ExamWise For Cisco CCNP Certification Exam 640-901

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This book is dedicated to my wife Dorothy. Her encouragement and understanding made it possible.

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About the Book

Overview

Part of the "TotalRecall The IT Question Book Series," this new guide fills the gap existing in study material available for candidates preparing to sit for Cisco's BSCI or BSCN exam. It covers the information associated with each exam topic in detail and includes units on the nine elements that comprise the test - routing principles, extending IP addressing, OSPF in a single area, Interconnecting multiple OSPF areas, configuring IS-IS, configuring EIGRP, configuring basic BGP, and implementing BGP in scalable networks.

The intent of this book is help candidates realize their goal of achieving the CCIP or CCNP certification and to provide them with a strong foundation and knowledge base that they can build on. This is not a textbook about the subject, but should be used as a final check to see if you are ready to pass the Routing exam for either CCIP or CCNP. This book contains a comprehensive cross-section of the exam material and is presented in a question and answer manner similar to that of the actual exam. The one distinguishing point between the BSCI and BSCN exams is that the BSCN does not include the section relating to the IS-IS protocol. Otherwise, the two tests cover identical material.

BSCI is a core requirement for the CCIP (Cisco Certified Internetworking Professional) certification. You also need to know that the BSCI Examination has replaced the CCNP BSCN Routing exam as a core requirement for the CCNP (Cisco Certified Networking Professional) certification. Using the book will help readers determine if they're ready for the BSCI exam. Each unit in the guide includes a quiz to measure comprehension of each topic. Within each unit are loads of author scoops describing each exam topic, along with additional exam-taking tips, tricks, hints, and test traps. Also included are helpful tips and time management techniques that will alleviate pre-exam jitters and put you in control.

Accompanying the book is our exclusive CD-ROM test engine that creates randomized simulated exams drawn from a database of over 300 sample exam questions. A score of 800 is needed to pass the BFQ Practice Exam. Written to mimic the real exam, you also get complete answers and explanations plus a detailed scoring summery showing test results by exam topic.

You cannot go wrong with this book! Its Guaranteed!

Introduction

So you may be looking at this book wondering two things: why should I get my CCNP or my CCIP and why should I buy this book? In response to the first thought, you already have your CCNA and that has opened the door for you, but now you wish to further your knowledge and expertise, and you want to be considered for a more responsible position. This is where advanced certification will help. Based upon whichever path you choose for specialization, either CCIP or CCNP, the BSCI exam will satisfy the Routing portion of the certification.

Being a market leader, many companies have Cisco products in their networks and are looking for experienced senior engineers to be able to support them; The Professional level of Cisco certifications are a step to showing your expertise. Cisco being the market leader has led many of its competitors to make comparative command line interfaces which users interact with to configure devices. So by learning Cisco, you are actually learning a basic command set that you can use to configure other devices. There are of course differences, but there are a lot of similarities as well, so don't think you are limiting yourself to just being able to work with Cisco products. In addition, by learning general networking, routing and switching theories and practices you can use these with any product. OSPF or BGP is OSPF or BGP no matter on which vendor's product it is running. During your studies remember this: unlike many different certifications out there that try to make their products dissimilar; networking is much more standardized. This means if you learn the foundations of TCP/IP, Routing, Switching, Bridging and the other technologies, then no matter what company may be providing the best products at the time, you will simply have to learn how to operate within their structure to make the protocols behave the way you want them to.

Now to the second question, why buy this book? Well, I have seen several books and to be honest many books have a lot of the same information. They have to be if they are to address the same certification. I have conveyed mine in a concise but easy to understand format. Whenever you write a book you walk that fine line on how much information should I convey and how should I convey it. I have tried to keep the questions in this book to the information you need to help you pass the test as well as to expand your knowledge and confidence on the foundations of advanced routing.

This book is divided into 10 chapters

Chapter 1: Routing Principles

The objective of this chapter is to provide the reader with an understanding of the following:

- List the key information routers need to route data
- Describe classful and classless routing protocols
- Compare distance vector and link-state protocol operation
- Describe the use of the fields in a routing table
- Analyze a routing table, and test connectivity using accepted troubleshooting techniques

1. Examples of Classful routing protocols are:

   A. RIP and OSPF
   B. RIP V1 and IGRP
   C. OSPF and ISIS
   D. ISIS and BGP

2. An example of a Classless routing protocols is:

   A. PIM Sparse Mode
   B. ISIS
   C. RIP
   D. RTMP

3. Distance Vector Routing Protocols use _____ updates

   A. Incremental
   B. Event Driven
   C. Periodic
   D. On-Demand

4. Classful Routing Protocols automatically summarize

   A. When traversing a different network
   B. Never
   C. When traversing a network with a different network mask
   D. When traversing a different subnet

