200-105.exam

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Cisco

200-105

Interconnecting Cisco Networking Devices Part 2

Version 1.0

Exam A

QUESTION 1
You have executed the following commands on switch55:

```
switchA(config)# dot1x system-auth-control
switchA(config)# aaa new-model
switchA(config)# radius-server host 192.168.105.67 key firstKey111
switchA(config)# aaa authentication dot1x default group radius
switchA(config)# interface range Fa 0/1 - 11
switchA(config-if)# switchport mode access
switchA(config-if)# dot1x port-control auto
```

What is the result of executing the given commands? (Choose two.)

A. Only the listed RADIUS server is used for authentication
B. 802.1X authentication is enabled on the Fa0/1 interface only
C. The key for the RADIUS server is firstKey111
D. AAA is not enabled on the switch

Correct Answer: AC
Section: (none)
Explanation

Explanation/Reference:
Explanation:
As a result of executing these commands, the default list is used for the RADIUS server for authentication, and the key for the RADIUS server is firstKey111.

A RADIUS server combines the authentication and authorization processes. Before you configure the RADIUS server, you should enable AAA by using the aaa new-model command in global configuration mode. Then, you can specify the location of the RADIUS server and the key using the radius-server host command. In this case, the RADIUS server is located at the IP address 192.168.105.67 and requires the key firstKey111 as the encryption key. This key must be mutually agreed upon by the server and the clients.

The aaa authentication dot1x default group radius command creates a method list for 802.1X authentication. The default group radius keywords specify that the default method will be to use all listed RADIUS servers to authenticate clients. Since only one is listed, it will be the only one used.

It is incorrect to state that 802.1X authentication is enabled only on the Fa0/1 interface. The interface range Fa 0/1 - 11 and the dot1x port-control auto commands specify that 802.1X authentication is enabled on the interfaces Fa0/1 to Fa0/11.

It is incorrect to state that AAA is not enabled on the switch. The aaa new-model command enables AAA globally on the switch.

References:
https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/security/a1/sec-a1-cr-book/sec-cr-a2.html
https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/security/a1/sec-a1-cr-book/sec-cr-a2.html
https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/security/m1/sec-m1-cr-book/sec-cr-r1.html

QUESTION 2
Which command will display the Virtual LAN (VLAN) frame tagging method for a switch link?

A. show vlan
B. show vlan encapsulation
C. show vtp status
D. show interfaces trunk

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The show interfaces trunk command displays the list of trunk ports and the configured VLAN frame tagging methods.

Sample output of the show interfaces trunk command would be as follows:

SwitchB# show interfaces trunk
Port Mode Encapsulation Status Native vlan
Fa0/1 on 802.1q trunking 1
Fa0/2 on 802.1q trunking 1
Fa0/3 on 802.1q trunking 1
<<output omitted>>

The show vlan command displays the VLAN number, name, status, and ports assigned to individual VLANs. Although the command cannot be used to determine the frame tagging method used for each trunk, it can be used to determine which ports are trunk ports by the process of elimination.

In the output below, generated from a six-port switch, the missing port (Fa0/6) is a trunk port. For communication to be possible between the two VLANs configured on the switch, Fa0/6 must be connected to a router, and trunking must be configured on the router end as well. The command is also useful for verifying that a port has been assigned to the correct VLAN as it indicates in the VLAN column the VLAN to which each port belongs.

Switch# show vlan

Vlan name	Status	Ports
1 default	active	Fa0/1, Fa0/2, Fa0/3, Fa0/4
58 vlan 58	active	Fa0/5

The show vlan encapsulation command is not a valid command for Cisco switches.

The show vtp status command does not display VLAN frame tagging method. The command is used to verify the status of VTP. The output of the show vtp status command would be as follows:

SwitchB# show vtp status
VTP Version : 2
Configuration Revision : 1
Maximum VLANs supported locally : 64
Number of existing VLANs : 16
VTP Operating Mode : Client
VTP Domain Name : MARKETING
VTP Pruning Mode : Disabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
MD5 digest : 0x4D 0x60 0xA3 0x5E 0xC7 0x41 0x8C 0x47

Line 6 of the given output indicates that the switch is operating in VTP Client mode. There are three possible VTP modes in which a switch can operate: Server, Client, and Transparent.
- In Server mode, any changes made in the switch, such as adding a VLAN, will be recorded in the local database and also passed on to the other switches, where the change will be added.
- In Client mode, the switch will accept and record changes from switches in Server mode, but will not accept changes made on the local switch.
- In Transparent mode, the switch adds changes made locally to the database, but will not send or accept changes sent from other switches.

The mode in use could be a useful piece of information during troubleshooting. For example, if you were unsuccessfully attempting to add a VLAN to the database, the reason would be that the switch is in VTP Client mode. If you were adding a VLAN in Transparent mode, the VLAN would be added to the local database but fail to appear on the other switches. If the switch were in Transparent mode, Line 6 in the above output would appear as follows:

VTP Operating Mode: Transparent

Only switches operating in VTP Server mode can accept changes to the VLAN database. This situation could be corrected easily and a VLAN 50 could be successfully added at two different configuration prompts by executing the following commands:

At global configuration mode:

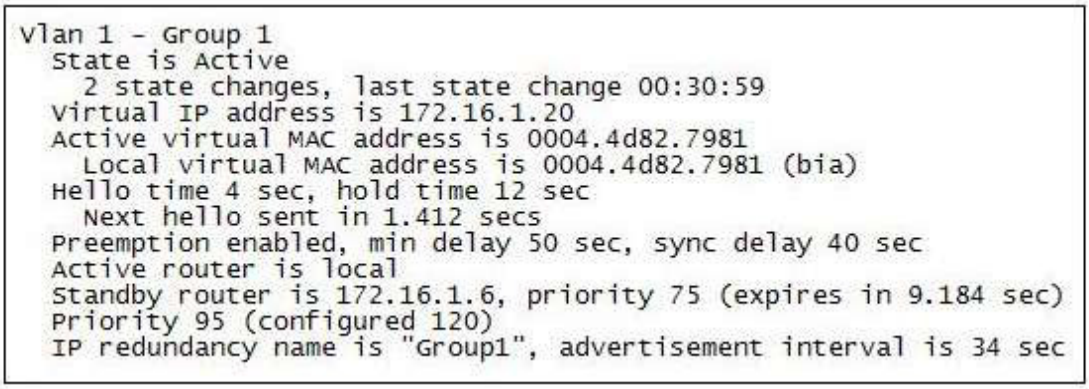
switchB# config t
switchB(config)# vtp mode server
switchB(config)# vlan 50

At VLAN configuration mode:

switchB# vlan database
switchB(vlan)# vtp server
switchB(vlan)# vlan 50

References:
http://www.ciscopress.com/articles/article.asp?p=102157&seqNum=6

QUESTION 3
The partial output displayed in the exhibit is a result of what IOS command? (Click on the Exhibit(s) button.)



A. switch# show running-config
B. switch# show standby vlan1 active brief
C. switch# show hsrp 1
D. switch# show standby

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The command show standby produces the output displayed in the exhibit. This command displays information about HSRP on all configured interfaces and for all HSRP groups. Important information in the exhibit includes that this router is the active router, the virtual IP address for the HSRP group is 172.16.1.20, the address of the

standby router is 172.16.1.6, and the router is configured to preempt.

The command show running-config will display the complete configuration of the device, including the configuration of HSRP, but will not display the current status of HSRP on the switch.

The command show standby vlan 1 active brief provides a summary display of all HSRP groups on the switch that are in the active state. This output would provide basic information, not nearly the detail indicated in the exhibit. The following is an example of output for show standby vlan 1 active brief:

Interface Grp Prio P State Active addr Standby addr Group addr
Vlan1 0 120 Active 172.16.1.5 Unknown 172.16.1.20

The command show hsrp 1 is not valid due to incorrect syntax.

References:
https://www.cisco.com/c/en/us/td/docs/ios/ipapp/command/reference/iap_s2.html
https://www.cisco.com/c/en/us/products/index.html

QUESTION 4
Which of the following are characteristics of Open Shortest Path First (OSPF)? (Choose three.)

A. Administrative distance of OSPF is 90
B. Administrative distance of OSPF is 110
C. OSPF uses the Dijkstra algorithm to calculate the SPF tree
D. OSPF uses the Diffusing Update algorithm (DUAL) algorithm to calculate the SPF tree
E. OSPF uses 224.0.0.5 as multicast address for ALLDRouters
F. OSPF uses 224.0.0.6 as multicast address for ALLDRouters

Correct Answer: BCF
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The following are characteristics of Open Shortest Path First (OSPF) routing protocol:
- The default administrative distance is 110.
- It uses 224.0.0.6 as the multicast address for ALLDRouters.
- It uses the Dijkstra algorithm to calculate the Shortest Path First (SPF) tree.
- It uses Internet Protocol (IP) protocol 89.
- OSPF supports Non-Broadcast Multi-Access (NBMA) networks such as Frame Relay, X.25, and Asynchronous Transfer Mode (ATM). The default hello interval for NBMA networks is 30 seconds.
- OSPF supports point-to-point and point-to-multipoint connections.
- It also supports authentication.
- OSPF uses 224.0.0.5 as the multicast address for ALLSPFRouters.
- It uses link-state updates and SPF calculations that provides fast convergence.
- OSPF is recommended for large networks due to good scalability.
- It uses cost as the default metric.
- There is no maximum hop count as with distance vector routing protocols. The number of hops to a network can be unlimited.
The option stating that AD of OSPF is 90 is incorrect because 90 is the default administrative distance for an internal Enhanced Interior Gateway Routing Protocol (EIGRP) route.

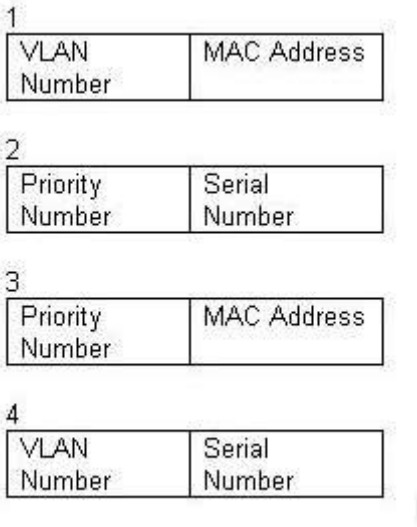
The option stating that OSPF uses the Diffusing Update algorithm (DUAL) algorithm to calculate the SPF tree is incorrect. The DUAL algorithm is used by EIGRP to calculate the SPF tree.

Keep the following in mind when comparing OSPF and EIGRP:
- EIGRP is vendor specific; OSPF is not
- EIGRP has an AD of 90; OSPF has an AD of 110

- OSPF elects a DR on each multi-access network; EIGRP does not
- OSPF uses cost as its metric, and EIGRP uses bandwidth as its metric
The option stating that OSPF uses 224.0.0.5 as multicast address for ALLDRouters is incorrect because OSPF uses 224.0.0.6 as multicast address for ALLDRouters, and 224.0.0.5 as multicast address for ALLSPFRouters.

References:
https://www.cisco.com/c/en/us/support/docs/ip/open-shortest-path-first-ospf/7039-1.html
https://www.cisco.com/en/US/tech/tk828/tech_brief09186a00800a4415.html

QUESTION 5
In the given exhibit, which combination shows the components of a bridge ID used for Spanning Tree Protocol (STP)?



A. 1
B. 2
C. 3
D. 4

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The bridge ID, also known as the switch ID, is used to elect the root bridge in a redundant network topology. The bridge ID has two components:
- Switch's priority number: Configured as 32768 on Cisco switches by default
- Switch's Media Access Control (MAC) address: The burnt-in hardware address of the network interface card (NIC)
The switch with the lowest bridge ID is elected as the root bridge. If the same priority number is configured on two or more switches in the network, the switch with the lowest MAC address will become the root.

Bridge Protocol Data Units (BPDUs) communicate the details of the switch with the lowest bridge ID in the network. The election process for the root bridge takes place every time there is a topology change in the network. A topology change may occur due to the failure of a root bridge or the addition of a new switch in the network. The root bridge originates BPDUs every two seconds, which are propagated by other switches throughout the network. BPDUs are used as keepalives between switches. If a switch stops receiving BPDUs from a neighboring switch for ten intervals (20 seconds), it will assume a designated role for the network segment.

The combinations of the remaining options are incorrect because Virtual LAN (VLAN) numbers and serial numbers are not components of a bridge ID.

References:
https://www.amazon.com/gp/product/1119288282/ref%3Das_li_tl?ie=UTF8&camp=1789&creative=9325&creativeASIN=1119288282&linkCode=as2&tag=transcender02-20&linkId=cd2bd2412c028f0db900fe3aef249938
https://www.cisco.com/c/en/us/td/docs/routers/7600/ios/12-2SXF/configuration/guide/swcg/spantree.html

QUESTION 6
Which of the following items are NOT required to match for two routers to form an OSPF adjacency?

A. Area IDs
B. Hello/Dead timers
C. Passwords (if OSPF authentication has been configured)
D. Process IDs

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
All of the listed items must match except for the process IDs. The process IDs are locally significant, which keeps multiple instances of OSPF separate on a router, and do not need to match between neighboring routers for the adjacency to form. Process identifiers can be valued from 1 to 65535.

Adjacencies must be formed before routing updates can be exchanged. OSPF routers will form neighbor adjacencies on common subnets if the following three items match:
- Area IDs
- Hello/Dead timers
- Passwords (if OSPF authentication has been configured)
Once an adjacency has been formed it will be maintained by the exchange of Hello messages. On a broadcast medium like Ethernet, they will be sent every 10 seconds. On point-to-point links, they will be sent every 30 seconds.

The show ip ospf interface interface number command can be used to display the state of the DR/BDR election process.

Consider the following output:

RouterA# show ip ospf interface fastethernet0/0

Fastethernet0/0 is up, line protocol is up
Internet Address 192.168.30.2/24, Area 0
Process ID 1, Router ID 192.168.45.1, Network Type BROADCAST, Cost: 10
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 192.168.45.1, Interface address 192.168.30.2
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
Hello due in 00:00:06

RouterB# show ip ospf interface fastethernet0/0
Fastethernet0/0 is up, line protocol is up
Internet Address 192.168.30.1/24, Area 0
Process ID 2, Router ID 192.168.60.1, Network Type BROADCAST, Cost: 10
Transmit Delay is 1 sec, State DR, Priority 2
Designated Router (ID) 192.168.60.1, Interface address 192.168.30.1

No backup designated router on this network
Timer intervals configured, Hello 30, Dead 60, Wait 40, Retransmit 5
Hello due in 00:00:12

The timer intervals' configured output reveals that RouterA is showing a Hello timer of 10 seconds and a Dead timer of 40 seconds. RouterB has a Hello timer of 30 seconds and a Dead timer of 60 seconds. Hello/Dead timers have to match before OSPF routers will form an adjacency. If you executed the debug ip ospf events command on one of the routers, the router at serial /01 will not form a neighbor relationship because of mismatched hello parameters:

RouterA# debug ip ospf events
OSPF events debugging is on
RouterA#
*Nov 9 05:41:21.456:OSPF:Rcv hello from 10.16.2.3 area 0 from Serial0/1
192.168.35.1
*Nov 9 05:41:21.698:OSPF:Mismatched hello parameters from
192.168.35.1

Hellos are used to establish neighbor adjacencies with other routers. On a point-to-point network, hello packets are sent to the multicast address 224.0.0.5, which is also known as the ALLSPFRouters address.

Area IDs have to match for OSPF routers to form an adjacency. Both of these routers have the interface correctly configured in matching Area 0.

The interface priorities do not have to match for OSPF routers to form an adjacency. Interface priorities can be configured to control which OSPF router becomes the designated router (DR) or backup designated router (BDR) on a multi-access network segment.

References:
https://www.cisco.com/c/en/us/support/docs/ip/open-shortest-path-first-ospf/13699-29.html

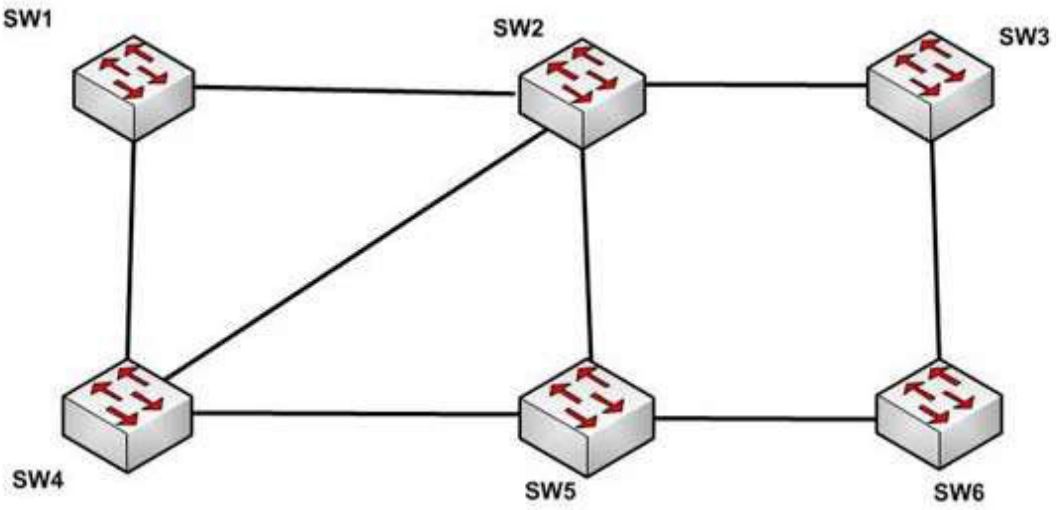
QUESTION 7
Why is it recommended to use Spanning Tree Protocol (STP) in Local Area Networks (LANs) with redundant paths?

A. To prevent loops
B. To manage VLANs
C. To load balance across different paths
D. To prevent forwarding of unnecessary broadcast traffic on trunk links

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Spanning Tree Protocol (STP) is a Layer 2 protocol used in LANs to maintain a loop-free network topology by recognizing physical redundancy in the network and logically blocking one or more redundant ports.

An example of switch redundancy is shown in the diagram below. The connection from SW4 to SW2, while providing beneficial redundancy, introduces the possibility of a switching loop.



