are necessary for SwitchA to meet the requirements? (Choose two).



B. Port security needs to be enabled on the interface.

D. Port security needs to be configured to allow only one learned MAC address.

From the output we can see that port security is disabled so this needs to be enabled. Also, the maximum number of devices is set to 2 so this needs to be just one if we want the single host to have access and nothing else.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 7

11. Which set of commands is recommended to prevent the use of a hub in the access layer?

**C. switch(config-if)#switchport mode access
switch(config-if)#switchport port-security maximum 1**

Examine the layer 2 security configuration. In order to satisfy the requirements of this question, you should perform the following configurations in the interface mode: configure the interface mode as the access mode, then enable the port security and set the maximum number of connections to 1.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 7

12. Refer to the exhibit. The following commands are executed on interface fa0/1 of 2950Switch.

```
2950Switch(config-if)#switchport port-security
2950Switch(config-if)#switchport port-security mac-address sticky
2950Switch(config-if)#switchport port-security maximum 1
```

The Ethernet frame that is shown arrives on interface fa0/1. What two functions will occur when this frame is received by 2950Switch? (Choose two).

SwitchA# **show mac-address-table**

< non-essential output omitted >

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

Frame received by SwitchA:

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

B. Only host A will be allowed to transmit frames on fa0/1.

D. All frames arriving on 2950Switch with a destination of 0000.00aa.aaaa will be forwarded out fa0/1.

The first command enables port-security. The second command, the STICKY keyword is used to make the MAC address appear in the running configuration. If you do not specify any MAC addresses after the STICKY keyword, the switch will dynamically learn the attached MAC Address and place it into your running-configuration. In the last command, 1 is the limited the number of secure MAC addresses to one and dynamically assigned it (because no MAC address is mentioned, the switch will get the MAC address of the attached MAC address to interface fa0/1), the workstation attached to that port is assured the full bandwidth of the port. Therefore, only host A will be allowed to transmit frames on fa0/1. Frames with a destination of 0000.00aa.aaaa will be forwarded out of fa0/1 interface.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 7

13. What are two recommended ways of protecting network device configuration files from outside network security threats? (Choose two).

B. Use a firewall to restrict access from the outside to the network devices.

D. Use SSH or another encrypted and authenticated transport to access device configurations.

Using a firewall is a must for networks of any size to protect the internal

network from outside threats and unauthorized access. SSH traffic is encrypted while telnet is not, so it is always recommended to use SSH. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 10

14. What is the effect of this configuration?

```
line vty 0 4
password todd
login
transport input ssh
```

C. It configures a Cisco network device to use the SSH protocol on incoming communications via the VTY lines.

Secure Shell (SSH) is a protocol which provides a secure remote access connection to network devices. Communication between the client and server is encrypted in both SSH version 1 and SSH version 2. If you want to prevent non-SSH connections, add the “transport input ssh” command under the lines to limit the router to SSH connections only. Straight (non-SSH) Telnets are refused.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 10

15. On which options are standard access lists based?

D. source address and wildcard mask

Standard ACL’s only examine the source IP address/mask to determine if a match is made. Extended ACL’s examine the source and destination address, as well as port information.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 10

16. Refer to the exhibit. Statements A, B, C, and D of ACL 10 have been entered in the shown order and applied to interface E0 inbound, to prevent all hosts (except those whose addresses are the first and last IP of subnet 172.21.1.128/28) from accessing the network. But as is, the ACL does not restrict anyone from the network. How can the ACL statements be re-arranged so that the system works as intended?

ACL 10

Statements are written in this order:

- A. permit any
- B. deny 172.21.1.128 0.0.0.15
- C. permit 172.21.1.129 0.0.0.0
- D. permit 172.21.1.142 0.0.0.0

D. CDBA

Routers go line by line through an access list until a match is found, then it will not look any further, even if a more specific or better match is found later on in the access list. So, it is best to begin with the most specific entries first, in this case the two hosts in line C and D. Then, include the subnet (B) and then finally the rest of the traffic (A).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

17. Refer to the exhibit. An attempt to deny web access to a subnet blocks all traffic from the subnet. Which interface command immediately removes the effect of ACL 102?

```
ACL 102
access-list 102 deny tcp 172.21.1.1 0.0.0.255 any eq 80
access-list 102 deny ip any any
```

```
RouterA#sho ip int
FastEthernet0/0 is up, line protocol is up
Internet address is 192.168.1.144/20
Broadcast address is 255.255.255.255
Address determined by DHCP
MTU is 1500 bytes
Helper address is not set
Directed broadcast forwarding is enabled
Outgoing access list is 102
Inbound access list is not set
Proxy ARP is enabled
```