STP probes the network at regular intervals to identify the failure or addition of a link, switch, or bridge. In the case of any topology changes, STP reconfigures switch ports to prevent loops. The end result is one active Layer 2 path through the switch network.

STP is not used for management of Virtual Local Area Networks (VLANs). VLAN Trunking Protocol (VTP) simplifies the management of VLANs by propagating configuration information throughout the switching fabric whenever changes are made. In the absence of VTP, switch VLAN information would have to be configured manually.

STP is not used to load-balance traffic across different redundant paths available in a topology. Load balancing allows a router to use multiple paths to a destination network. Routing protocols, Routing Information Protocol (RIP), RIPv2, Interior Gateway Routing Protocol (IGRP), Enhanced IGRP (EIGRP), and Open Shortest Path First (OSPF) support load balancing. Similarly, multiple links can be combined in a faster single link in switches. This can be achieved with the Fast EtherChannel or Gigabit EtherChannel features of Cisco switches.

STP does not prevent forwarding of unnecessary broadcast traffic on trunk links. This is achieved by manually configuring VLANs allowed on the trunk, or through VTP pruning.

References:
https://www.cisco.com/c/en/us/td/docs/routers/7600/ios/12-2SXF/configuration/guide/swcg/spantree.html

QUESTION 8
Which command produced the following output?

<output omitted>
Routing Process "ospf 203" with ID 21.0.0.1 and Domain ID 21.20.0.1
Supports only single TOS(TOS0) routes
Supports opaque LSA
SPF schedule delay 10 secs, Hold time between two SPFs 20 secs
Minimum LSA interval 10 secs. Minimum LSA arrival 5 secs
LSA group pacing timer 200secs
Interface flood pacing timer 110 msecs
Retransmission pacing timer 110 msecs
Number of external LSA 1. Checksum Sum 0x0
Number of opaque AS LSA 1. Checksum Sum 0x0
Number of DCbitless external and opaque AS LSA 0
Number of DoNotAge external and opaque AS LSA 0
Number of areas in this router is 3. 1 normal 0 stub 1 nssa
External flood list length 0

Area BACKBONE(0)
Number of interfaces in this area is 4
Area has message digest authentication
SPF algorithm executed 6 times
Area ranges are
Number of LSA 3. Checksum Sum 0x29BEB
Number of opaque link LSA 1. Checksum Sum 0x0
Number of DCbitless LSA 3
Number of indication LSA 0
Number of DoNotAge LSA 0
Flood list length 0

A. show ip ospf database
B. show ip ospf statistics
C. show ip ospf
D. show ip ospf traffic

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The output was produced by the show ip ospf command. The show ip ospf command is used to view information about the OSPF routing processes. The syntax of the command is as follows:

Router# show ip ospf [process-id]

The process-id parameter of the command specifies the process ID.

The show ip ospf database command is incorrect because this command is used to view the OSPF database for a specific router. The following is sample output from the show ip ospf database command when no arguments or keywords are used:

Router# show ip ospf database
OSPF Router with id(192.168.239.66) (Process ID 300)
Displaying Router Link States(Area 0.0.0.0)
Link ID ADV Router Age Seq# Checksum Link count
172.16.21.6 172.16.21.6 1724 0x80002CFB 0x69BC 5
172.16.21.5 172.16.21.5 2512 0x800009D2 0xA2B8 3
172.16.1.2 172.16.1.2 1659 0x80000A98 0x4CB6 7
172.16.1.1 172.16.1.1 5115 0x800009B6 0x5F2C 9
172.16.1.5 172.16.1.5 1626 0x80002BC 0x2A1A 4
172.16.65.6 172.16.65.6 1315 0x80001947 0xEEE1 9
172.16.241.5 172.16.241.5 1123 0x8000007C 0x7C70 1
172.16.27.6 172.16.27.6 1712 0x80000548 0x8641 4
172.16.70.6 172.16.70.6 1142 0x80000B97 0xEB84 6
Displaying Net Link States(Area 0.0.0.0)
Link ID ADV Router Age Seq# Checksum
172.16.1.3 192.168.239.66 1245 0x800000EC 0x82E
Displaying Summary Net Link States(Area 0.0.0.0)
Link ID ADV Router Age Seq# Checksum
172.16.240.0 172.16.241.5 1152 0x80000077 0x7A05
172.16.241.0 172.16.241.5 1152 0x80000070 0xAEB7
172.16.244.0 172.16.241.5 1152 0x80000071 0x95CB

The show ip ospf statistics command is incorrect because this command is used to view the OSPF calculation statistics. The following is sample output from the show ip ospf statistics command that shows a single line of information for each SPF calculation:

Router# show ip ospf statistics
OSPF process ID 200

Area 0: SPF algorithm executed 10 times
Area 200: SPF algorithm executed 8 times
Summary OSPF SPF statistic
SPF calculation time
Delta T Intra D-Intra Summ D-Summ Ext D-Ext Total Reason
08:17:16 0 0 0 0 0 0 0 R,
08:16:47 0 0 0 0 0 0 0 R, N,
08:16:37 0 0 0 0 0 0 0 R, X
00:04:40 208 40 208 44 220 0 720 R, N, SN, X
00:03:15 0 112 4 108 8 96 328 R, N, SN, X
00:02:55 164 40 176 44 188 0 612 R, N, SN, X
00:01:49 0 4 4 0 4 4 16 R, N, SN, X
00:01:48 0 0 4 0 4 0 12 R, N, SN, SA, X
00:01:43 0 0 4 0 4 0 8 R,
00:00:53 164 40 176 44 188 0 612 R, N, SN, X

The show ip ospf traffic command is incorrect because this is not a valid command.

References:
https://search.cisco.com/search?query=Cisco%20IOS%20IP%20Routing%20Command%20Reference&locale=enUS&tab=Cisco

QUESTION 9
Which of the following are Wide Area Network (WAN) protocols? (Choose three.)

A. PPP
B. AAA
C. WEP
D. STP
E. HDLC
F. Frame Relay

Correct Answer: AEF
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Point-to-Point Protocol (PPP), High-Level Data Link Control (HDLC), and Frame Relay are WAN protocols.

PPP is a WAN protocol is defined in Request for Comments (RFCs) 1332, 1661, and 2153. PPP works with asynchronous and synchronous serial interfaces as well as High-Speed Serial Interfaces (HSSI) and Integrated Services Digital Network (ISDN) interfaces (BRI and PRI). Some of the characteristics of PPP are:
- Can be used over analog circuits
- Can encapsulate several routed protocols, such as TCP/IP
- Provides error correction
- Should be used rather than HDLC when non-Cisco routers are involved, as it is implemented consistently among vendors
- PPP authentication can be used between the routers to prevent unauthorized callers from establishing an ISDN circuit
To change the encapsulation from the default of HDLC to PPP when connecting to a non-Cisco router, such as a Juniper, you would use the following command:

router(config)#interface serial S0

router(config-if)#encapsulation ppp

HDLC is a WAN protocol used with synchronous and asynchronous connections. It defines the frame type and interaction between two devices at the Data Link layer.

Frame Relay is a group of WAN protocols, including those from International Telecommunication Union (ITU-T) and American National Standards Institute (ANSI). Frame Relay defines interaction between the Frame Relay customer premises equipment (CPE) and the Frame Relay carrier switch. The connection across the carrier's network is not defined by the Frame Relay standards. Most carriers, however, use Asynchronous Transfer Mode (ATM) as a transport to move Frame Relay frames between different sites.

Authentication, Authorization, and Accounting (AAA) is incorrect because this is a scheme to monitor access control and activities on networked devices.

Wired Equivalent Privacy (WEP) is a security scheme for wireless networks and therefore it is incorrect.

Spanning Tree Protocol (STP) is for loop avoidance in redundant topologies. This option is incorrect because this protocol is used on Local Area Network (LAN).

References:
http://docwiki.cisco.com/wiki/Point-to-Point_Protocol
http://docwiki.cisco.com/wiki/Frame_Relay
https://www.cisco.com/c/en/us/support/docs/wan/high-level-data-link-control-hdlc/7927-hdlc-back.html

QUESTION 10
Your assistant is interested in gathering statistics about connection-oriented operations. Which of the following should be done to enhance the accuracy of the information gathered?

A. configure an IP SLA responder on the destination device
B. configure an IP SLA responder on the source device
C. schedule the operation on the destination device
D. add the verify-data command to the configuration of the operation

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Any IP SLA operations accuracy can be enhanced by configure an IP SLA responder on the destination device. It is important to note that only Cisco devices support the configuration as a responder.

You do not configure an IP SLA responder on the source device. You schedule the operation on the source device and the destination device is the one that is configured as a responder.

You do not schedule the operation on the destination device. You schedule the operation on the source device and the destination device is the one that is configured as a responder.

Adding the verify-data command to the configuration of the operation will not enhance the accuracy of the information gathered. When data verification is enabled, each operation response is checked for corruption. Use the verify-data command with caution during normal operations because it generates unnecessary overhead.

References:
https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/ipsla/configuration/15-mt/sla-15-mt-book/sla_tcp_conn.html

QUESTION 11
You would like for Router25 in your OSPF network to become the DR. You execute the show ip ospf interface command, receiving the output shown below.

Router25# show ip ospf interface
Ethernet0 is up, line protocol is up
Internet Address 10.10.10.1/24, Area 0
Process ID 1,Router ID 10.10.10.1, Network Type BROADCAST, Cost: 10
Transmit Delay is 1 sec, State BDR, Priority 1
Designated Router (ID) 172.16.10.1, Interface address 10.10.10.2
Backup Designated router(ID)10.10.10.1,Interface address 10.10.10.1
<output omitted>

You assign an IP address of 192.168.5.6 to the Ethernet1 interface of Router25 and enable the interface. However, Router25 does NOT become the designated router. What additional command must you execute to cause Router25 to become the DR?

A. Router25(config-router)# network 192.168.5.0 0.0.0.255 area 0
B. Router25(config-router)# network 192.168.5.0 0.0.0.255 area 1
C. Router25(config-router)# network 192.168.5.0 255.255.255.0 area 0
D. Router25(config)# network 192.168.5.0 0.0.0.255 area 0

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The command Router25(config-router)# network 192.168.5.0 0.0.0.255 area 0 must be executed to enable Router25 to become the DR. For an interface to be considered in the DR election, it must be advertised in OSPF. Otherwise, it is not participating in OSPF routing and you may be faced with the situation illustrated by the output of the shown ip ospf interface command below:

Router25# show ip ospf interface
Ethernet0 is up, line protocol is up
Internet Address 10.10.10.1/24, Area 0
Process ID 1,Router ID 225.16.33.4, Network Type BROADCAST, Cost: 10
Transmit Delay is 1 sec, State BDR, Priority 1
Designated Router (ID) 172.16.10.1, Interface address 10.10.10.2
Backup Designated router(ID)225.16.33.4,Interface address 10.10.10.1
<output omitted>

The RID of Router25, 225.16.33.4, is higher than that of the current DR, which has an RID of 172.16.10.1. Despite that fact, Router 25 did not become the DR because the 225.0.0.0 network has not been advertised. This could be verified by executing the show ip protocols command as shown below:

Router25# show ip protocols

Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 225.16.33.4
<output omitted>

Routing for Networks:
10.0.0.0 0.0.0.255 area 0

As only the 10.0.0.0 network is being advertised, the 225.16.33.4 IP address will not be a factor in the DR election.

The command Router25(config-router)# network 192.168.5.0 0.0.0.255 area 1 is incorrect because it references area 1 instead of area 0, which is the area in use in this scenario.

The command Router25(config-router)# network 192.168.5.0 255.255.255.0 area 0 is incorrect because it uses a regular mask instead of a wildcard mask. Network commands in OSPF must use a wildcard mask.

The command Router25(config)# network 192.168.5.0 0.0.0.255 area 0 is incorrect because it is executed at the global configuration, router25(config)#, prompt rather than the OSPF configuration prompt, router25(config-router)#.

References:
https://www.cisco.com/c/en/us/support/docs/ip/open-shortest-path-first-ospf/7039-1.html

QUESTION 12
Which WAN switching technology is used with ISDN?

A. packet switching
B. virtual switching
C. circuit switching
D. cell switching

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Circuit switching dynamically establishes a connection between a source and a destination. The connection cannot be used by other callers until the circuit is released. Circuit switching is the most common technique used with the public switched telephone network (PSTN) to make phone calls. During a call, a dedicated virtual circuit is temporarily established between the caller and receiver for the duration of the call. Once the caller or receiver hangs up the phone, the circuit is released and is made available for other users.

Packet switching is a technique popularly used for transfer of data that is not delay sensitive and does not require real-time transfer rates from a sender to a receiver. Also unlike circuit switching which makes a fixed amount of bandwidth available for the connection (which may not be fully utilized) packet switching uses bandwidth more efficiently. With packet switching, the data is broken into labeled packets and is transmitted using packet-switching networks.

Cell switching is used by Asynchronous Transfer Mode (ATM). ATM is an International Telecommunication Union-Telecommunications (ITU-T) standard for transmission of data, voice, or video traffic using a fixed size frame of 53 bytes, known as cells. Of these 53 bytes, the initial five bytes are header information and the remaining 48 bytes are the payload. These cells are transmitted over a path that may vary with each cell. It does not maintain a dedicated virtual circuit.

The term "virtual switching" is incorrect because it is not a valid WAN switching technology.

References:
http://docwiki.cisco.com/wiki/Introduction_to_WAN_Technologies#Circuit_Switching

QUESTION 13
Which of the following commands could you use to verify the type of serial cable you are connected to (DCE or DTE)?

A. show interfaces
B. show controllers
C. show ip interface
D. show interface dce
E. show interface switchport

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The show controllers command provides hardware-related information used to troubleshoot and diagnose issues with Cisco router interfaces. The output of the command is as follows:

routerA# show controllers serial 0
HD unit 1, idb = 0x1C44E8, driver structure at 0x1CBAC8
buffer size 1524 HD unit 1
V.35 DTE cable, clock rate 64000

The preceding output indicates that a V.35 DTE cable is currently connected to interface Serial 0, and that a clock rate of 64000 bps has been detected from the DCE (the other side of the serial link). When the other end is a CSU/DSU, as is usually the case, the clock rate is provided by the CSU/DSU. The clocks stopped portion of the following output would indicate that a clock rate has not been detected from the DCE:

routerA# show controllers serial 0
HD unit 1, idb = 0x1C44E8, driver structure at 0x1CBAC8
buffer size 1524 HD unit 1
V.35 DTE cable, clocks stopped

This condition would be rectified by configuring a clock rate on the DCE router.

The show interfaces, show ip interface, and show interface switchport commands do not display any hardware-related information, such as connected cable types.

The show interface dce command is incorrect because this is not a valid Cisco IOS command.

QUESTION 14
You have implemented the following IP SLA configuration, as shown in the following partial output of the show run command:

ip sla 1
dns cow.cisco.com name-server 10.52.128.30
ip sla schedule 1 start-time now

Which of the following statements is true of this configuration?

A. It will find the response time to resolve the DNS name cow.cisco.com
B. It will find the response time to connect to the DNS server at 10.52.128.30
C. It will start in one minute
D. It will gather data from one minute

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
It will find the response time to resolve the DNS name cow.cisco.com. Domain Name System (DNS) response time is computed by calculating the difference between the time taken to send a DNS request and the time a reply is received. The Cisco IOS IP SLAs DNS operation queries for an IP address if the user specifies a hostname, or queries for a hostname if the user specifies an IP address.

It will not find the response time to connect to the DNS server at 10.52.128.30. That is the IP address of the

DNS server being used for the operation (10.52.128.30). However, it will measure the response time to resolve the DNS name cow.cisco.com.

It will not start in one minute. It will start immediately, as indicated by the start-time now parameter.

It will not gather data for one minute. The numeral 1 in the first line refers to the IP SLA number, and the numeral 1 in the last line refers to the IP SLA number to be scheduled.

References:
https://www.cisco.com/en/US/technologies/tk648/tk362/tk920/technologies_white_paper09186a00802d5efe.html

QUESTION 15
Which of the following statements are NOT true, based on the output below?
Access1#show spanning-tree vlan 10

VLAN0010

Spanning tree enabled protocol rstp
Root ID Priority 24586
Address 0015.63f6.b700
Cost 19
Port 107 (FastEthernet3/0/1)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32778 (priority 32768 sys-id-ext 10)
Address 000f.f794.3d00
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300

Interface Role Sts Cost Prio.Nbr Type
---------- ---- --- --------- -------- --------------------------
Fa3/0/1 Root FWD 19 128.107 P2p
Fa3/0/2 Altn BLK 19 128.108 P2p

A. This switch is the root bridge.
B. This switch has a priority of 32778.
C. This switch has a MAC address of 0015.63f6.b700.
D. This switch is the root bridge.
E. All ports will be in a state of discarding, learning, or forwarding.
F. All designated ports are in a forwarding state.
G. This switch is using the default priority for STP

Correct Answer: AC
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The upper half of the output provides information about the root bridge. It indicates that the root bridge has a bridge priority of 24586 and a MAC address of 0015.63f6.b700. The bottom half of the output pertains to the current switch, and indicates that this switch has a bridge priority of 32778 and a MAC address of 000f.f794.3d00.

The value of the switch bridge priority is arrived at by adding the configured priority of 32768, which is indicated by the line priority 32768 sys-id-ext 10, to the VLAN ID of 10. Because 32768 is the default bridge priority for STP, this switch is set to the default priority for STP.

The priority of this switch is 32778. The bridge priority is arrived at by adding the configured priority of 32768 to the VLAN ID of 10.

This switch is not the root bridge, as indicated by the differences in priorities and MAC addresses between the root ID and the bridge ID output. If this were the root bridge, the MAC addresses and priority values would be the same in both the Root ID and the Bridge ID sections.

Finally, when a switch is using RSTP, as indicated by the output Spanning tree enabled protocol rstp, all ports will be in a state of discarding, learning, or forwarding, with all designated ports in a forwarding state. When RSTP has converged, all ports will be in either the discarding or forwarding states.

References:
https://www.cisco.com/c/en/us/td/docs/ios/lanswitch/command/reference/lsw_book/lsw_s1.html

QUESTION 16
Which classful protocols perform an automatic summarization of routes when routers send updates across major classful network boundaries? (Choose two.)

A. RIPv1
B. RIPv2
C. IGRP
D. OSPF
E. EIGRP
F. BGPv4

Correct Answer: AC
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The classful routing protocols Routing Information Protocol version1 (RIPv1) and Interior Gateway Routing Protocol (IGRP) summarize routes at classful network boundaries. RIPv1 is a standard distance vector protocol that uses hop count as a metric. IGRP is a Cisco Systems proprietary distance vector routing protocol that has a composite metric based on bandwidth, delay, load, reliability, and maximum transmission unit (MTU).

In classless routing protocols RIPv2, Open Shortest Path First (OSPF), Enhanced IGRP (EIGRP) and Border Gateway Protocol version 4 (BGPv4), route summarization can be controlled manually at any bit position in the IP address. Classless routing protocols transmit subnet mask along with the routes, and therefore manual summarization may be required at times to keep the routing table size in control.

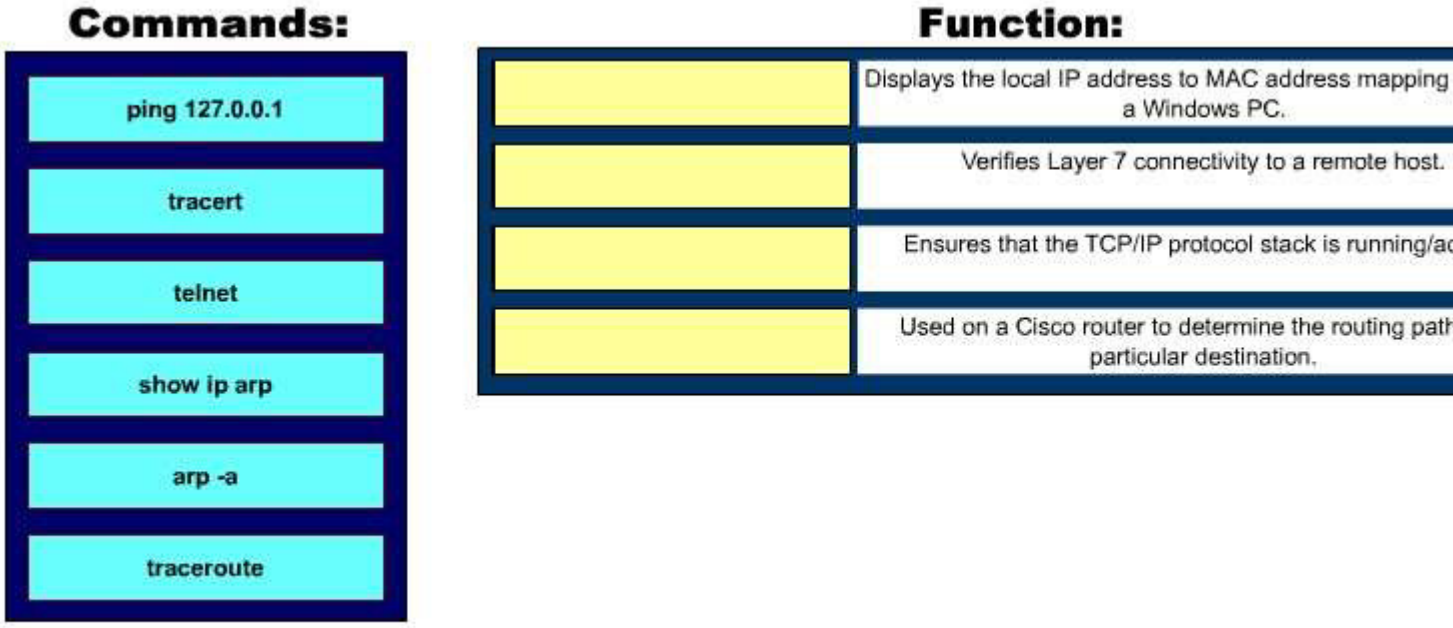
It should be noted that RIPv2 and EIGRP, although classless protocols, will perform automatic summarization by default unless the no auto-summary command is configured. Once no auto-summary is configured, you can manually configure summarization on any bit position in the IP address. Since you can override auto-summarization in both RIPv2 and EIGRP, RIPv1 and IGRP are better answers to this question.

References:
http://www.ciscopress.com/articles/article.asp?p=330807&seqNum=4&rl=1

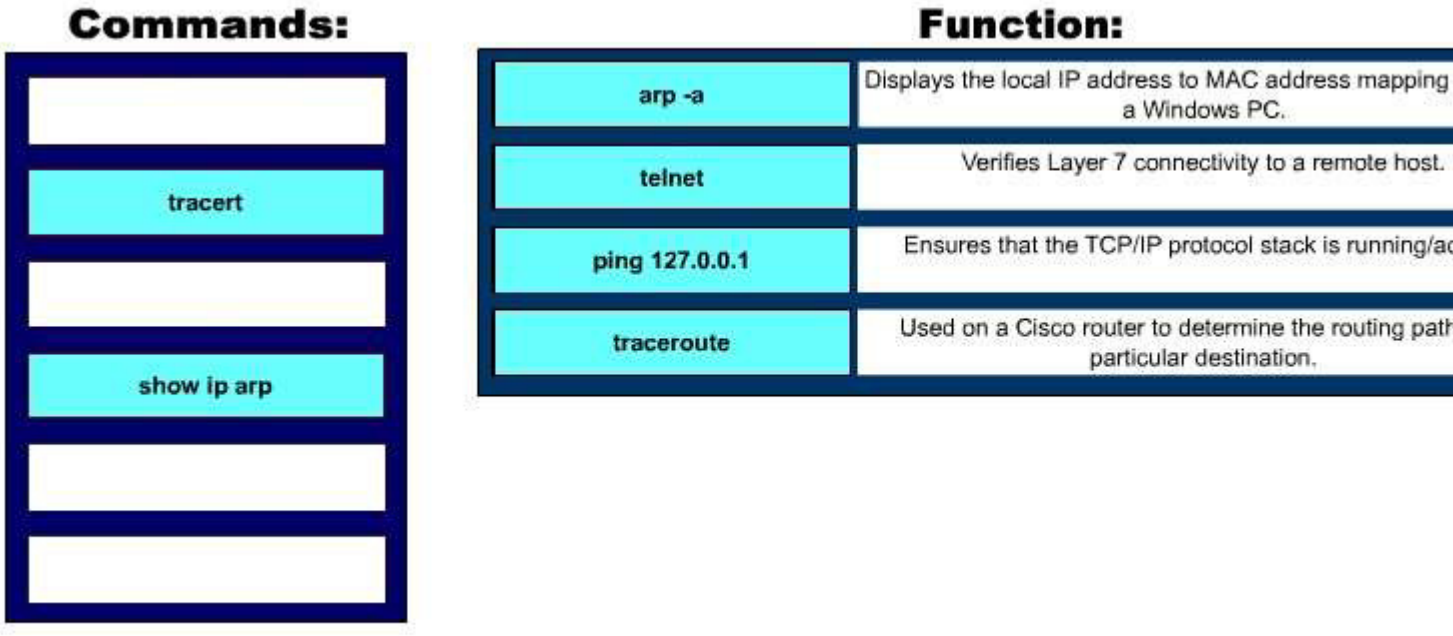
QUESTION 17
DRAG DROP

Click and drag the command line tools used to troubleshoot the network problems on the left to their associated functions on the right. Not all commands may be used.

Select and Place:



Correct Answer:



Section: (none)
Explanation

Explanation/Reference:
Explanation:

The following commands can be used to troubleshoot network connectivity problems:

- ping 127.0.0.1: This command will attempt to contact the local TCP/IP protocol stack. The 127.0.0.1 address is the reserved loopback IP address, which allows applications to communicate with the local system without using an actual IP address assigned to an interface, such as a workstation's Ethernet port. Thus, this command allows you to ping yourself, and if successful, only verifies that TCP/IP is running locally. It does not confirm that the system can communicate with any other host on the network.
- telnet: Telnet is a network application used to establish a remote terminal connection to a host, such as logging in remotely to a Cisco router or switch via TCP/IP. Since network applications reside on the OSI Application Layer (Layer 7), a successful Telnet connection to a remote has confirms that there is network connectivity through Layer 7.
- arp ? a: This command is used to display the local IP address to MAC address mappings on a Windows PC.
- traceroute: This command is used on a Cisco router or switch to verify, or trace, the path that IP packets will take towards a particular destination.
- tracert: This command is used on a Windows PC to verify, or trace, the path that IP packets will take towards a particular destination.
- show ip arp: This command is used to display the local IP address to MAC address mappings on a Cisco router or switch.

References:
https://www.cisco.com/en/US/docs/internetworking/troubleshooting/guide/tr1902.html
http://www.ciscopress.com/articles/article.asp?p=98156&seqNum=4

QUESTION 18
Which redundancy mode for supervisor engine modules exhibits all of the following characteristics?

- Static routes are maintained during a switchover
- The Forwarding Information Base (FIB) is cleared during a switchover
- Dynamic route information is cleared during a switchover
- Route engine is initialized and switch modules are loaded

A. RPR
B. RPR+
C. SSO
D. NSF

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Redundant supervisor engine modules can be configured in several modes. In route processor redundancy plus (RPR+) mode, the backup module is booted up and the supervisor and route engines initialize. However, no Layer 2 or Layer 3 functions are started, which means it will be necessary to start them after a failover. This also means the routing protocols must re-converge and the FIB table must be rebuilt, since it is derived from the routing table. The static routes are maintained in the running configuration, so they are not lost in the failover.

In route processor redundancy (RPR) mode, the module is booted, but the supervisor and route engines are not initialized.

In stateful switchover (SSO) mode, all functionality provided by RPR+ is available at failover, and the FIB table is not cleared.

Non-stop forwarding (NSF) is not a redundant supervisor engine module mode but an additional redundancy feature designed to reduce the amount of time needed to rebuild the routing information base (RIB) table after a supervisor failure. Instead of waiting for any Layer 3 routing protocols to converge and rebuild the Forwarding

Information Base (FIB), the router will use NSF to get assistance from other NSF-aware neighbors, allowing the routing information to be rebuilt quickly.

References:
https://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst4500/12-2/20ew/configuration/guide/config/RPR.html

QUESTION 19
Which of the following is NOT managed by the cloud provider in an IaaS deployment?

A. virtualization
B. servers
C. storage
D. operating system

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Operating systems are not managed by the cloud provider in an Infrastructure as a service (IaaS) deployment. Only storage, virtualization, servers, and networking are the responsibility of the provider. The customer is responsible for the following with IaaS:
- Operating systems
- Data
- Applications
- Middleware
- Runtime

In a Platform as a Service (PaaS) deployment, the provider is responsible for all except the following, which is the responsibility of the customer:
- Applications
- Data

In Software as a Service (SaaS) deployment, the provider is responsible for everything.

References:
https://apprenda.com/library/paas/iaas-paas-saas-explained-compared/

QUESTION 20
Which of the following statements is true with regard to SDN?

A. It combines the control plane and the data plane
B. It separates the data plane and the forwarding plan
C. It implements the control plane as software
D. It implements the data plane as software

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
In Software-defined networking (SDN), the control plane is separated from the data (or forwarding) plane and is implemented through software. The data plane remains on each physical device but the control plane is managed centrally for all devices though software.

SDN does not combine the data and control plane. Instead it decouples them.

SDN does not separate the data plane and the forwarding plan. These are both names for the same plane; that is, a data plane is a forwarding plane.

SDN does not implement the data plane as software. The data plane remains on each physical device.

References:
http://www.techrepublic.com/article/software-defined-networking-the-cisco-approach/

QUESTION 21
What command can be used on a Cisco switch to display the virtual MAC address for the HSRP groups of which the switch is a member?

A. switch# show standby mac
B. switch# show hsrp mac
C. switch# show standby
D. switch# show standby brief

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The command show standby can be used to display the virtual MAC address for HSRP groups of which a switch is a member. This command displays information about HSRP on all configured interfaces and for all HSRP groups. It also displays hello timer information and the expiration timer for the standby switch. The standby switch will take over as the active switch if the timer expires before it hears a heartbeat from the active switch. Below is an example of the show standby command for the HSRP group 1:

Tacoma# show standby

Fastethernet0/1 - group 1
State is active
3 state changes, last state change 00:22:49
Virtual IP address is 192.168.5.3
Secondary virtual ip address 192.168.5.3
Active virtual MAC address is 0006.6b45.5801
Local virtual MAC address is 0006.6b45.5812(bia)
Hello time is 4 sec, hold time 12 sec
Next hello sent in 1.664 sec
Preemption enabled, min delay 50 sec, sync delay 40 sec
Active router is local
Standby router is unknown expired
Priority 95 (configured 120)
Tracking 2 objects, 0 up
Down Interface Fastethernet0/2, pri 15
Down Interface Fastethernet0/3
IP redundancy name is "HSRP1", advertisement interval is 34 sec

In the above output, the following can be determined:
- The router is currently active for the group, as can be seen in line 2. The Active Virtual MAC address is 0006.6b45.5801, which includes the group number (1) in the last two positions, which is why the address is different from the routers actual MAC address shown on the next line. Special Note: Some router models (Cisco 2500, 4000 and 4500) WILL NOT use this altered MAC address format, but will instead use the real MAC address for the virtual MAC address and will display that MAC address as the virtual MAC address in the output of the show standby command. An example of the output of the show standby command on an older router such as the 2500 would be as follows:

```
Router# show standby
Ethernet0/1 - Group 1
   State is Active
   2 state changes, last state change 00:30:59
   Virtual IP address is 10.1.0.20
   Secondary virtual IP address 10.1.0.21
   Active virtual MAC address is 0004.4d82.7981
   Local virtual MAC address is 0004.4d82.7981 (bia)
```

These routers have Ethernet hardware that only recognize a single MAC address. In either case if for some reason this router becomes the standby router, such as due to loss of interfaces, then when the interfaces come back up it will be able to recover the active role because it is set for preemption, as shown on line 10.
- The router is tracking two of its own interfaces. Because both interfaces are down, the router's priority has been reduced by 25 (15 for Fastethernet0/2 and 10 for Fastethernet0/3), from the configured value of 120 to 95. This data is shown on lines 13-16. The default is 10 if not otherwise specified, as is the case for Fastethernet0/3.
- If either of the two interfaces comes back up, the priority will be increased by the amount assigned to the interface. For example, if Fastethernet0/3 comes back up, the priority will become 105 (95 + 10).
- The standby router is unreachable, which can be determined because it is marked unknown expired in line 12. This could be due to either a physical layer issue or an HSRP misconfiguration.
The command show standby brief can be used to view summary information about HSRP groups of which the switch is a member. This information includes the group number, priority, state, active device address, standby address, and group address. It does not include the virtual MAC address.

The commands show standby mac and show hsrp mac are invalid due to incorrect syntax.

References:
https://www.cisco.com/c/en/us/td/docs/ios/ipapp/command/reference/iap_s4.html
https://www.cisco.com/c/en/us/products/index.html

QUESTION 22
Which Cisco Internetwork Operating System (IOS) command is used to view the number of Enhanced Interior Gateway Routing Protocol (EIGRP) packets that are sent and received?

A. show eigrp neighbors
B. show ip eigrp interfaces
C. show ip eigrp packets
D. show ip eigrp traffic
E. show ip route
F. show ip eigrp topology

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The show ip eigrp traffic command is used to view the number of EIGRP packets that are sent and received.
The syntax of the command is:

Router# show ip eigrp traffic [autonomous-system-number]

The autonomous-system-number parameter is optional. The output of the command is as follows:

Router# show ip eigrp traffic

IP-EIGRP Traffic Statistics for process 78
Hellos sent/received: 2180/2005
Updates sent/received: 70/21
Queries sent/received: 3/1
Replies sent/received: 0/3
Acks sent/received: 22/11

The show ip eigrp neighbors command is incorrect because it does not show the number of packets sent or received. It does show IP addresses of the devices with which the router has established an adjacency, as well as the retransmit interval and the queue count for each neighbor, as shown below:

Router# show ip eigrp neighbors
IP-EIGRP Neighbors for process 49
Address Interface Holdtime Uptime Q Seq SRTT RTO
(secs) (h:m:s) Count Num (ms) (ms)
146.89.81.28 Ethernet1 13 0:00:41 0 11 4 20
146.89.80.28 Ethernet0 12 0:02:01 0 10 12 24
146.89.80.31 Ethernet0 11 0:02:02 0 4 5 20

The show ip eigrp interfaces command is incorrect because this command is used to view information about the interfaces configured for EIGRP.

The show ip eigrp packets command is incorrect because it is not a valid Cisco IOS commands.

The show ip route command will not display EIGRP packets that are sent and received. It is used to view the routing table. When connectivity problems occur between subnets, this is the logical first command to execute. Routers must have routes to successfully send packets to remote subnets. Using this command is especially relevant when the underlying physical connection to the remote network has been verified as functional, but routing is still not occurring.

The show ip eigrp topology command is incorrect because it does not show the number of packets sent or received. This command displays all successor and feasible successor routes (if they exist) to each network. If you are interested in that information for only a specific destination network, you can specify that as shown in the output below. When you do, the command output displays all possible routes, including those that are not feasible successors:

Router# show ip eigrp topology 25.0.0.5 255.255.255.255

IP-EIGRP topology entry for 25.0.0.5/32 State is Passive, Query origin flag is 1, 1 Successor(s), FD is 41152000

<output omitted>

10.1.0.1 (serial0), from 10.1.0.1 composite
metric is 46152000/41640000
<output omitted>
10.0.0.2 (serial0.1), from 10.0.0.2
composite metric is 53973240/120256
<output omitted>
10.1.0.3 (serial0), from 10.1.0.3
composite metric is 46866176/46354176
<output omitted>
10.1.1.1 (serial0.1), from 10.1.1.1
composite metric is 46670776/46251776
<output omitted>

In the above output, four routers are providing a route to the network specified in the command. However, only one of the submitted routes satisfies the feasibility test. This test dictates that to be a feasible successor, the

advertised distance of the route must be less than the feasible distance of the current successor route.