D. no ip access-group 102 out

The “ip access-group” is used to apply an ACL to an interface. From the output shown, we know that the ACL is applied to outbound traffic, so “no ip access-group 102 out” will remove the effect of this ACL.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

18. Which statement about access lists that are applied to an interface is true?

C. You can configure one access list, per direction, per Layer 3 protocol.

We can have only 1 access list per protocol, per direction and per interface. It means: We cannot have 2 inbound access lists on an interface. We can have 1 inbound and 1 outbound access list on an interface

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

19. Which item represents the standard IP ACL?

B. access-list 50 deny 192.168.1.1 0.0.0.255

The standard access lists are ranged from 1 to 99 and from 1300 to 1999, so only access list 50 is a standard access list.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

20. A network administrator is configuring ACLs on a Cisco router, to allow traffic from hosts on networks 192.168.146.0, 192.168.147.0, 192.168.148.0, and 192.168.149.0 only. Which two ACL statements, when combined, would you use to accomplish this task? (Choose two).

A. access-list 10 permit ip 192.168.146.0 0.0.1.255

C. access-list 10 permit ip 192.168.148.0 0.0.1.255

“access-list 10 permit ip 192.168.146.0 0.0.1.255” would allow only the 192.168.146.0 and 192.168.147.0 networks, and “access-list 10 permit ip 192.168.148.0 0.0.1.255” would allow only the 192.168.148.0 and 192.168.149.0 networks.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301

Chapter 10

21. What can be done to secure the virtual terminal interfaces on a router? (Choose two).

- D. Configure a virtual terminal password and login process.**
- E. Enter an access list and apply it to the virtual terminal interfaces using the access-class command.**

The simplest way to secure the virtual terminal interface is to configure a username & password to prevent an unauthorized login. To apply an access list to a virtual terminal interface we must use the “access-class” command. The “access-group” command is only used to apply an access list to a physical interface.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

22. Which of the following statements are TRUE regarding Cisco access lists? (Choose two).

- A. In an inbound access list, packets are filtered as they enter an interface.**
- D. You must specify a deny statement at the end of each access list to filter unwanted traffic.**

In an inbound access list, packets are filtered as they enter an interface. Extended access lists are used to filter protocol specific packets. Access lists can be used in a variety of situations when the router needs to be given guidelines for decision-making.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

23. Which statement about ACLs is true?

- A. An ACL have must at least one permit action, else it just blocks all traffic.**

Access Controls Lists contain an explicit deny statement. Unless one permit statement is configured, all traffic will be blocked.

Correct. Access Controls Lists contain an explicit deny statement. Unless one

permit statement is configured, all traffic will be blocked.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

24. A Host is able to ping a web server, but it is not able to do HTTP request. What could be the problem?

C. ACL blocking port 80

Access Control Lists can be used to filter traffic based on various protocols. If a host can communicate to another with ICMP traffic, but not via HTTP (web browser), the host is being blocked from using HTTP. The well-known port for HTTP traffic is port 80.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

25. Which of the following are the valid numbers of standard ACL? (Choose two).

A. 50

B. 1550

The range of standard ACL is 1-99, 1300-1999 so 50 and 1550 are two valid numbers.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

26. Which command can you enter to block HTTPS traffic from the whole class A private network range to a host?

D. R1(config)#access-list 105 deny tcp 10.0.0.0 0.255.255.255 40.0.0.2 0.0.0.0 eq 443

HTTPS relates to well-known port 443. To deny traffic for this particular network range, use deny tcp 10.0.0.0 0.255.255.255 40.0.0.2 0.0.0.0 which will deny all hosts as designated by the 40.0.0.0 0.0.0.0 (meaning all hosts).

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

27. Which range represents the standard access list?

A. 99

The range of standard and extended access list: Standard 1-99, 1300-1999
Extended 100-199, 2000-2699.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

28. Which command is necessary to permit SSH or Telnet access to a Cisco switch that is otherwise configured for these VTY line protocols?

D. transport input all

A, B, and C are invalid commands, "transport input all" is needed to configure SSH or Telnet on VTY lines.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

29. Which action can change the order of entries in a named access-list?

D. Resequencing

We can resequence a named access-list with the command: "ip access-list resequence access-list-name starting-sequence-number increment".