The current successor route has a FD of 41152000, as shown in the first section of the output. In the values listed for each of the four submitted routes, the first number is the feasible distance and the second is the advertised distance. Only the route received from 10.0.0.2 (second section) with FD/AD values of 53973240/120256 satisfies this requirement, and thus this route is the only feasible successor route present in the topology table for the network specified in the command.

References:
https://www.cisco.com/c/en/us/td/docs/ios/12_2/iproute/command/reference/fiprrp_r/1rfeigrp.html

QUESTION 23
What command should you use to quickly view the HSRP state of the switch for all HSRP groups of which the switch is a member?

A. switch# show standby brief
B. switch# show ip interface brief
C. switch# show hsrp
D. switch# show standby

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The command show standby brief should be used to quickly view the HSRP state of a switch for all HSRP groups of which it is a member. The summary information it provides includes the group number, priority, state, active device address, standby address, and group address.

The command show standby can be used to display detailed information about HSRP groups of which a switch is a member. This command would not provide a quick view. This command displays information about HSRP on all configured interfaces and for all HSRP groups. It also displays hello timer information and the expiration timer for the standby switch.

The command show ip interface brief is useful in that lists the interfaces and displays the basic IP configuration of each. This output would include the IP address of the interface and the state of the interface, but not HSRP information.

The command show hsrp is not a valid command due to incorrect syntax.

References:
https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/ipaddr/command/ipaddr-cr-book/ipaddr-r1.html
https://www.cisco.com/c/en/us/products/index.html

QUESTION 24
What command would be used to verify trusted DHCP ports?

A. show mls qos
B. show ip dhcp snooping
C. show ip trust
D. show ip arp trust

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:

Explanation:
The command show ip dhcp snooping is used to verify trusted DHCP ports. This command is used to verify which ports are intended to have DHCP servers connected to them.

DHCP snooping creates an IP address to MAC address database that is used by Dynamic ARP Inspection (DAI) to validate ARP packets. It compares the MAC address and IP address in ARP packets, and only permits the traffic if the addresses match. This eliminates attackers that are spoofing MAC addresses.

DHCP snooping is used to define ports as trusted for DHCP server connections. The purpose of DHCP snooping is to mitigate DHCP spoofing attacks. DHCP snooping can be used to determine what ports are able to send DHCP server packets, such as DHCPOFFER, DHCPACK, and DHCPNAK. DHCP snooping can also cache the MAC address to IP address mapping for clients receiving DHCP addresses from a valid DHCP server.

MLS QOS has no bearing on DHCP services, so show mls qos is not correct.

The other commands are incorrect because they have invalid syntax.

References:
https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/ipaddr/command/ipaddr-cr-book/ipaddr-r1.html

QUESTION 25
Which of the following TCP port numbers is used by Simple Mail Transfer Protocol (SMTP)?

A. 23
B. 21
C. 53
D. 80
E. 57
F. 25

Correct Answer: F
Section: (none)
Explanation

Explanation/Reference:
Explanation:
TCP port 25 is assigned to SMTP. SMTP is a Transmission Control Protocol (TCP)/ Internet Protocol (IP) protocol used to send and receive e-mail messages.

Important TCP port number assignments are as follows:
- TCP port 23 is used by Telnet to allow remote logins.
- TCP port 21 is assigned to File Transfer Protocol (FTP) for FTP control. FTP also uses port 20 to transmit FTP data.
- TCP and User Datagram Protocol (UDP) port 53 is assigned to Domain Name Service (DNS), which is used to convert hostnames into Internet Protocol (IP) addresses.
- TCP port 80 is used by Hypertext Transfer Protocol (HTTP), which is the base for transferring Web pages over the Internet.
- TCP port 57 is assigned to Mail Transfer Protocol (MTP).
- TCP port 22 is used by Secure Shell (SSH).
- UDP ports 67 and 68 are used by Dynamic Host Configuration Protocol (DHCP).
- UDP port 69 is used by Trivial FTP (TFTP).
- TCP port 110 is used by Post Office Protocol 3 (POP3).
- UDP port 161 is used by Simple Network Management Protocol (SNMP).
- TCP port 443 is used by Secure Sockets Layer (SSL).
TCP port numbers help to direct data to the appropriate application, service, or application window. TCP port numbers ensure that data is displayed in the correct browser window when accessing Web data from multiple sources, and ensures it is directed to the proper application or service when received.

References:
http://docwiki.cisco.com/wiki/Internetworking_Basics#Multiplexing_Basics

QUESTION 26
You have connected two routers in a lab using a Data Terminal Equipment (DTE)-to-Data Circuit-terminating Equipment (DCE) cable. Which command must be issued on the DCE end for the connection to function?

A. bandwidth
B. no clock rate
C. clock rate
D. no bandwidth

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
You should issue the clock rate command on the DCE end for the connection to function. The clock rate is set on the Data Circuit-terminating Equipment (DCE) device. DCE is also known as Data Communications Equipment.

The DCE terminates a physical WAN connection, provides clocking and synchronization of a connection between two locations, and connects to a DTE. The DCE category includes equipment such as CSU/DSUs, NT1s, and modems. In the real world, the clock rate is provided by the CSU/DSU end at the telcom provider. In a lab, you must instruct the DCE end to provide a clock rate.

The DTE is an end user device, such as a router or a PC, which connects to the WAN via the DCE device.

You would not issue the bandwidth command. This command is used to inform the router of the bandwidth of the connection for purposes of calculating best routes to locations where multiple routes exist. It is not necessary for the link described to function.

You should not issue the no clock rate command. This command is used to remove any previous settings implemented with the clock rate command.

You would not issue the no bandwidth command. This command is used to remove any previous settings implemented with the bandwidth command

References:
CCNA ICND2 Official Exam Certification Guide (Cisco Press, ISBN 1-58720-181-X), Chapter 12: Point-to-Point WANs, pp. 446-447.

QUESTION 27
Which two statements are TRUE of synchronous serial ports? (Choose two.)

A. These ports can be used to provide leased-line or dial-up communications.
B. These ports do not support the High-Level Data Link Control (HDLC) encapsulation method.
C. An AUI connector is used with serial ports.
D. These ports can be used to configure high-speed lines (E1 or T1).
E. An RJ-45 connector is used with serial ports.

Correct Answer: AD
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Synchronous serial ports can be used to provide leased-line or dial-up communications, and these ports can be used to configure high-speed lines (E1 or T1). The following are also true of synchronous serial ports:
- With the help of synchronous serial lines, dialers can be configured, which are then used to support dial-on-demand routing.
- These ports are found on several serial network interface processors and cards.

The option stating that synchronous serial ports cannot support High-Level Data Link Control (HDLC) encapsulation method is incorrect because HDLC is the default encapsulation method configured on serial interfaces.

The option stating that an AUI connector is used with serial ports is incorrect because AUI is a connector used with Ethernet ports.

The option stating that an RJ-45 connector is used with serial ports is incorrect because RJ-45 and RJ-48 connectors are used with ISDN BRI connections.

QUESTION 28
Which VLAN can NOT be filtered through the VLAN Trunking Protocol (VTP) Pruning feature of Cisco switches?

A. VLAN 1
B. VLAN 10
C. VLAN 100
D. VLAN 1000

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
VLAN 1 traffic cannot be pruned. Cisco recommends that VLAN 1 be used for management of VLANs.

VTP pruning is a Cisco VTP feature that allows switches to dynamically delete or add VLANs to a trunk for traffic transmission. It creates an efficient switching network by optimal use of available trunk bandwidth.

The options 10, 100, and 1000 are incorrect because these VLAN numbers can be pruned. By default, VLANs 2 to 1000 are eligible for pruning.

References:
http://www.ciscopress.com/articles/article.asp?p=102157&seqNum=6

QUESTION 29
Which command was used to create the following configuration?

Router# show ip protocol
Routing Protocol is "eigrp 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Redistributing: eigrp 1
Automatic network summarization is in effect
Routing for Networks:
192.168.1.80/28
192.168.1.128/28
Routing Information Sources:
Gateway Distance Last Update
192.168.1.85 90 0:04:01

Distance: internal 90 external 170

A. Router(config-router)# network 192.168.1.0 0.0.0.15
B. Router(config-router)# network 192.168.1.0 255.255.255.0
C. Router(config-router)# network 192.168.1.80
D. Router(config-router)# network 192.168.1.128
E. Router(config-router)# network 192.168.1.0

Correct Answer: E
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The network 192.168.1.0 command instructs the router to activate EIGRP on every interface that belongs to the class C network 192.168.1.0. The exhibit indicates that the router is running EIGRP on two subnets of 192.168.1.0 (192.168.1.80/28 and 192.168.1.128/28). Since both of these are subnets of the same class C network number, only the class C address needs to be referenced with a network statement.

All interfaces that will participate in EIGRP must be specified with a network command that specifying the network of which the interface is a member. Failure to do so will result in neighbor relationships not forming. In the example below, Router A and Router B are directly connected, but not forming a neighbor relationship. The network they share is the 192.168.5.0/24 network. The output of the show run command for both routers reveals that Router B does not have EIGRP running on the 192.168.5.0 network.

RouterA#show run	Router B#show run
<output omitted>	<output omitted>
router eigrp 36	router eigrp 36
network 192.168.5.0	network 10.0.0.0

The network 192.168.1.0 0.0.0.15 command is incorrect because only the class C network number (192.168.1.0) needs to be referenced to enable EIGRP on all subnets. It is actually valid to include an inverse mask with EIGRP network statements, but it is unnecessary in this case, and the network/mask provided does not match either of the routed networks.

The network 192.168.1.0 255.255.255.0 command is incorrect because the mask is unnecessary in this case, and if masks are included, they must be expressed inversely (0.0.0.255).

It is unnecessary to configure two network commands in this example, as both networks are subnets of the same class C network (192.168.1.0), and a single network command can enable EIGRP on both. Additionally, if specific subnets are referenced in network commands, it is necessary to include an inverse mask after them, or EIGRP will automatically summarize the command to the classful boundary.

References:
https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute_eigrp/configuration/12-4t/ire-12-4t-book.pdf

QUESTION 30
Which metric does the Open Shortest Path First (OSPF) routing protocol use for optimal path calculation?

A. MTU
B. Cost
C. Delay
D. Hop count

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
OSPF is a link-state routing protocol which uses cost as a metric for optimal path calculation. It is an open standard protocol based on Dijkstra's Shortest Path First (SPF) algorithm. Metrics are used by routing protocols to determine the lowest cost path to a network number, which is considered the optimal or "fastest" path. Cisco's implementation of OSPF calculates the cost (metric) of a link as inversely proportional to the bandwidth of that interface. Therefore, a higher bandwidth indicates a lower cost, and a more favorable metric.

For this to work properly, the bandwidth of the link must be configured to allow OSPF to arrive at the cost of the link. This is done with the bandwidth command executed in interface configuration mode, and is entered in kbps. For example, if the link were 64 kbps, you would enter the following command:

Router(config-if)# bandwidth 64

The metric for any OSPF link defaults to 100,000,000/bandwidth. The bandwidth used in the formula is in bits per second. So, in this example the calculation would be 100,000,000 / 64000 = 1562.5. The cost assigned to the link would be 1562. The cost for a network route is the sum of all individual links in the path to that network.

If multiple paths are assigned equal costs, OSPF will load balance across the multiple paths. By default it will limit this load balance to a maximum of four equal-cost paths. When this occurs, all four equal-cost paths will be placed in the routing table. There are two approaches to allow or prevent load balancing when multiple equal cost paths are available:
- Use the bandwidth command to make one or more of the paths either less or more desirable.
- Use the ip ospf cost command to change the cost value assigned to one or more of the paths

Maximum Transmission Unit (MTU), bandwidth, delay, load, and reliability form a composite metric used by Interior Gateway Routing Protocol (IGRP) and Enhanced Interior Gateway Routing Protocol (EIGRP). IGRP is a distance vector routing protocol developed by Cisco Systems. Enhanced IGRP (EIGRP) is a Cisco-proprietary hybrid protocol having features of both distance-vector and link-state protocols.

Hop count is a metric used by Routing Information Protocol (RIP). The fewer hops between the routers, the better the path.

References:
https://www.cisco.com/c/en/us/support/docs/ip/open-shortest-path-first-ospf/7039-1.html
http://docwiki.cisco.com/wiki/Open_Shortest_Path_First

QUESTION 31
Which Cisco IOS command would you use to troubleshoot IP addressing problems?

A. ipconfig /all
B. show config
C. show running-config
D. show config-file

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The show running-config command will help troubleshoot IP addressing problems, because it shows the details of the router configuration, including the IP address configured on each interface.

The ipconfig /all command is a Microsoft command used to verify IP address configuration on a workstation running Windows. This is not a valid Cisco command.

The show config command has been replaced by the show startup-config command. Both of these commands

are used to display the startup configuration of the router stored in NVRAM.

The show config-file command is not a valid Cisco command.

References:
https://www.cisco.com/c/en/us/td/docs/ios/fundamentals/command/reference/cf_book/cf_s2.html

QUESTION 32
You have two routers in your OSPF area 0. Router 1 is connected to Router 2 via its Serial 1 interface, and to your ISP via the Serial 0 interface. Router 1 is an ASBR.

After your assistant configures a default route on Router 1, you discover that whenever either router receives packets destined for networks that are not in the routing tables, it causes traffic loops between the two routers.

To troubleshoot, you execute the show run command on Router 1. Part of the output is shown below:

<output omitted>
IP route 0.0.0.0 0.0.0.0 serial 1
Router ospf 1
Network 192.168.5.0 0.0.0.255 area 0
Default-information originate

Which command or set of commands should you execute on Router 1 to stop the looping traffic while maintaining Router 2's ability to send traffic to the Internet?

A. Execute the no default-information originate command.
B. Execute the no ip route 0.0.0.0 0.0.0.0 serial 1 command and then execute the ip route 0.0.0.0 0.0.0.0 serial 0 command.
C. Execute the default-information originate always command.
D. Execute the no network 192.168.5.0 area 0 command and then execute the network 192.168.5.0 255.255.255.0 area 0 command.

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
You should execute the no ip route 0.0.0.0 0.0.0.0 serial 1 command followed by the ip route 0.0.0.0 0.0.0.0 serial 0 command. The original configuration command was executed on the wrong interface on Router 1 by your assistant. It should be executed on Serial 0, which is the connection to the ISP. The show run command indicates that with the current configuration, if Router 2 receives a packet not in its table, it sends it to Router 1, and then Router 1 sends it back out on Serial 1. This redirects the packet back to Router 2, and the loop begins. By changing the configuration to Serial 0, Router 1 will start forwarding all traffic not in the routing table to the ISP.

You should not execute the no default-information originate command. This command instructs Router 1 to NOT inject the default route into area 0, which is the desired behavior. Running this command would stop the loop, but would leave Router2 with no default route to send packets to the Internet.

You should not execute the default-information originate always command. It will not change the existing looping behavior. The addition of the always parameter instructs Router 1 to inject a default route into area 0, even if one does not exist on Router 1. This is unnecessary, since Router 1 does have a default route configured, and will not change the existing looping behavior. To advertise a default route to other OSPF routers, you should run this command:

Router1(config-router)#default information originate

You should not execute the no network 192.168.5.0 area 0 command followed by the network 192.168.5.0

255.255.255.0 area 0 command. There is nothing wrong with the original network command. Also, the network 192.168.5.0 255.255.255.0 area 0 command uses an incorrect mask type. The mask must be in the wildcard format. Moreover, since it is incorrect, this will have the effect of disabling OSPF on the network connecting the two routers.

References:
https://www.cisco.com/c/en/us/support/docs/ip/open-shortest-path-first-ospf/47868-ospfdb9.html

QUESTION 33
Which of the following is NOT true of APIC-EM?

A. It supports greenfield but not brownfield deployments
B. It provides a single point for network automation
C. It saves time and cost
D. It is open and programmable

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Cisco Application Policy Infrastructure Controller Enterprise Module (APIC_EM) is an SDN controller platform that supports both greenfield implementations, which use no previous code and design from the ground up, and brownfield implementations, which incorporate existing code.

APIC-EM does provide a single point for network automation. This automation leads to both time and cost savings.

APIC-EM uses an open and programmable approach to devices, policies, and analytics.

References:
https://www.cisco.com/c/en/us/products/collateral/cloud-systems-management/application-policy-infrastructure-controller-enterprise-module/datasheet-c78-730594.html

QUESTION 34
Refer to the following sample output:

*: interface is up
IHQ: pkts in input hold queue IQD: pkts dropped from input queue
OHQ: pkts in output hold queue OQD: pkts dropped from output queue
RXBS: rx rate (bits/sec) RXPS: rx rate (pkts/sec)
TXBS: tx rate (bits/sec) TXPS: tx rate (pkts/sec)
TRTL: throttle count
Interface IHQ IQD OHQ OQD RXBS RXPS TXBS TXPS TRTL
---
* FastEthernet0/0 0 0 0 0 0 0 0 0 0
Serial0/0 0 0 0 0 0 0 0 0 0
FastEthernet0/1 0 0 0 0 0 0 0 0 0
Serial0/1 0 0 0 0 0 0 0 0 0

Which Cisco Internetwork Operating System (IOS) command produces this output?

A. show interfaces
B. show interfaces summary
C. show interfaces serial fast-ethernet
D. show interfaces fast-ethernet 0/0

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The show interfaces summary command will produce the given output. This command provides a summarized view of all interfaces configured on a device.

The show interfaces command is incorrect because this command does not produce the displayed output. This command is used to view information regarding statistics for specific interfaces. Without specifying an interface, a section for each interface will display, as in the example below for FastEthernet0:

FastEthernet0 is up, line protocol is down
Hardware is Fast Ethernet, address is 0019.e818.a3dd (bia 0019.e818.a3dd)
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Auto-duplex, Auto-speed
ARP type: ARPA, ARP Timeout 04:00:00
Last input never, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
0 packets input, 0 bytes, 0 no buffer
Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
0 input packets with dribble condition detected
0 packets output, 0 bytes, 0 underruns
0 output errors, 0 collisions, 2 interface resets
0 babbles, 0 late collision, 0 deferred
0 lost carrier, 0 no carrier
--More

The show interfaces serial fast-ethernet command is incorrect because this is not a valid Cisco IOS command.

The show interfaces fast-ethernet 0/0 command is incorrect. Although it produces similar output, that output only relates to the FastEthernet 0/0 interface. An example of this output follows:

FastEthernet0 is up, line protocol is up
Hardware is Fast Ethernet, address is 0019.e818.a3dd (bia 0019.e818.a3dd)
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Auto-duplex, Auto-speed
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:00, output 00:00:00, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops:105
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 1530000 bits/sec, 201 packets/sec
5 minute output rate 673000 bits/sec, 173 packets/sec
404737363 packets input, 23875417953 bytes, 11 no buffer
Received 1206930011 broadcasts, 0 runts, 0 giants, 0 throttles

0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
0 input packets with dribble condition detected
401877661 packets output, 23875417953 bytes, 0 underruns
0 output errors, 576297 collisions, 0 interface resets
0 babbles, 0 late collision, 2174225 deferred
0 lost carrier, 0 no carrier
0 output buffer failures, 0 output buffers swapped out

Notice that the line of output that says FastEthernet0 is up, line protocol is up indicates that Layers 1 to 3 of the OSI Model are functioning correctly. Also, in the lower portion, there are no values in the error counters such as input errors, output errors, and so on. Finally, make note in line 8 where the interface is set to autosense both the duplex and the speed. Duplex and speed must be in agreement between the NIC on the host and the switch port.

QUESTION 35
Which of the following is NOT a packet type used by Enhanced Interior Gateway Routing Protocol (EIGRP)?

A. Query
B. Reply
C. Ack
D. Response

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Response is not a packet type used by EIGRP. The following are the packet types used by EIGRP:
- Hello/Ack: Establish neighbor relationships. The Ack packet is used to provide acknowledgement of a reliable packet.
- Update: Send routing updates.
- Query: Ask neighbors about routing information.
- Reply: Provide response to queries about routing information.
- Requests: Gain specific information from one or more neighbors.

References:
https://search.cisco.com/search?query=Cisco%20IOS%20EIGRP%20Configuration%20Guide&locale=enUS&tab=Cisco

QUESTION 36
You are configuring SPAN so you can connect a sniffer to your switch. Which of the following is NOT true with regard to the source port in the configuration?

A. It can be an EtherChannel
B. It can also be the destination port
C. It can be monitored in multiple SPAN sessions
D. It can monitor both ingress and egress traffic

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The source port in a SPAN configuration cannot also be a destination port. The selected destination port will no longer operate as a normal switch port. It will only pass the traffic redirected from the source port. Therefore, there would be no "source" traffic if it were a destination port as well.

Source ports in a SPAN configuration have the following characteristics:
- It can be any port type, such as EtherChannel, Fast Ethernet, Gigabit Ethernet, and so forth.
- It can be monitored in multiple SPAN sessions.
- It cannot be a destination port.
- Each source port can be configured with a direction (ingress, egress, or both) to monitor.
- Source ports can be in the same or different VLANs.
- For VLAN SPAN sources, all actives ports in the source VLAN are included ae source ports.

References:
https://www.cisco.com/c/en/us/support/docs/switches/catalyst-6500-series-switches/10570-41.html

QUESTION 37
On Cisco switches, what is the correct order of port transition through the Spanning Tree Protocol (STP) states?

A. learning, listening, blocking, forwarding
B. listening, blocking, forwarding, learning
C. blocking, learning, forwarding, listening
D. blocking, listening, learning, forwarding

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
There are five states in STP transition:
- Blocking
- Listening
- Learning
- Forwarding
- Disabled
After STP initialization, a port moves from blocking to listening, then to learning, and finally into forwarding state. In case of any errors or exceptions, a port may enter into a disabled state directly from any of the other four states. Once STP has fully converged, all ports on all switches will be in either a forwarding state or a blocking state. All other port states are transitioning states between blocking and forwarding.

When STP is initialized, all ports start in the blocking state to prevent bridge loops. If a switch determines that a blocking port must transition to a forwarding state, the blocked port will first move into a listening state, where it begins sending Bridge Protocol Data Units (BPDUs). Next, the port will transition to a learning state, which allows it to populate its Media Access Control (MAC) address table with addresses learned on the port, but it does not yet forward data frames. Finally, it moves into the forwarding state, where the port is capable of sending and receiving data. The switch only learns MAC addresses during the learning and forwarding states.

QUESTION 38
What is the HSRP virtual router MAC address for the virtual router for HSRP group 31?

A. 0000.0c07.ac1f
B. ac1f
C. 0c07
D. 07.ac

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:

Explanation:
The Hot Standby Router Protocol (HSRP) virtual MAC address for the virtual router for HSRP group 31 is 0000.0c07.ac1f. A Media Access Control (MAC) address is a 6-byte value that is unique for every networked device. MAC addresses are typically written in hexadecimal notation. The address 0000.0c07.ac1f is a MAC address for an HSRP virtual router; this address can also be written as 00-00-0c-07-ac-1f or 00.00.0c.07.ac.1f. Hexadecimal letters can be written as either lowercase or uppercase letters.

The MAC address for an HSRP virtual router consists of the vendor ID, the HSRP code and the group ID. The vendor ID corresponds to the first three bytes of the MAC address. A vendor ID of 0000.0c indicates that the device was manufactured by Cisco. The HSRP code corresponds to the fourth and fifth bytes of the MAC address. The HSRP code for a virtual router is always equal to 07.ac. Finally, the group ID corresponds to the last byte of the MAC address. For example, a group ID of 1f, when converted to decimal, indicates that the virtual router belongs to HSRP group 31.

QUESTION 39
When a router has been configured with a loopback address, which of the following determines the OSPF router ID?

A. The highest MAC address assigned to a physical interface on the router
B. The lowest priority of a physical interface on the router
C. The lowest IP address assigned to a physical interface on the router
D. The highest IP address assigned to a loopback interface on the router

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Routers configured with OSPF must be assigned a router ID (RID), which is an IP address unique across the entire OSPF autonomous system. The RID can be assigned manually with the router-id command, or it will be determined automatically by OSPF. If the RID has not been manually assigned, then OSPF will use the highest numerical IP address of a loopback interface on the local router. If there are no configured loopback interfaces, then the RID will be determined by the highest numerical IP address on an active physical interface. The sequence for determining the RID is as follows:
1. Any address manually configured with the router-id command
2. The highest IP address on a loopback interface
3. The highest IP address on an active physical interface
Either of the first two options would be a recommended best practice, since they each offer fault tolerance to the RID. If the RID is determined by a physical interface IP address, then the entire OSPF routing process is bound to an interface that could become unplugged or go down due to network reasons.

Loopback interfaces remain operational unless they are manually shut down. Loopback interfaces are configured as follows:

```
Router(config)# interface loopback0
Router(config-if)# ip address 192.168.1.254 255.255.255.255
```

The highest media access control (MAC) address assigned to a physical interface on the router is not used. IP addresses are used for the determination of the router ID.

Priorities are not used to determine the OSPF router ID. Priorities are used by OSPF to influence the election of the designated router (DR) and backup designated router (BDR) on a multi-access segment.

Router IDs are determined by the highest IP address on a loopback or physical interface, not the lowest.

References:
CCNA ICND2 Official Exam Certification Guide (Cisco Press, ISBN 1-58720-181-X), Chapter 9: OSPF, pp. 366-367.

QUESTION 40
Which command is NOT mandatory for inclusion in a plan to implement IP Service Level Agreements (SLAs) to monitor IP connections and traffic?

A. ip sla
B. ip sla schedule
C. ip sla reset
D. icmp-echo

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The ip sla reset command is not mandatory for an implementation plan to configure IP SLAs for monitoring IP connections and traffic. This command causes the IP SLA engine to either restart or shutdown. As a result, all IP SLAs operations are stopped, IP SLA configuration information is erased, and IP SLAs are restarted. The IP SLAs configuration information will need to be reloaded to the engine.

The following commands are essential to the implementation plan:

ip sla
ip sla schedule
icmp-echo

The ip sla command allows you to configure IP SLAs operations. When you execute this command in the global configuration mode, it enables the IP SLA configuration mode. In the IP SLA configuration mode, you can configure different IP SLA operations. You can configure up to 2000 operations for a given IP SLA ID number.

The icmp-echo command allows you to monitor IP connections and traffic on routers by creating an IP SLA ICMP Echo operation. This operation monitors end-to-end response times between routers.

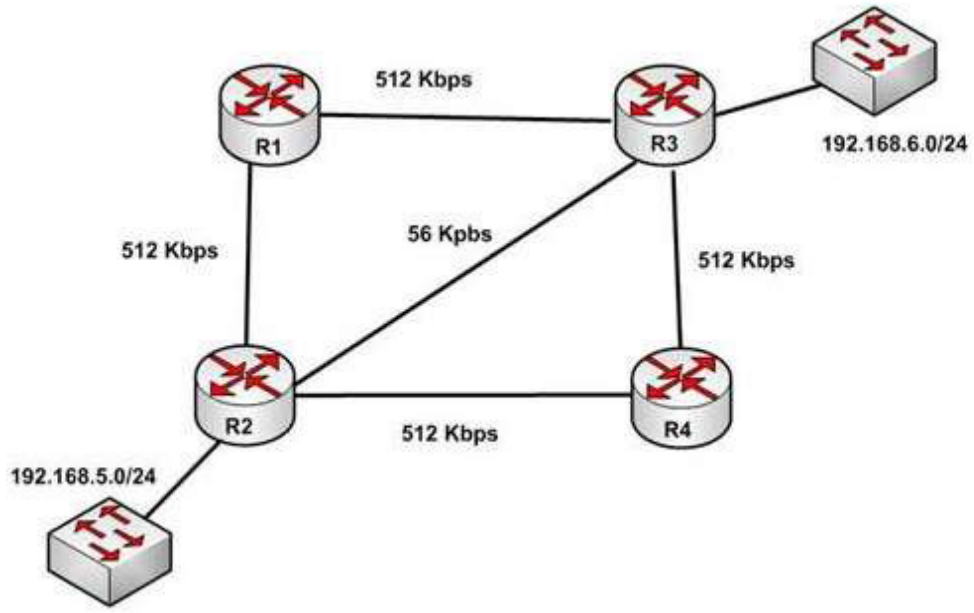
The ip sla schedule command allows you to schedule the IP SLA operation that has been configured. With this command, you can specify when the operation starts, how long the operation runs, and the how long the operation gathers information. For example, if you execute the ip sla schedule 40 start-time now life forever command, the IP SLA operation with the identification number 40 immediately starts running. This is because the now keyword is specified for the start-time parameter. Using the forever keyword with the life parameter indicates that the operation keeps collecting information indefinitely. Note that you cannot re-configure the IP SLA operation after you have executed the ip sla schedule command.

The information gathered by an IP SLA operation is typically stored in RTTMON-MIB. A Management Information Base (MIB) is a database hosting information required for the management of routers or network devices. The RTTMON-MIB is a Cisco-defined MIB intended for Cisco IOS IP SLAs. RTTMON MIB acts as an interface between the Network Management System (NMS) applications and the Cisco IOS IP SLAs operations.

References:
https://www.cisco.com/c/en/us/support/docs/ip/enhanced-interior-gateway-routing-protocol-eigrp/16406-eigrp-toc.html
https://www.cisco.com/en/US/technologies/tk648/tk362/tk920/technologies_white_paper09186a00802d5efe.html
https://www.cisco.com/c/en/us/td/docs/ios/ipsla/command/reference/sla_book/sla_02.html
https://www.cisco.com/c/en/us/td/docs/ios/ipsla/command/reference/sla_book/sla_02.html
https://www.cisco.com/c/en/us/td/docs/ios/ipsla/command/reference/sla_book/sla_02.html

QUESTION 41
With respect to the network shown below, which of the following statements are true when R2 sends a packet

to the 192.168.6.0/24 network? (Choose all that apply.)



A. If RIPv1 is in use, the path taken will be R2 - R4 - R3
B. If both RIPv2 and EIGRP are in use, the EIGRP route will be placed in the routing table
C. If EIGRP is in use, the only path taken will be R2 - R4 - R3
D. If RIPv2 is in use, the path taken will be R2 - R3

Correct Answer: BD
Section: (none)
Explanation

Explanation/Reference:
Explanation:
If both RIPv2 and EIGRP are in use, the EIGRP route will be placed in the routing table. If RIPv2 is in use, the path taken will be R2 - R3.

EIGRP has a default administrative distance (AD) of 90, while RIPv2 has a default administrative distance (AD) of 120. The route learned by the routing protocol with the lowest AD will be placed in the routing table.

If you wanted to force R2 to use the RIPv2 route instead of the EIGRP route, this could be accomplished by changing the administrative distance of RIPv2 to a value less than 90, such as 80. The commands that would accomplish this are:

R2(config)# router rip
R2(config-router)# distance 80

If either of the versions of RIP is in use, hop count is used to determine the route. The path with the least number of hops is R2 - R3.

If RIPv1 is in use, the path taken would be R2 - R3, not R2 - R4 - R3, because R2 - R3 has a lower hop count.

If EIGRP is in use, the path R2 - R4 - R3 will not be the only path taken. EIGRP load-balances two equal cost paths when they exist, and R2 - R4 - R3 and R2 - R1 - R3 are of equal cost so would both be used.

References:
http://www.ciscopress.com/articles/article.asp?p=102174&seqNum=7

QUESTION 42
You are discovering that there are differences between the configuration of EIGRP for IPv6 and EIGRP for IPv4. Which statement is true with regard to the difference?

A. A router ID is required for both versions
B. A router ID must be configured under the routing process for EIGRP for IPv4
C. AS numbers are not required in EIGRP for IPv6
D. AS numbers are not required in EIGRP for IPv4

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Both versions of EIGRP require a router ID. The difference is that with EIGRP for IPv6, you must configure a router ID under the routing process if there are no IPv4 addresses on the router. In EIGRP for IPv4, the router can select one of the configured IPv4 addresses as the router ID.

A router ID can be configured under the routing process for EIGRP for IPv4, but it is not required. In EIGRP for IPv4, the router can select one of the configured Pv4 addresses as the router ID.

AS numbers are required in both versions of EIGRP.

Objective:
Routing Technologies
Sub-Objective:
Configure, verify, and troubleshoot EIGRP for IPv6 (excluding authentication, filtering, manual summarization, redistribution, stub)

References:
http://www.ciscopress.com/articles/article.asp?p=2137516&seqNum=4

QUESTION 43
You would like for Router25 in your OSPF network to become the DR. You execute the show ip ospf interface command, receiving the output shown below.

Router25# show ip ospf interface
Ethernet0 is up, line protocol is up
Internet Address 10.10.10.1/24, Area 0
Process ID 1,Router ID 10.10.10.1, Network Type BROADCAST, Cost: 10
Transmit Delay is 1 sec, State BDR, Priority 1
Designated Router (ID) 172.16.10.1, Interface address 10.10.10.2
Backup Designated router(ID)10.10.10.1,Interface address 10.10.10.1
<output omitted>

You assign an IP address of 192.168.5.6 to the Ethernet1 interface of Router25 and enable the interface. However, Router25 does NOT become the designated router. What additional command must you execute to cause Router25 to become the DR?

A. Router25(config-router)# network 192.168.5.0 0.0.0.255 area 0
B. Router25(config-router)# network 192.168.5.0 0.0.0.255 area 1
C. Router25(config-router)# network 192.168.5.0 255.255.255.0 area 0
D. Router25(config)# network 192.168.5.0 0.0.0.255 area 0

Correct Answer: A
Section: (none)

Explanation

Explanation/Reference:
Explanation:
The command Router25(config-router)# network 192.168.5.0 0.0.0.255 area 0 must be executed to enable Router25 to become the DR. For an interface to be considered in the DR election, it must be advertised in OSPF. Otherwise, it is not participating in OSPF routing and you may be faced with the situation illustrated by the output of the shown ip ospf interface command below:

Router25# show ip ospf interface
Ethernet0 is up, line protocol is up
Internet Address 10.10.10.1/24, Area 0
Process ID 1,Router ID 225.16.33.4, Network Type BROADCAST, Cost: 10
Transmit Delay is 1 sec, State BDR, Priority 1
Designated Router (ID) 172.16.10.1, Interface address 10.10.10.2
Backup Designated router(ID)225.16.33.4,Interface address 10.10.10.1
<output omitted>

The RID of Router25, 225.16.33.4, is higher than that of the current DR, which has an RID of 172.16.10.1. Despite that fact, Router 25 did not become the DR because the 225.0.0.0 network has not been advertised. This could be verified by executing the show ip protocols command as shown below:

Router25# show ip protocols

Routing Protocol is "ospf 1"
Outgoing update filter list for all interfaces is not set
Incoming update filter list for all interfaces is not set
Router ID 225.16.33.4
<output omitted>

Routing for Networks:
10.0.0.0 0.0.0.255 area 0

As only the 10.0.0.0 network is being advertised, the 225.16.33.4 IP address will not be a factor in the DR election.

The command Router25(config-router)# network 192.168.5.0 0.0.0.255 area 1 is incorrect because it references area 1 instead of area 0, which is the area in use in this scenario.

The command Router25(config-router)# network 192.168.5.0 255.255.255.0 area 0 is incorrect because it uses a regular mask instead of a wildcard mask. Network commands in OSPF must use a wildcard mask.

The command Router25(config)# network 192.168.5.0 0.0.0.255 area 0 is incorrect because it is executed at the global configuration, router25(config)#, prompt rather than the OSPF configuration prompt, router25(config-router)#.

References:
https://www.cisco.com/c/en/us/support/docs/ip/open-shortest-path-first-ospf/7039-1.html

QUESTION 44
Which of the following statements describes split horizon?

A. The router learns from its neighbor that a route has gone down, and the router sends an update back to the neighbor with an infinite metric to that route.
B. For a period of time, the router will ignore any route advertisements with a lower metric to a downed route.
C. A router will not send route information back out the same interface over which it was learned.
D. The moment a router determines a route has gone down, it will immediately send a route update with an infinite metric to that route.
E. The packets are flooded when a topology change occurs, causing network routers to update their

topological databases and recalculate routes.

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Split horizon is used to prevent routing loops in distance vector routing environments. It prevents a router from advertising a network back in the direction of the router from which it was learned. In this sense, route advertisements flow "downstream" (away from the route), but never "upstream" (back towards the advertised route).