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

30. If you wanted to deny all Telnet connections to only network 192.168.10.0, which command could you use?

C. access-list 100 deny tcp any 192.168.10.0 0.0.0.255 eq 23

The extended access list ranges are 100–199 and 2000–2699, so the access-list number of 100 is valid. Telnet uses TCP, so the protocol TCP is valid. Now you just need to look for the source and destination address. Only the third option has the correct sequence of parameters. Option B may work, but the question specifically states "only" to network 192.168.10.0, and the wildcard in option B is too broad.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 10

31. You want to create an extended access list that denies the subnet of the

following host: 172.16.50.172/20. Which of the following would you start your list with?

D. access-list 110 deny ip 172.16.48.0 0.0.15.255 any

First, you must know that a /20 is a 255.255.240.0 subnet mask, which is a block size of 16 in the third octet. Counting by 16s, this makes our subnet 172.16.48.0 in the third octet. The wildcard mask for the third octet would be 15, since the wildcard is always one less than the block size.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 10

32. The following access list has been applied to an interface on a router:

```
access-list 101 deny tcp 199.111.16.32 0.0.0.31 host 199.168.5.60
```

Which of the following IP addresses will be blocked because of this single rule in the list? (Choose two).

B. 199.111.16.38

D. 199.11.16.54

The scope of an access list is determined by the wildcard mask and the network address to which it is applied. For example, in this case the starting point of the list of addresses affected by the mask is the network ID 192.111.16.32. The wildcard mask is 0.0.0.31. Adding the value of the last octet in the mask to the network address ($32 + 31 = 63$) tells you where the effects of the access list ends, which is 199.111.16.63. Therefore, all addresses in the range 199.111.16.32–199.111.16.63 will be denied by this list.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 10

33. What are two recommended ways of protecting network device configuration files from outside network security threats? (Choose two).

B. Use a firewall to restrict access from the outside to the network devices.

D. Use SSH or another encrypted and authenticated transport to access device configurations.

Using a firewall is a must for networks of any size to protect the internal network from outside threats and unauthorized access. SSH traffic is encrypted while telnet is not, so it is always recommended to use SSH.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

34. What should be part of a comprehensive network security plan?

B. Physically secure network equipment from potential access by unauthorized individuals.

Computer systems and networks are vulnerable to physical attack; therefore, procedures should be implemented to ensure that systems and networks are physically secure.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

35. Which type of attack is characterized by a flood of packets that are requesting a TCP connection to a server?

A. denial of service

A denial-of-service attack (DoS attack) is a cyber-attack in which the perpetrator seeks to make a machine or network resource unavailable to its intended users by temporarily or indefinitely disrupting services of a host connected to the Internet. Denial of service is typically accomplished by flooding the targeted machine or resource with superfluous requests in an attempt to overload systems and prevent some or all legitimate requests from being fulfilled.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

36. The maximum size of a TCP/IP packet is 65,535 bytes. What type of attack is characterized by oversized packets, causing a device to reboot incessantly, freeze up, or totally crash?

C. ping of death

On the Internet, ping of death is a denial of service (DoS) attack caused by an attacker deliberately sending an IP packet larger than the 65,536 bytes

allowed by the IP protocol. One of the features of TCP/IP is fragmentation; it allows a single IP packet to be broken down into smaller segments.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

37. Refer to the exhibit. Identify the security threats on RouterA (Choose three).

```
RouterA
!
no service password-encryption
!
enable password cisco
!
username cisouser privilege 15 password 0 cisco
!
banner motd ^CWelcome! If you encountered any problem,
please consult the administrator^C
!
line vty 0 4
password 4t&34rkf
login local
transport input telnet ssh
!
```

A. unencrypted password set

C. remote access can only be made through telnet or SSH

D. user gets level 15 automatically by default

From the output given, passwords for this device are not encrypted as noted by the "no service password-encryption". By using the command service password-encryption, it will encrypt clear text passwords on the device. For remote access, Telnet/SSH can be used as noted by the line vty configuration.

The command `username ciscouser privilege 15 password 0 cisco`, this command gives the user the highest privilege when accessing this device. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 13

38. Refer to the exhibit. Which two of the following are true regarding the configuration of RouterA (Choose two).

```
RouterA
!
no service password-encryption
!
enable password cisco
!
username ciscouser privilege 15 password 0 cisco
!
banner motd ^CWelcome! If you encountered any problem,
please consult the administrator^C
!
line vty 0 4
password 4t&34rkf
login local
transport input telnet ssh
!
```

- A. At least 5 simultaneous remote connect are possible.**
- C. Remotely connection to RouterA using telnet will succeed.**

The vty line configuration allows 5 simultaneous lines (0-4). By default, Cisco routers have three levels of privilege—zero, user, and privileged. User level 15 provides complete control over the router.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 13

39. Of the following, identify the numerous kinds of security threats. (Choose

three).