Poison reverse describes when a router learns that a network has gone down, and the router sends an update back to the neighbor with an infinite metric.

Holddown describes when a router ignores any route advertisements that have a lower metric to a downed route.

Triggered updates describe when a router immediately sends a route update with an infinite metric, as opposed to waiting for its next regularly scheduled routing update.

Link State Advertisements (LSA) are packets that are flooded when a topology change occurs, causing network routers to update their topological databases and recalculate routes.

References:
http://www.ciscopress.com/articles/article.asp?p=24090&seqNum=3

QUESTION 45
Which of the following is NOT a characteristic of Open Shortest Path First (OSPF)?

A. Is a Cisco-proprietary routing protocol
B. Has a default administrative distance of 110
C. Supports authentication
D. Uses cost as the default metric

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
OSPF is not a Cisco-proprietary routing protocol. It is an industry standard protocol supported by a wide range of vendors. The following are characteristics of OSPF:
- Uses Internet Protocol (IP) protocol 89.
- Has a default administrative distance of 110.
- Is an industry standard protocol (non Cisco-proprietary).
- Supports Non-Broadcast Multi-Access (NBMA) networks such as frame relay, X.25, and Asynchronous Transfer Mode (ATM). The default hello interval for NBMA networks is 30 seconds.
- Supports point-to-point and point-to-multipoint connections.
- Supports authentication.
- Uses 224.0.0.6 as multicast address for ALLDRouters.
- Uses 224.0.0.5 as multicast address for ALLSPFRouters.
- Uses link-state updates and SPF calculation that provides fast convergence.
- Recommended for large networks due to good scalability.
- Uses cost as the default metric.

References:

http://www.ciscopress.com/articles/article.asp?p=98156&seqNum=4
https://www.cisco.com/c/en/us/obsolete/mixed-technologies/internetworking.html
CCNA ICND2 Official Exam Certification Guide (Cisco Press, ISBN 1-58720-181-X), Chapter 9: OSPF, pp. 347-361.

QUESTION 46
Which Wide Area Network (WAN) switching technology is used by Asynchronous Transfer Mode (ATM)?

A. packet switching
B. virtual switching
C. circuit switching
D. cell switching

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Cell switching is a WAN switching technology that is used by ATM. ATM is an International Telecommunication Union-Telecommunications (ITU-T) standard for transmission of data, voice, or video traffic using a fixed size frame of 53 bytes, known as cells. Out of these 53 bytes, the initial five bytes are header information and the rest 48 bytes is the payload.

Packet switching is incorrect because packet switching is popularly used for data transfer, as data is not delay sensitive and it does not require real time transfer from a sender to a receiver. With packet switching, the data is broken into labeled packets and transmitted using packet-switching networks.

Virtual switching is incorrect because no such WAN switching technology exists.

Circuit switching is incorrect because circuit switching dynamically establishes a virtual connection between a source and destination. The virtual connection cannot be used by other callers unless the circuit is released. Circuit switching is the most common technique used by the Public Switched Telephone Network (PSTN) to make phone calls. A dedicated circuit is temporarily established for the duration of call between caller and receiver. Once the caller or receiver hangs up the phone, the circuit is released and is available for other users.

References:
http://docwiki.cisco.com/wiki/Introduction_to_WAN_Technologies#Circuit_Switching

QUESTION 47
Which Enhanced Interior Gateway Routing Protocol (EIGRP) packet type is used for neighbor discovery?

A. Hello
B. Update
C. Queries
D. Replies

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Hello packets are used for neighbor discovery. These are sent as multicasts and do not require an acknowledgement.

Update packets are sent to communicate the routes used by a router to converge. When a new route is discovered or the convergence process is completed, updates are sent as multicast. During topology table

synchronization, updates are sent as unicasts to neighboring peers.

Query packets are sent when a router performs route computation and cannot find a feasible successor. These packets are sent to neighboring peers asking if they have a feasible successor to the destination network.

Reply packets are sent in response of a query packet. These are unicast and sent to the originator of the query.

QUESTION 48
You instructed your assistant to add a new router to the network. The routers in your network run OSPF. The existing router, OldRouter, is configured as follows:

router ospf 1
network 192.168.5.0 0.0.0.255 area 0
network 192.168.10.0 0.0.0.255 area 0

The OldRouter interface that connects to NewRouter is 192.168.5.3/24. Your assistant shows you the configuration that will be implemented:

newrouter(config)# router ospf 1
newrouter(config-router)# network 192.168.5.0 255.255.255.0 area 0

What is wrong with this configuration?

A. The area ID is incorrectly configured.
B. The wildcard mask is incorrectly configured.
C. The network statement is incorrectly configured.
D. The process ID number is incorrectly configured.

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
When entering network statements for OSPF, a wildcard mask is used instead of a regular mask. Since the network connecting the two routers is a class C network, as shown by the address 192.168.5.0/24, the wildcard mask should be 0.0.0.255 rather than 255.255.255.0. With wildcard masks, the 0s octets must match, and the 255s octets do not have to match.

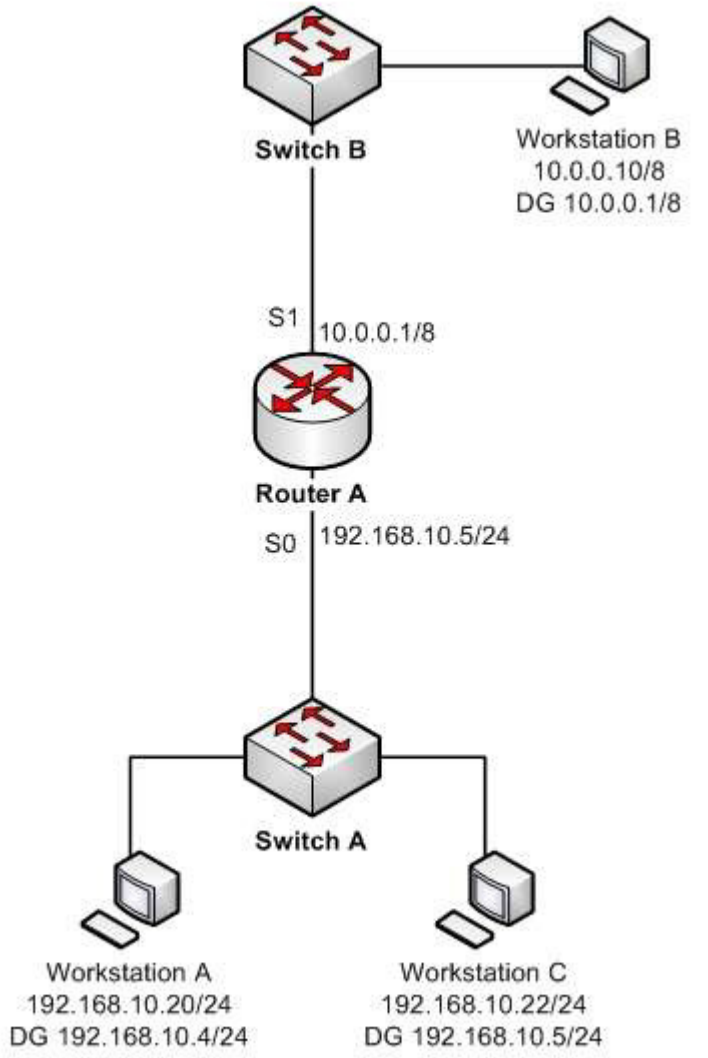
The area ID is correct. OldRouter is in area 0, so NewRouter should be as well. There must be an area 0 in an OSPF network. There can be multiple areas as well, but they must all connect to area 0. If non-0 areas cannot be directly connected to area 0, they must be configured with a virtual link across an area that does connect to the backbone (area 0).

The network statement is correct. The network between the routers is 192.168.5.0.

The process ID number is correct. The number is stated as OSPF 1 on OldRouter and OSPF 1 on NewRouter. They match in this case but that is not required. Process IDs are only locally significant.

References:
http://docwiki.cisco.com/wiki/Open_Shortest_Path_First

QUESTION 49
You are the Cisco administrator for Verigon Incorporated. The given exhibit displays some of the devices in the network. (Click the Exhibit(s) button.) Workstation A can communicate with Workstation C but cannot communicate with Workstation B.



What is the problem?

A. Workstation B has an incorrect default gateway
B. Workstation A has an incorrect subnet mask
C. Workstation A has an incorrect default gateway
D. Workstation B has an incorrect subnet mask

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Workstation A has an incorrect default gateway. To communicate with remote computers or those computers outside of its own subnet, a computer must have the address of the nearest router interface as its default gateway. In this case, the default gateway of Workstation A should be 192.168.10.5/24, which is the Serial0 address of Router A. The diagram shows that it is instead configured as 192.168.10.4/24. This will not cause a problem for Workstation A to communicate with Workstation C, but it will make communication with remote subnets impossible.

Workstation B does not have an incorrect default gateway. Its nearest router interface is 10.0.0.1/8, which is the configuration of its default gateway.

Workstation A does not have an incorrect subnet mask. The mask used by Workstation C and the router interface of Router A, which are in the same subnet, is /24, or 255.255.255.0, which is also the subnet mask used by Workstation A.

Workstation B does not have an incorrect subnet mask. Since the subnet mask of the router interface that is nearest to Workstation B is /8, or 255.0.0.0, then Workstation B also should have an 8 bit mask.

References:
https://www.cisco.com/c/en/us/support/docs/ip/routing-information-protocol-rip/13788-3.html
https://www.cisco.com/c/en/us/support/docs/ip/dynamic-address-allocation-resolution/13711-40.html
CCNA ICND2 Official Exam Certification Guide (Cisco Press, ISBN 1-58720-181-X), Appendices D, E and H: Subnetting.

QUESTION 50
Which switch will be selected as the root bridge by Spanning Tree Protocol (STP)?

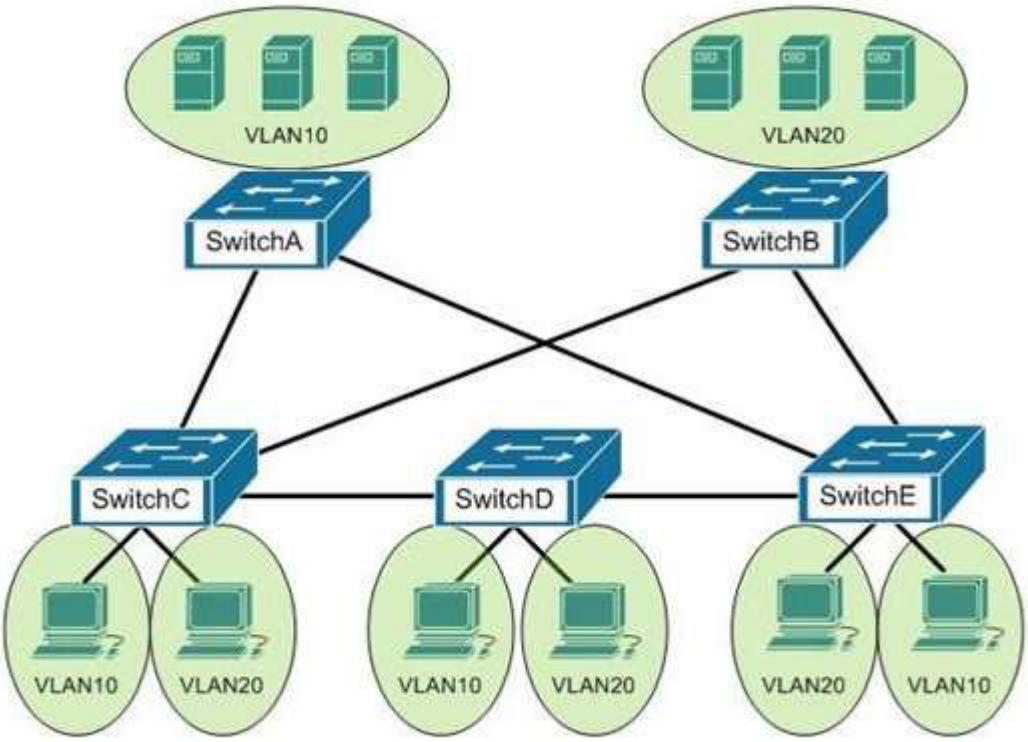
A. switch with lowest bridge ID
B. switch with lowest IP address
C. switch with lowest Media Access Control (MAC) address
D. switch with lowest number of root ports

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
STP will use elections to arrive at a fully converged state that will ensure a switching loop free network. It will select:
- The root bridge
- The root port on each non-root bridge
- Designated ports on any shared segments with no direct connection to the root bridge.
The switch with the lowest bridge ID will be selected as the root bridge by STP. A bridge ID has two components: the priority number and the MAC address. On Cisco devices, the priority number may range from 0 to 65535. The priority number constitutes the most significant bits of the bridge ID. If you want to ensure that a particular switch in a topology always becomes a root bridge, regardless of the MAC address, you can set the priority number of that switch to the lowest value among all switches in the topology.

Since the selection of the root bridge influences all other decisions and thus the single loop free path for each VLAN, the selection and location of the root bridge is important and best not left to chance. Once you have determined the best switch for the role of root bridge, you can ensure its election by lowering its bridge priority.

It is best for the root bridge to be centrally located with respect to the clients and the servers that generate the most traffic on the VLAN. For example, in the diagram below, if most of the traffic travels between the clients and the servers on VLAN 20, the best choice for the root bridge for VLAN 20 would be SwitchD. SwitchD is centrally located between the clients on VLAN 20 and the servers on VLAN 20.



To illustrate the type of inefficient traffic that could occur when care is not given to the location of the root bridge, consider the diagram above and assume that Switch B was chosen the root bridge. Next, assume that traffic needs to go from VLAN 10 connected to Switch C to VLAN 10 connected to Switch A. The shortest path would be from Switch C to Switch A. However, because the only port that is forwarding on Switch C is the port that leads to the root bridge (Switch B), then the actual path would be from Switch C, to Switch B, to Switch E, and then to Switch A.

By default, the priority number of all Cisco switches is configured to a value of 32768. For example, consider three switches in network topology with the following MAC addresses and the same default priority number:

0000.0B02.AAAA
0000.0B02.BBBB
0000.0B02.CCCC

The switch with the lowest MAC address, 0000.0B02.AAAA, will become the root bridge.

The switch with the lowest IP address will not be selected as the root bridge by STP because the IP address of the switch does not influence the selection of the root bridge.

The switch with the lowest MAC address will not be selected as the root bridge by STP. A combination of priority number and MAC address determines the selection of the root bridge. The MAC address will determine the root bridge only if there is a tie for the switch with the lowest priority number.

The switch with the lowest number of root ports will not be selected as the root bridge by STP. Root ports are the interfaces on non-root bridges. On a non-root bridge, the least-root-cost interface is known as a root port. Therefore, the switch having the fewest root ports is not the root bridge.

References:
https://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst6500/ios/12-2SX/configuration/guide/book/port_sec.html
https://www.cisco.com/c/en/us/td/docs/routers/7600/ios/12-2SXF/configuration/guide/swcg/spantree.html

QUESTION 51
Which of the following technologies allows a switch port to immediately transition to a forwarding state?

A. Rapid STP
B. PortFast
C. VTP
D. CDP

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
PortFast is a technology that allows a switch port connected to an end node such as a workstation, server, or printer to bypass the normal Spanning Tree Protocol (STP) convergence process. When a new device is powered up on a switch port, it will immediately transition to a forwarding state.

NOTE: PortFast should only be used on access ports. It should not be used on trunk ports or on ports that connect to hubs, routers and other switches.

Rapid STP (RSTP) is a new STP standard that provides faster convergence than the original 802.1d STP. RSTP supports PortFast, but it must be configured explicitly.

The VLAN Trunking Protocol (VTP) does not allow for immediate transition to a forwarding state. VTP is used to synchronize VLAN databases between switches, and has no effect on STP.

The Cisco Discovery Protocol (CDP) does not allow for immediate transition to a forwarding state. CDP is used to verify connectivity and document directly connected Cisco devices. CDP is not related to STP.

References:
https://www.cisco.com/c/en/us/support/docs/lan-switching/spanning-tree-protocol/24062-146.html

QUESTION 52
Which command enables HSRP on an interface?

A. hsrp
B. standby ip
C. standby mode hsrp
D. switchport mode hsrp

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The standby ip interface configuration command enables Hot Standby Router Protocol (HSRP). The syntax for this command is as follows:

switch(config-if)# standby group-number ip ip-address

The group-number argument specifies the HSRP group number on the interface. You do not need to enter a group number if there is only one HSRP group.

At least one interface on one of the routers in the group must be configured with the virtual IP address of the group. It is optional on all other interfaces on the other routers, which can learn the address through the hellos sent among the group.

A complete HSRP configuration is shown below with an explanation of each command.

RouterA (config) #interface Fa0/1
RouterA (config-if) # ip address 192.168.5.6 255.255.255.0
RouterA (config-if) # standby 2 ip 192.168.5.10
RourerA(config-if) # standby 2 priority 150
RouterA (config-if) #standby 2 Preempt
RouterA(config-if) #standby 2 track interface fa0/2
-Line 1 specifies the interface
-Line 2 addresses the interface
-Line 3 specifies the HSRP group number and the virtual IP address
-Line 4 sets the HSRP priority
-Line 5 allows the router to take the active role if its priority becomes higher than that of the active router
In the above, the router is tracking its own Fa0/2 interface. If that interface goes down it will reduce its priority by 10 (this is the default decrement when not specified). The new value would be 140 if that happened. To specify a decrement value, add it to the track command, as in this example: track interface Fa0/2 20.

When you configure routers to be part of an HSRP group, they listen for the HSRP MAC address for that group as well as their own burned-in MAC addresses.

HSRP uses the following MAC address:
0000.0c07.ac** (where ** is the HSRP group number)

The switchport mode interface configuration command will configure the VLAN membership mode of a port. It is not used to enable HSRP.

The options standby mode hsrp and hsrp are not valid commands.

References:
https://www.cisco.com/c/en/us/support/docs/ip/hot-standby-router-protocol-hsrp/9234-hsrpguidetoc.html
https://www.cisco.com/c/en/us/products/index.html

QUESTION 53
You are in the process of verifying the operation of your core switches, which are using HSRP. One core switch was left with the default priority; the other was given a lower priority to make it the standby switch. The command show standby brief was executed on one of the switches. Output of the command is shown below:

Interface	Grp	Prio	P	State	Active	Standby	Virtual IP
Vl10	1	90	P	Active	local	192.168.10.20	192.168.10.1
Vl20	1	90	P	Active	local	192.168.20.20	192.168.20.1

What does this output mean? (Choose all that apply.)

A. this switch is using the default priority
B. this switch is the active HSRP switch
C. the HSRP devices are up and functioning correctly
D. the switch intended to be the active switch has failed and this switch has taken over
E. preemption is enabled for the group

Correct Answer: BDE
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The output in the exhibit indicates that this switch is the active HSRP switch, the switch intended to be the

active switch has failed, and that preemption is enabled for the group.

This is the active switch because Active is the State listed for each interface that is a member of HSRP.

The question states that the switch that was intended to be the standby switch was given a priority lower than the default. The default priority is 100, so this is not the switch intended to be the active switch. This information indicates that the switch intended to be the active switch has failed.

Preemption is enabled, as indicated by the P following the priority value in line 2. Since preemption is enabled, the switch with the priority of 100 is still down. When that switch is corrected and joins the group again, it will take over as active.

The HSRP group is still providing access for users, but not all devices are functioning properly.

References:
https://www.cisco.com/c/en/us/td/docs/ios/ipapp/command/reference/iap_s4.html

QUESTION 54
What is the significance of the 1 in the following configuration?

```
router(config)# router eigrp 1
```

A. It is the process ID for EIGRP and is locally significant to this router.
B. It is the process ID for EIGRP and must be the same on all EIGRP routers.
C. It is the AS number for EIGRP and is locally significant to this router.
D. It is the AS number for EIGRP and must be the same on all EIGRP routers.

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Enhanced Interior Gateway Routing Protocol (EIGRP) configuration requires the specification of an Autonomous System (AS) number with the router eigrp command. Any number can be chosen, but it must match on all EIGRP routers in the domain. This value may appear to be is similar to one used in enabling OSPF, which demands a process ID number but that value is locally significant to each router and need not match on each router.

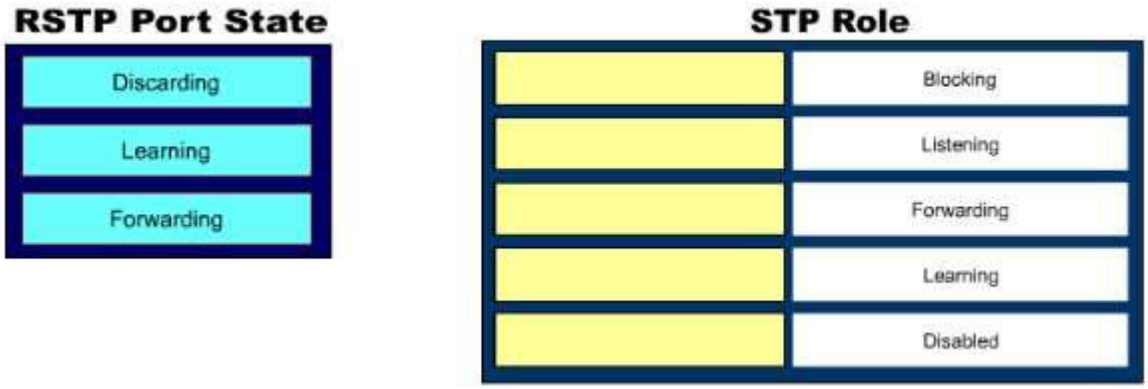
The syntax of this command is router eigrp [autonomous-system]. Therefore, the 1 in the example indicates an Autonomous System (AS) number, not a process ID.

The Autonomous System (AS) number is not locally significant to each router, and must match on all EIGRP routers.

QUESTION 55
DRAG DROP

Click and drag the RSTP port state on the left to its matching equivalent STP role, on the right. RSTP port states may be used more than once, and it may not be necessary to use all RSTP port states.

Select and Place:



Correct Answer:

Section: (none)
Explanation

Explanation/Reference:
Explanation:
Rapid Spanning Tree Protocol (RSTP) was developed to reduce the high convergence times required in Spanning Tree Protocol (STP), and introduces the alternate port and backup port. RSTP is an Institute of Electrical and Electronics Engineers (IEEE) standard, 802.1w, and is interoperable with 802.1d (STP). There are fewer transitional states used in RSTP than STP. In RSTP, there are only Forwarding, Learning, and Discarding. The three states are defined as follows:
- Forwarding - the state of all root ports and designated ports. The port is passing traffic.
- Learning - the state of a port that was formerly discarding but due to a change in the topology (link down) it has transitioned to learn its new state. The port could return to discarding or move to forwarding depending on the new topology needs
- Discarding - the state of all non-root and non- designated ports. The port is not passing traffic to prevent potential switching loops.
RSTP can reconfigure the spanning tree in less than a second, compared to the 50 seconds that STP may take. This is achieved through having fewer transition states, the use of alternate and backup ports, and faster transitions.

References:
https://www.cisco.com/c/en/us/support/docs/lan-switching/spanning-tree-protocol/24062-146.html
https://www.cisco.com/c/en/us/support/docs/lan-switching/spanning-tree-protocol/24062-146.html

QUESTION 56
Your network consists of one HSRP group of six routers. All of the routers are functioning properly. The

network has been stable for several days. In which HSRP state are most of the routers?

A. Learn
B. Listen
C. Standby
D. Active

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
If all of the routers in the Hot Standby Routing Protocol (HSRP) group are functioning properly, then most of the routers in the group are in the listen state. Four routers will be in the listen state, one router will be in the standby state, and one router will be in the active state.

HSRP is used by a group of routers to create the appearance of a virtual router with which end stations can communicate in the event that the default gateway becomes unavailable. The active router is responsible for forwarding packets that are sent to the virtual router. The standby router is responsible for assuming the role of active router should the active router fail or become unavailable. All other HSRP routers monitor the hello messages sent by the active and standby routers. Should the active and standby routers both become unavailable, the HSRP router with the highest priority is elected to become the active router by default. For routers with equal priority values, the router with the highest IP address becomes the active router.

HSRP routers can exist in one of the following six states:
- Initial
- Learn
- Listen
- Speak
- Standby
- Active

All HSRP routers start in the initial state. A router in the learn state is waiting for its first hello message from the active router so that it can learn the virtual router's IP address. When the hello message is received and the virtual router's IP address is discovered, the HSRP router is in the listen state. A router in the listen state listens for hello messages from the active and standby routers. If an election for a new active router and a new standby router is required, then an HSRP router will enter the speak state and begin transmitting hello messages. The standby state is reserved for the standby router, and the active state is reserved for the active router. Only routers in speak, standby, and active states will transmit hello packets.

References:
https://www.cisco.com/c/en/us/support/docs/ip/hot-standby-router-protocol-hsrp/9234-hsrpguidetoc.html
https://www.cisco.com/c/en/us/products/index.html

QUESTION 57
Which of the following statements are TRUE regarding EIGRP operation? (Choose two.)

A. A successor is a backup route, and is installed in both the routing and topology tables.
B. A successor is a primary route, and is installed in both the routing and topology tables.
C. A successor is a primary route, and is installed only in the routing table.
D. A feasible successor is a backup route, and is installed in both the routing and topology tables.
E. A feasible successor is a primary route, and is only installed in the routing table.
F. A feasible successor is a backup route, and is only installed in the topology table.
G. If the successor route fails and no feasible successor route exists, the router will send an update with the route marked with an unreachable metric of 16.

Correct Answer: BF
Section: (none)
Explanation

Explanation/Reference:
Explanation:
In EIGRP operations, primary or active routes are known as successors. These routes are maintained in both the routing and topology tables. The routing table is the list of network paths that are currently used by the router.

EIGRP also has the ability to maintain backup routes to destination networks. These backup routes are known as feasible successors. If a feasible successor is discovered by EIGRP, it will be maintained only in the topology table, since it is not currently being used to route traffic. In the event of a successor failure, the backup feasible successor will become the successor, and will be installed in the routing table automatically. If the successor route fails and no feasible successor route exists, the router will send queries to all neighbors until a new successor is found.

EIGRP maintains three dynamic tables in RAM:
- Neighbor table, which is a list of all neighboring EIGRP routers on shared subnets
- Topology table, which contains all discovered network paths in the internetwork
- Routing table, which contains the best path (based on lowest metric) to each destination network
A successor is not a backup route. A successor is a primary or active route, and it is stored in both the routing and topology tables.

A feasible successor is not a primary route. It is a backup route, and it is stored only in the topology table.

If the successor route fails and no feasible successor route exists, the router will not send an update with the route marked with an unreachable metric of 16. EIGRP does not send an update with the route marked with an unreachable metric, and even if it did, 16 is not an unreachable metric in EIGRP as it is in RIP. Instead it sends a multicast query packet to all adjacent neighbors requesting available routing paths to the destination network.

References:
https://www.cisco.com/c/en/us/support/docs/ip/enhanced-interior-gateway-routing-protocol-eigrp/16406-eigrp-toc.html

QUESTION 58
Which of the following commands would instruct OSPF to advertise ONLY the 192.168.10.0/24 network in Area 0?

A. Router(config)# router ospf 1
Router(config-router)# network 192.168.10.0 0.0.0.255 area 0
B. Router(config)# router ospf 1
Router(config-router)# network 192.168.11.0 0.0.0.255 area 0
C. Router(config)# router ospf 1
Router(config-router)# network 192.168.10.0 255.255.255.0 area 0
D. Router(config)# router ospf 1
Router(config-router)# network 192.168.10.0 0.0.255.255 area 0

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The command Router(config-router)# network 192.168.10.0 0.0.0.255 area 0 would instruct OSPF to advertise the 192.168.10.0 network in Area 0. It is executed in OSPF process 1 configuration mode, as indicated by the prompt Router(config-router)#. This command correctly states the network as 192.168.10.0 and uses the proper wildcard mask of 0.0.0.255.

The command Router(config-router)# network 192.168.11.0 0.0.0.255 area 0 is incorrect because it advertises the 192.168.11.0/24 network instead of the 192.168.10.0/24 network.

The command Router(config-router)# network 192.168.10.0 255.255.255.0 area 0 is incorrect because it uses a regular mask instead of a wildcard mask.

The wildcard mask in OSPF network statements must be expressed inversely, and not as a regular subnet mask. If the network you are configuring for OSPF operation is 192.168.10.0/24, then the inverse version of a /24 mask (or 255.255.255.0) would be 0.0.0.255. The correct command, Router(config-router)# network 192.168.10.0 0.0.0.255 area 0,will configure OSPF to run over any local interfaces assigned an IP address beginning with 192.168.10, since the inverse mask dictates that the first three octets must be a match.

The command Router(config-router)# network 192.168.10.0 0.0.255.255 area 0 is incorrect because it uses an improper wildcard mask. This mask would instruct OSPF to advertise any network with a prefix longer than the 192.168.0.0/16 network. For example, if a router had three interfaces with the addresses 192.168.5.1/24, 192.168.6.1/24, and 192.168.7.1/24, and you executed the command network 192.168.0.0 0.0.0.255.255, all three of the subnets would be advertised and would be present in the neighboring router's routing table.

When routing does not seem to be working correctly, one of the first things to check is whether OSPF is operating on the proper interfaces. OSPF is enabled by network statements. To verify the network statements that were entered, you should execute the show run command and examine the output. If the network statement is configured so that the interface on the router is not in that network, OSPF will not operate on that interface. For example, suppose that Router A has an interface of 192.168.5.1/30 and the show run command produces the following output:

<output omitted>
router ospf 2 area 0
network 192.168.5.0 0.0.0.4

In this case, OSPF will not operate on the interface because the router interface is not in the network indicated by the network statement. The problem is not the network address but the wildcard mask. For a 30-bit mask, the wildcard should be 0.0.0.3, not 0.0.0.4. The wildcard mask can be determined by subtracting the regular mask value in the last octet (252) from 255, which is 3. The solution would to remove the incorrect statement and enter the correct statement as follows:

routerA(config)# router ospf 2 area 0
no network 192.168.5.0 0.0.0.4 area 0
network 192.168.5.0 0.0.0.3 area 0

References:
https://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute_ospf/configuration/12-4t/iro-12-4t-book/iro-cfg.html

QUESTION 59
Which of the following is NOT true of the Cisco APIC-EM?

A. It can verify the operation of access lists
B. It provides network topology visualization
C. It can perform identity tracking
D. It is appropriate for the datacenter environment

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
With all of its benefits, the Cisco APIC-EM is not appropriate for the datacenter environment. A more appropriate controller for the datacenter environment is Cisco APIC-DC. Both of these are software-defined network controllers, which can be used to program a network in an automated fashion.

Specific benefits provided by the Cisco APIC-EM include:
- It can verify the operation of access lists with the Path Trace Analysis tool
- It provides network topology visualization
- It can perform identity tracking
- It provides an inventory of devices
- It automatically adds new devices

References:
https://www.cisco.com/c/en/us/td/docs/cloud-systems-management/application-policy-infrastructure-controller-enterprise-module/1-2-x/config-guide/b_apic-em_config_guide_v_1-2-x/b_apic-em_config_guide_v_1-2-x_chapter_01000.pdf

QUESTION 60
Which of the following is NOT a benefit of cloud computing to cloud users?

A. On-demand self-service resources provisioning
B. Centralized appearance of resources
C. Highly available, horizontally scaled applications
D. Cost reduction from standardization and automation

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Cost reduction from standardization and automation is a benefit that accrues to the cloud provider, not the cloud users. Additional benefits to cloud providers are:
- High utilization through virtualization and shared resources
- Easier administration
- Fail-in-place operations model
Benefits that accrue to cloud users include:
- On-demand self-service resources provisioning
- Centralized appearance of resources
- Highly available, horizontally scaled applications
- No local backups required
Cloud users can also benefit from new services such as intelligent DNS, which can direct user requests to locations that are using fewer resources.

References:
https://www.cisco.com/c/en/us/products/cloud-systems-management/benefit.html

QUESTION 61
You are the Cisco administrator for NationalAct Incorporated. One of your assistants is preparing to introduce a new switch to the network. Before doing so, you execute the show vtp status command on OldSwitch and NewSwitch, respectively, and receive the following output:

OldSwitch# show vtp status
VTP Version : 2
Configuration Revision : 62
Maximum VLANs supported locally : 1005
Number of existing VLANs : 24
VTP Operating Mode : Server
VTP Domain Name : Corporate
VTP Pruning Mode : Enabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
<output omitted>

NewSwitch# show vtp status
VTP Version : 2
Configuration Revision : 125
Maximum VLANs supported locally : 1005
Number of existing VLANs : 10
VTP Operating Mode : Server
VTP Domain Name : Corporate
VTP Pruning Mode : Enabled
VTP V2 Mode : Disabled
VTP Traps Generation : Disabled
<output omitted>

If NewSwitch is introduced to the network, which of the following will be true?

A. NewSwitch will delete its current VTP data.
B. There will be 10 VLANs in the network.
C. OldSwitch will retain its current VTP data.
D. There will be 24 VLANs in the network.

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
If NewSwitch is introduced to the network, there will be 10 VLANs. The VLAN database of the new switch will overwrite the VLAN databases of the production switches because it is operating in server mode and has a higher VLAN configuration revision number.

VLAN Trunking Protocol (VTP) is used to synchronize VLANs between different switches. The VTP configuration revision number is used to determine which VTP switch has the most current version of the VLAN database, and is incremented whenever a VLAN change is made on a VTP server switch. The Configuration Revision: 125 output indicates that NewSwitch has a configuration revision number of 125, which will be compared to other switches in the same VTP domain, including OldSwitch, which has a revision number of 62. If the production switches have lower configuration revision numbers than the new switch, their VLAN databases will be replaced with the VLAN database of the new switch. Any switch ports that had been assigned to be removed from VLANs in the configuration database of the new switch will be disabled, possibly resulting in catastrophic network failure. All VTP switches in the same VTP domain should have a domain password defined, which will protect against a rogue switch being added to the network and causing VLAN database corruption.

NewSwitch will not delete its current VTP data. If the production switches have lower configuration revision numbers than the new switch, their VLAN databases will be replaced with the VLAN database of the new switch.

The number of VLANs will not remain 24. The 24 VLANs indicated by the Number of existing VLANs: 24 output will be overwritten with the 10 VLANs in the NewSwitch VLAN database.

OldSwitch will not retain its current VTP data. It will be replaced with the VLAN database of the new switch.

References:
https://www.cisco.com/c/en/us/support/docs/lan-switching/vtp/98154-conf-vlan.html
https://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst4500/12-2/25sg/configuration/guide/conf/vlans.html

QUESTION 62
You are planning the configuration of an IPsec-protected connection between two routers. You are concerned only with the integrity of the data that passes between the routers. You are less concerned with the confidentiality of the data, and you would like to minimize the effect of IPsec on the data throughput.

Which protocol option should you choose?

A. Authentication Header (AH) in tunnel mode
B. Authentication Header (AH) in transport mode
C. Encapsulating Security Payload (ESP) in tunnel mode
D. Encapsulating Security Payload (ESP) in transport mode

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
You should choose Authentication Header (AH) in tunnel mode to meet the scenario requirements. Two protocols can be used to build tunnels and protect data traveling across the tunnel:
- Authentication Header (AH) uses protocol 51.
- ESP uses protocol 50.
AH is defined in Request for Comments (RFC) 1826 and 2402. AH does not perform data encryption, and therefore information is passed as clear text. The purpose of AH is to provide data integrity and authentication, and optionally to provide anti-reply service. It ensures that a packet that crosses the tunnel is the same packet that left the peer device and no changes have been made. It uses a keyed hash to accomplish this.

ESP is defined in RFC 2406. ESP can provide data integrity and authentication, but its primary purpose is to encrypt data crossing the tunnel. On Cisco devices, ESP supports encryption using Advanced Encryption Standard (AES), Data Encryption Standard (DES), or Triple DES (3DES). Tunnel mode is used between Virtual Private Network (VPN) gateways such as routers, firewalls, and VPN concentrators.

You would not choose Authentication Header (AH) in transport mode. Transport mode is used between end stations or between an end station and a VPN gateway.