- A. Hardware threats**
- B. Access attacks**
- D. Password attacks**

IDS (Intrusion Detection System) and IPS (Intrusion Prevention System) are tools to help mitigate threats. A, B, and D are actual threat methods.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

40. To prevent users from plugging a host into a Switch port, which command is used to enable port security on a Switch?

- D. Switch(config-if)#switchport port-security**

The correct syntax to enable port security on a Switch, use the command "switchport port-security" on the desired switchports to be secured, in interface configuration mode.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

41. In order to allow only one host to use a specific port on a Switch, what command will accomplish this?

- A. Switch(config-if)#switchport port-security maximum 1**

This is an optional command that sets the maximum number of secure MAC addresses for the interface. The range is 1 to 3072; the default is 1.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

42. By default, ports on a Cisco Switch are?

- B. enabled**

By default, all ports on a Cisco Switch are enabled and ready for use.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

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

E. It will encrypt all current and future passwords.

Encryption adds a level of security to the system as anyone having access to the network device cannot reverse the process of encryption to know the actual passwords which were created originally in clear text.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

44. What is the effect of this configuration?

```
line vty 0 4
password todd
login
transport input ssh
```

C. It configures a Cisco network device to use the SSH protocol on incoming communications via the VTY lines.

Secure Shell (SSH) is a protocol which provides a secure remote access connection to network devices. Communication between the client and server is encrypted in both SSH version 1 and SSH version 2. If you want to prevent non-SSH connections, add the “transport input ssh” command under the lines to limit the router to SSH connections only. Straight (non-SSH) Telnets are refused.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

45. What are two characteristics of Telnet?

A. It sends data in clear text.

D. It requires that the destination device be configured to support Telnet connections.

Telnet is a virtual terminal protocol that allows you to make connections to remote devices. Telnet is considered insecure because it transfers all data in clear text. In order to connect to a remote device, the destination device needs to support Telnet connection.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

46. A company has placed a networked PC in a lobby so guests can have access to the internet. A security concern is that someone will disconnect the Ethernet cable from the PC and re-connect it to 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.

C. Create the port as an access port.

F. Statically assign the MAC address to the address table.

The first thing to configure is setting the port to access mode, then enable port security. The next option is to use the sticky command to save the source MAC address to the running-config.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

47. From which of the following attacks can Message Authentication Code (MAC) shield your network?

C. spoofing

Message Authentication Code (MAC) can shield your network from spoofing attacks. Spoofing, also known as masquerading, is a popular trick in which an attacker intercepts a network packet, replaces the source address of the packet's header with the address of the authorized host, and reinserts fake information which is sent to the receiver. This type of attack involves modifying packet contents. MAC can prevent this type of attack and ensure data integrity by ensuring that no data has chained. MAC also protects against frequency analysis, sequence manipulation, and ciphertext-only attacks.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 13

Chapter 6 Automation and Programmability

10% 6.0 Automation and Programmability

6.1 Explain how automation impacts network management

6.2 Compare traditional networks with controller-based networking

6.3 Describe controller-based and software defined architectures (overlay, underlay, and fabric)

6.3.a Separation of control plane and data plane

6.3.b North-bound and south-bound APIs

6.4 Compare traditional campus device management with Cisco DNA Center enabled device management

6.5 Describe characteristics of REST-based APIs (CRUD, HTTP verbs, and data encoding)

6.6 Recognize the capabilities of configuration management mechanisms Puppet, Chef, and Ansible

6.7 Interpret JSON encoded data

1. Which output displays a JSON data representation?

- | | |
|---------------------|---------------------|
| A. | B. |
| { | { |
| —response ,{ | —response :{ |
| —taskId ,{} | —taskId ,{} |
| —url , string | —url , string |
| }; | }; |
| —version , —string | —version ; —string |
| } | } |
| C. | D. |
| { | { |
| —response - { | —response :{ |
| —taskId - {}; | —taskId :{}, |
| —url —string | —url : string |
| }, | }, |
| —version —string | —version : —string |
| } | } |

- A. A
- B. B
- C. C
- D. D

2. Which option best describes an API?

- A. Communication often uses either Java scripting, Python, XML, or simple HTTP.
- B. An architectural style (versus a protocol) for designing applications.
- C. A stateless client-server model.
- D. Request a certain type of data by specifying the URL path that models the data.

3. Which option about JSON is true?

- A. Uses predefined tags or angle brackets (<>) to delimit markup text
- B. used to describe structured data that includes arrays
- C. used for storing information
- D. similar to HTML, it is more verbose than XML

4. Which of the following is the JSON encoding of a dictionary or hash?

- A. {—key||: —value||}
- B. [—key||, —value||]
- C. {—key||, —value||}
- D. (—key||: —value||)

5. Which two encoding methods are supported by REST APIs? (Choose two)

- A. YAML
- B. JSON
- C. EBCDIC
- D. SGML
- E. XML

6. What are two benefits of network automation? (Choose two).

- A. Reduced operational costs.
- B. Reduced hardware footprint.
- C. Faster changes with more reliable results.
- D. Fewer network failures.
- E. Increased network security.

7. Which two capacities of Cisco DNA Center make it more extensible? (Choose two).

- A. Adapters that support all families of Cisco IOS software.
- B. SDKs that support interaction with third-party network equipment.
- C. Customized versions for small, medium, and large enterprises.
- D. REST APIs that allow for external applications to interact natively with Cisco DNA Center.
- E. Modular design that is upgradable as needed.

8. What makes Cisco DNA Center different from traditional network management applications and their management of networks?

- A. It only supports auto-discovery of network elements in a green field deployment.
- B. Its modular design allows someone to implement different versions to meet the specific needs of an organization
- C. It abstracts policy from the actual device configuration.
- D. It does not support high availability of management functions when operating in cluster mode.

9. Which is a function of the Proactive Insights feature of Cisco DNA Center Assurance?

- A. Pointing out where the most serious issues are happening in the network.
- B. Generating synthetic traffic to perform tests that raise awareness of potential network issues.
- C. Enabling you to quickly view all of the contextual information related to a single use.
- D. Enabling you to see the complete path of packets from the client to the end application.

10. How does Cisco DNA Center gather data from the network?

- A. Devices use the call-home protocol to periodically send data to the controller
- B. Devices establish an IPsec tunnel to exchange data with the controller.
- C. The Cisco CLI Analyzer tool gathers data from each licensed network device and streams it to the controller.
- D. Network devices use different services like SNMP, syslog, and streaming telemetry to send data to the controller.

Chapter 6 Answers

1. Which output displays a JSON data representation?

- | | |
|-----------------------|-----------------------|
| A. | B. |
| { | { |
| —responsell,{ | —responsell:{ |
| —taskIdll,{ }; | —taskIdll,{ }; |
| —urllll,stringll | —urllll,stringll |
| }; | }; |
| —versionll, —stringll | —versionll; —stringll |
| } | } |
| C. | D. |


```

{
  --response|- {
  --taskId|- { };
  --url|- --string|
},
--version|- --string|
}

{
  --response|: {
  --taskId|: { },
  --url|: |string|
},
--version|: --string|
}

```

Answer: D

JSON data is written as key/value pairs. A key/value pair consists of a field name (in double quotes), followed by a colon, followed by a value:

“name”:”Mark”

JSON can use arrays. Array values must be of type string, number, object, array, boolean or null.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 21

2. Which option best describes an API?

- A. Communication often uses either Java scripting, Python, XML, or simple HTTP.
- B. An architectural style (versus a protocol) for designing applications.
- C. A stateless client-server model.
- D. Request a certain type of data by specifying the URL path that models the data.

C. A stateless client-server model.

APIs are classified as Client-server, Stateless, Cacheable, Uniform interface, Layered system, and Code on demand.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 21

3. Which option about JSON is true?

- A. Uses predefined tags or angle brackets (<>) to delimit markup text.
- B. Used to describe structured data that includes arrays.
- C. Used for storing information.
- D. Similar to HTML, it is more verbose than XML.