You would not choose Encapsulating Security Payload (ESP) in tunnel mode or transport mode. Using ESP will slow the connection because of the encryption and decryption process that will occur with each packet.

References:
http://www.ciscopress.com/articles/article.asp?p=25477&rl=1
https://www.cisco.com/c/en/us/about/press/internet-protocol-journal/back-issues/table-contents-4/ipj-archive/article09186a00800c830b.html
CCNA ICND2 Official Exam Certification Guide (Cisco Press, ISBN 1-58720-181-X), Chapter 15: Virtual Private Networks, pp. 536-537.

QUESTION 63
Which technique is used to stop routing loops by preventing route update information from being sent back over the interface on which it arrived?

A. Holddown timer
B. Triggered updates
C. Route poisoning
D. Split horizon
E. Maximum hop count

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:

Split horizon stops routing loops by preventing route update information from being sent back over the interface on which it arrived. Routing loops can occur due to slow convergence and inconsistent routing tables, and can cause excessive use of bandwidth or even complete network failure. Split horizon can prevent routing loops between adjacent routers.

Holddown timers prevent regular update messages from reinstating a route that is unstable. The holddown timer places the route in a suspended, or "possibly down" state in the routing table, and regular update messages regarding this route will be ignored until the timer expires.

Triggered updates are sent as soon as a change in network topology is discovered, as opposed to waiting until the next regular update interval (every 30 seconds in RIP networks). This speeds convergence and helps prevent problems caused by outdated information.

Route poisoning "poisons" a failed route by increasing its cost to infinity (16 hops, if using RIP). Route poisoning is combined with triggered updates to ensure fast convergence in the event of a network change.

References:
http://www.ciscopress.com/articles/article.asp?p=24090&seqNum=3

QUESTION 64
Which of the following statements is NOT true of Cisco ACI?

A. It is a comprehensive SDN architecture.
B. It uses Cisco APIC as the central management system.
C. It provides policy driven automation support.
D. It decreases network visibility.

Correct Answer: D
Section: (none)
Explanation

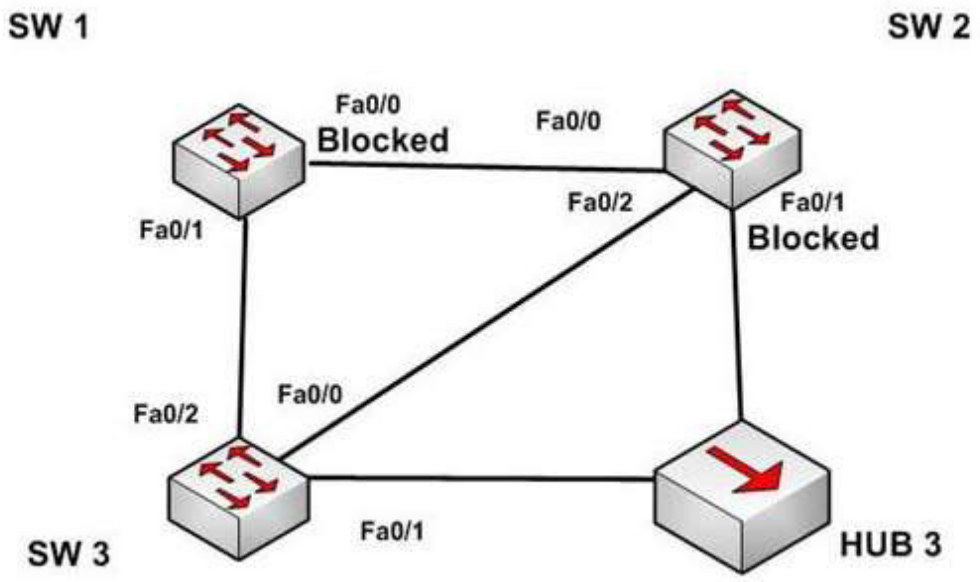
Explanation/Reference:
Explanation:
The Cisco ACI does not decrease network visibility. On the contrary, the Cisco Application Centric Infrastructure (ACI) increases network visibility. It is a policy-driven automaton solution that can keep the network inventory up-to-date automatically whenever a new device is added and provide a graphic representation at all times.

ACI is a comprehensive SDN architecture that integrates physical and virtual environments under one policy model. It uses the Cisco Application Policy Infrastructure Controller (APIC) as the central management system.

It provides policy driven automation support through a business-relevant application policy language.

References:
https://www.cisco.com/c/en/us/td/docs/switches/datacenter/aci/apic/sw/1-x/aci-fundamentals/b_ACI-Fundamentals/b_ACI-Fundamentals_chapter_010000.html

QUESTION 65
The diagram below shows the state of the switch interfaces after STP has converged. Based on the interface states, which of the following statements are true? (Choose all that apply.)



A. The Fa0/2 interface on SW 2 is a designated port
B. SW 3 is the root bridge
C. SW 2 is the root bridge
D. The Fa0/0 interface on SW 2 is a designated port
E. The Fa0/0 interface on SW 2 is a root port

Correct Answer: BD
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Convergence has occurred in a spanning-tree network when all switch ports are in either a forwarding state or a blocking state (known as discarding state in RSTP). You can use the location of these blocked and forwarding ports to infer the location of the root bridge and the state of any unlabeled ports in the diagram.

SW3 is the root bridge and the Fa0/0 interface on SW2 is a designated port. It can be determined that SW3 is the root bridge because all of its ports are in a forwarding state. Any switch that has at least one port blocking (such as SW1 and SW2) are non-root bridges. As there must be a root bridge, that leaves SW3 as the only candidate.

After establishing that SW3 is the root, it can be determined that the connection between SW1 and SW2 is a segment that does not have a direct connection to the root bridge. These sections must have one end set as a designated port and thus set to forward. Since the Fa0/0 interface on SW2 is forwarding, it is the designated port for that segment.

The Fa0/2 interface on SW2 is not a designated port. The interface on each non-root switch with the lowest cost path to the root bridge will be the root port. Since SW3 is the root bridge, the connection to SW3 via Fa0/2 is the lowest cost path to the root bridge for SW1 and thus is a root port, not a designated port. Moreover, designated ports only exist on segments that do not have a direct connection to the root bridge.

SW2 is not the root bridge. One of its ports is blocking, which will not occur on a root bridge.

The Fa0/0 interface on SW2 is a not root port. It is the designated port for the segment between SW1 and SW2.

The process of determining these port states occurs in this order:
1. Selection of the root bridge. When all bridge priorities have been left to their default, all switches will have same bridge priority. When that is the case, the switch with the lowest MAC address will be selected root bridge. ALL ports are in a forwarding state on the root bridge, which explains why all of the ports on SW3 will be in a forwarding state.
2. Determination of the root ports on each non-root bridge. Each non-root bridge will select the interface it possesses with the least cost path to the root bridge. Once selected, that port will be placed in a forwarding state.
3. Determination of the designated port on each segment that does not connect directly to the root bridge. There is one such segment in the diagram (SW1 to SW2). The interface on either end of the segment that has the least cost path to the root bridge will be the designated port for that section. It may have several paths, but the least cost path is used in the determination of the designated port for the segment.
Once determined, the designated ports will be set to forwarding, and all ports that are neither root nor designated ports will be set to blocking.

References:
http://docwiki.cisco.com/wiki/Transparent_Bridging#Spanning-Tree_Algorithm

QUESTION 66
What command would you run to determine which switch is the root bridge for a particular VLAN?

A. show spantree vlan
B. show spanning tree
C. show vlan spantree
D. show spanning-tree vlan
E. show spanning-tree interface

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The show spanning-tree vlan command provides Spanning Tree Protocol (STP) information on the root switch, including the bridge ID, root path, and root cost, as well as information on the local switch. The output of the command is as follows:

Switch# show spanning-tree vlan 1
VLAN0001

Spanning tree enabled protocol ieee
Root ID Priority 0
Address 000c.00d3.5124
Cost 19
Port 2 (FastEthernet0/2)
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec

Bridge ID Priority 32769 (priority 32768 sys-id-ext 1)
Address 000c.14f5.b5c0
Hello Time 2 sec Max Age 20 sec Forward Delay 15 sec
Aging Time 300

Interface	Role	Sts	Cost	Prio.Nbr	Type
Fa0/2	Root	FWD	19	128.2	P2p
Fa0/10	Desg	FWD	19	128.10	P2p
Fa0/1	Altn	BLK	19	128.1	P2p

This output indicates the following:
- The root switch has a bridge ID (Priority + MAC Address) of 0-000c.00d3.5124, while the local switch has a bridge ID of 32769-000c.14f5.b5c0. This indicates that the local switch is not the root switch for VLAN 1. Additional evidence that the local switch is not the root switch is the fact that the Fa0/1 port is blocking with a role listed as Altn. Only non- root bridges have blocking ports.
- For this switch, Fa0/1 represents the redundant link that needs to be blocked to prevent a switching loop. Interface Fa0/2 is the root port (the interface with the shortest path to the root switch).
- All three links have a cost of 19, which is the default cost of a single FastEthernet link.
- 802.1d is enabled in this switch, as indicated by the output Spanning tree enabled protocol ieee in line 2.
The show spanning-tree interface command will indicate the port role and state that a particular interface plays in each VLAN, but does not indicate the root bridge for a particular VLAN. Below is sample output from the show spanning-tree interface fastethernet0/1 command. In this example, RSTP is in use rather than 802.1d.

Switch# show spanning-tree interface fastethernet0/1

VLAN	Role	Sts	Cost	Prior.Nbr	Type
VLAN0001	Altn	BLK	19	128.2	P2P
VLAN0002	Root	FWD	19	128.1	P2P
VLAN0003	Root	FWD	19	128.1	P2P

In the above output, the Fa0/1 interface is not the root bridge for any of the three VLANs. It is the root port for VLANs 2 and 3. Root bridges have only designated ports. It is the alternate port for VLAN1, which means that Fa0/1 has a higher cost path to the root bridge than another interface in the topology, and will be in a blocking state as long as that other path is available.

The other options are incorrect because they are not valid Cisco IOS commands. The correct syntax would be show spanning-tree, not show spanning tree or show spantree.

References:
https://www.cisco.com/c/en/us/td/docs/ios/lanswitch/command/reference/lsw_book/lsw_s1.html

QUESTION 67
What is the Institute of Electrical and Electronics Engineers (IEEE) specification for Spanning Tree Protocol (STP)?

A. 802.1d
B. 802.1q
C. 802.3u
D. 802.3z

Correct Answer: A
Section: (none)
Explanation

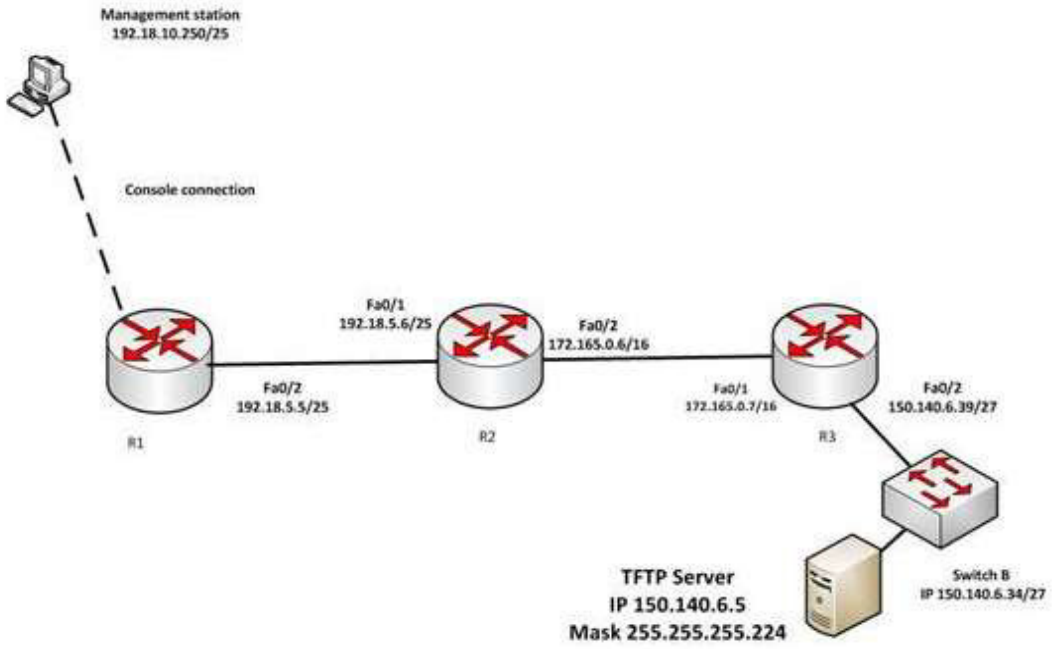
Explanation/Reference:
Explanation:
The IEEE specification for STP is 802.1d. STP uses the spanning-tree algorithm to find and prevent loops in redundant network topologies. This helps mitigate broadcast storms, multiple copies of frames, and Media Access Control (MAC) address database inconsistencies.

The IEEE committee developed the 802.1 series of specifications for bridging. The IEEE 802.1q specification is for Virtual LAN (VLAN) trunking. Per this specification, a 4-byte 802.q header, which contains the Priority and VLAN ID fields, is inserted in the middle of the original Ethernet header.

802.3 is the IEEE committee specification that defines the Ethernet group. Ethernet is a LAN protocol that specifies physical layer and MAC sublayer media access. IEEE 802.3 uses carrier sense multiple access collision detect (CSMA/CD) to provide access for many devices on the same network. 802.3u is the IEEE specification for Fast Ethernet. 802.3z is the IEEE specification for Gigabit Ethernet.

References:
https://www.cisco.com/c/en/us/td/docs/routers/7600/ios/12-2SXF/configuration/guide/swcg/spantree.html

QUESTION 68
You have established a console session with R1 and you are attempting to download an IOS image from the TFTP server in the diagram below.



However, you are unable to make the connection to 150.140.6.5. What is the problem?

A. The IP address of the management station is incorrect
B. The IP address of the TFTP server is incorrect
C. The interfaces between R1and R2 are not in the same subnet
D. The IP address of Switch B is incorrect

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
The IP address of the TFTP server is incorrect. The TFTP server, Switch B and the Fa0/2 interface on R3 should all be in the same subnet. With a 27 bit mask (255.255.255.224) against the 150.140.0.0 classful network the resulting subnets are:

150.140.0.0
150.140.0.32

150.140.0.64

and so on, incrementing in intervals of 32 in the last octet until it reaches the 150.140.6.0 subnet.

150.140.6.0
150.140.6.32
150.140.6.64

At this point, we can see that Switch B and the router interface are in the 150.140.6.32 subnet, while the TFTP server is in the 150.140.6.0 subnet. The IP address of the TFTP server needs to be in the 150.140.6.33-150.140.6.62 range, while avoiding the addresses already used on R1 and the switch.

The IP address of the management station does not appear to be in any of the networks listed in the diagram, but that doesn't matter since the connection to the router is through the console cable which does not require a correct IP address.

The Fa0/2 and Fa0/1 interfaces on R1 and R2 are in the same subnet. Using a 25-bit mask against the 192.18.5.0/24 classful network yields the following subnets:

192.18.5.0
192.168.5.128

Both router interfaces in question are in the 192.18.5.0 subnet.

As we have already determined, the IP address of Switch B is correct. Even if it were incorrect or missing altogether, it would have no impact on connecting to the TFTP server. Switches merely switch frames based on MAC addresses and only need an IP address for management purposes.

References:
https://www.cisco.com/c/en/us/support/docs/ip/routing-information-protocol-rip/13788-3.html

QUESTION 69
In the network exhibit, the routers are running OSPF and are set to the default configurations. (Click the Exhibit (s) button.) What would be the effect of configuring a loopback interface on RouterA with an address of 192.168.1.50/24?

A. Router B would become the DR
B. Router A would become the DR
C. Router C would become the DR
D. Router A would become the BDR

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Configuring a loopback interface on RouterA with an address of 192.168.1.50/24 would cause Router A to become the designated router (DR). The designated router (DR) is determined by the router with the highest interface priority number. If the priority numbers are tied, then the router with the highest router ID (RID) becomes the DR.

The default priority number is 1, and can be configured as high as 255. Changing the priority to 0 would make the router ineligible to become the DR or the backup designated router (BDR). The ip ospf priority # command is used to manually configure a priority on a specific interface.

Router IDs are determined first by the highest loopback IP address, followed by the highest IP address on an active physical interface. Thus, in the case of a priority tie, the router with the highest loopback IP address will have the highest RID, and will become the DR for the network segment.

The current Router ID for a router can be determined by executing the show ip interface brief command. In the sample output of the show ip interface brief command below, the RID will be 10.108.200.5.

Router# show ip interface brief

Interface IP-Address OK? Method Status Protocol
Ethernet0 10.108.00.5 YES NVRAM up up
Ethernet1 unassigned YES unset administratively down down
Loopback0 10.108.200.5 YES NVRAM up up
Serial0 10.108.100.5 YES NVRAM up up
Serial1 10.108.40.5 YES NVRAM up up
Serial2 10.108.100.5 YES manual up up
Serial3 unassigned YES unset administratively down down

Neither Router B nor C will be the DR because the IP addresses on their physical interfaces are lower than 192.168.1.50/24.

Router A will not be the backup designated router. Since it is the DR, it cannot also be the BDR.

Router C will not be the BDR because its IP address is lower than that of Router B. Router B will be the BDR.

References:
https://www.cisco.com/c/en/us/support/docs/ip/open-shortest-path-first-ospf/7039-1.html

QUESTION 70
With which type of service is bandwidth and latency the biggest consideration?

A. streaming video
B. telnet sessions
C. FTP transfers
D. authentication traffic

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:
Explanation:
Streaming video places the largest demand on both bandwidth and latency. Video traffic is real-time and benefits from dedicated bandwidth with QoS implementation to ensure quality. Moreover, this service can tolerate very little latency.

Telnet and FTP sessions are both low bandwidth users and can tolerate a high degree of latency since the data can be reassembled when all pieces arrive, which is not possible when data is coming in real-time, and waiting for retransmissions and reassembly is not feasible.

Authentication traffic is not sensitive to latency and does not require much bandwidth either.

References:
http://docwiki.cisco.com/wiki/Voice/Data_Integration_Technologies#Network_Performance