B. Used to describe structured data that includes arrays.

JSON data is written as key/value pairs separated with colons. A key/value pair consists of a field name (in double quotes), followed by a colon, followed by a value. JSON can use arrays. Array values must be of type string, number, object, array, boolean or null.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 21

4. Which of the following is the JSON encoding of a dictionary or hash?

- A. {—key||: —value||}
- B. [—key||, —value||]
- C. {—key||, —value||}
- D. (—key||: —value||)

A. {—key||: —value||}

JSON data is written as key/value pairs separated with colons. A key/value pair consists of a field name (in double quotes), followed by a colon, followed by a value.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 21

5. Which two encoding methods are supported by REST APIs? (Choose two)

- A. YAML
- B. JSON
- C. EBCDIC
- D. SGML
- E. XML

B. JSON

E. XML

The Application Policy Infrastructure Controller (APIC) REST API is a programmatic interface that uses REST architecture. The API accepts and returns HTTP (not enabled by default) or HTTPS messages that contain JavaScript Object Notation (JSON) or Extensible Markup Language (XML) documents.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 21

6. What are two benefits of network automation? (Choose two).

- A. Reduced operational costs.
- B. Reduced hardware footprint.
- C. Faster changes with more reliable results.
- D. Fewer network failures.
- E. Increased network security.

A. Reduced operational costs.

C. Faster changes with more reliable results.

Benefits of network automation software reduce chances of human errors, which affect network performance and security rapid provisioning of new services, including centralized zero-touch provisioning at remote locations. Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301 Chapter 21

7. Which two capacities of Cisco DNA Center make it more extensible? (Choose two).

- A. Adapters that support all families of Cisco IOS software.
- B. SDKs that support interaction with third-party network equipment.
- C. Customized versions for small, medium, and large enterprises.
- D. REST APIs that allow for external applications to interact natively with Cisco DNA Center.
- E. Modular design that is upgradable as needed.

B. SDKs that support interaction with third-party network equipment.

D. REST APIs that allow for external applications to interact natively with Cisco DNA Center.

Cisco DNA Center offers 360-degree extensibility through four distinct types of platform capabilities. Intent-based APIs leverage the controller and enable business and IT applications to deliver intent to the network and to reap network analytics and insights for IT and business innovation. Process adapters, built on integration APIs, allow integration with other IT and network systems to streamline IT operations and processes. Domain adapters, built on integration APIs, allow integration with other infrastructure domains such as data center, WAN, and security to deliver a consistent intent-based infrastructure across the entire IT environment. SDKs allow management to be extended to third-party vendor's network devices to offer support for

diverse environments.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 21

8. What makes Cisco DNA Center different from traditional network management applications and their management of networks?
- A. It only supports auto-discovery of network elements in a green field deployment.
 - B. Its modular design allows someone to implement different versions to meet the specific needs of an organization.
 - C. It abstracts policy from the actual device configuration.
 - D. It does not support high availability of management functions when operating in cluster mode.

C. It abstracts policy from the actual device configuration.

Cisco DNA Center is a complete management and control platform for a network. It includes integrated tools for network management, automation, virtualization, analytics and assurance, security, and Internet of Things (IoT) connectivity and can also interface with your business-critical tools. Until now, functionality this complete could be achieved only through the purchase and operation of multiple third-party software tools.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 22

9. Which is a function of the Proactive Insights feature of Cisco DNA Center Assurance?
- A. Pointing out where the most serious issues are happening in the network.
 - B. Generating synthetic traffic to perform tests that raise awareness of potential network issues.
 - C. Enabling you to quickly view all of the contextual information related to a single use.
 - D. Enabling you to see the complete path of packets from the client to the end application.

D. Enabling you to see the complete path of packets from the client to the end application.

The DNA center provides Path trace feature that allows the operator to visualize the path of an application or service from the client through all devices and to the server. A common, and critical, troubleshooting task that normally requires 6 to 10 minutes is displayed instantly upon clicking on a client or application. Troubleshoots issues along the network path. Using this feature, you can

1. Run a path trace from source to destination to quickly get key performance statistics for each device along the network path.
2. Identify access control lists (ACLs) that may be blocking or affecting the traffic flow.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 22

10. How does Cisco DNA Center gather data from the network?

- A. Devices use the call-home protocol to periodically send data to the controller
- B. Devices establish an IPsec tunnel to exchange data with the controller.
- C. The Cisco CLI Analyzer tool gathers data from each licensed network device and streams it to the controller.
- D. Network devices use different services like SNMP, syslog, and streaming telemetry to send data to the controller.

D. Network devices use different services like SNMP, syslog, and streaming telemetry to send data to the controller.

The DNA Center can dynamically scan the network for devices by querying IP addresses and follow CDP/LLDP information throughout the network.

Reference: CCNA Certification Study Guide, Volume 2: Exam 200-301
Chapter 22