5. The major difference between Classful and Classless routing protocols is

   A. Classful protocols include the subnet mask
   B. Classless protocols use periodic updates
   C. Classless protocols support discontiguous network routing
   D. Classful routing protocols send only the changed information

6. What table is not maintained by a Link State Protocol Router

   A. The Link State Announcement Table
   B. Routing Table
   C. Topology Table
   D. Network Status Table

E. Neighbor Table

7. The Link State Database contains:

    A. Information about all routers in the area
    B. Routing Table data
    C. Link State Best Path Entry (LSBPE)
    D. Route Forwarding Information

8. Neighbors in a Link-State environment establish neighbor relationships by:

    A. Broadcast messages
    B. Link State Announcements
    C. Hello Packets
    D. ARP Packets

9. Link-state updates use _____ packets.

    A. Broadcast
    B. Multicast
    C. Unicast
    D. UDP
    E. TCP

10. Review the attached diagram. You would like to communicate from router A to C. Which path will RIP choose?

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

11. When the path to the same destination is learned from multiple sources, what does Cisco use to ensure that the best path is selected.

    A. Administrative distance

B. Calculated distance
C. The EIGRP distance is always selected
D. Hops
E. Flip a coin

12. What is the purpose of this command?

ip route 172.68.0.0 255.255.0.0 Serial1

    A. Create a static route so that traffic for network 172.68.0.0 will be forwarded via interface S1
    B. Create a static route so that traffic for network 172.68.25.50 will be forwarded via interface S1, if there is not a more specific route.
    C. Create a static route so that traffic for network 172.68.1.0 will be forwarded via interface S1, if there is not a more specific route.
    D. All of the above

13. Your network is configured as shown in the display. As the systems administrator, you need to configure a static route to Houston R3 from Austin R2. The IP address for BRI0 on Houston R3 is 172.16.0.1 and the subnet is 172.10.0.0 on the ethernet interface. AustinR2 is configured as 172.16.0.2 and links to two subnets 10.10.0.0 and 10.20.0.0.

What command would you enter at AustinR2 to specify a static route to 172.10.0.0?

    A. ip route 172.10.0.0 255.255.0.0 172.16.0.1
    B. ip route 172.10.0.0 255.255.0.0 172.16.0.2
    C. ip route 172.16.0.1 255.255.0.0 172.10.0.0

D. ip route 172.10.0.1 255.255.0.0 172.16.0.0

14. Draw a line between the Routed source to its default administrative distance:

15. Which of the following are Routable protocols?

    A. SNA
    B. DEC LAT
    C. NETBEUI
    D. IPX
    E. AppleTalk

16. What is accomplished on a Cisco router by the last command in this configuration?

router rip

passive-interface Serial1

network 10.0.0.0

!

ip route 172.68.0.0 255.255.0.0 Serial1

    A. No routing updates are sent on interface E0.
    B. If there is no route in the table, send the packet to the default route.
    C. This would enter an static route in the routing table.
    D. This begins the configuration for the routing interface to use an access list.

17. RIP has a maximum hop count of 15. Which of the following routing protocols provide greater network dynamiter.

    A. Open Shortest Path First (OSPF)
    B. Intermediate System - Intermediate System (IS-IS)
    C. Border Gateway Protocol (BGP)
    D. Enhanced IGRP (EIGRP)
    E. All of the above

18. Which of the following is the correct range for a private class B network?

    A. 172.0.0.0 to 172.255.0.0
    B. 172.1.0.0 to 172.32.0.0
    C. 172.16.0.0 to 172.31.255.255
    D. 172.16.0.0 to 172.31.0.0
    E. 172.16.0.0 to 172.32.255.255

19. Which of the following use the hop count as a supported metric?

    A. Routing Information Protocol 1 (RIP1)
    B. Routing Information Protocol 2 (RIP2)
    C. Interior Gateway Routing Protocol (IGRP)
    D. Enhanced IGRP (EIGRP)

20. Which of the following statements are true with respects to how Link state protocols discover the network?

    A. Each set of neighboring routers establish formal communications.
    B. The entire routing table is broadcast across the network on a regular basis to update neighbors.
    C. Each router broadcasts its entire database regarding network topology (neighbors, etc) on startup.
    D. All information received by each neighbor is copied to the topology database.

21. Upon reviewing your routing table and running trace routes, you find that your router is using less than optimal paths. Which commands can help fix this situation?

    A. Show ip route
    B. Passive-interface
    C. Distance-Vector
    D. Static route
    E. Debug redistributed

22. To address the issues of the depletion of IP addresses and to reduce the number of Internet route table entries by establishing a hierarchy, several IP addressing solutions have been formulated. These include subnet masking, variable-length subnet masks, address allocation for private internets, network address translation and classless inter-domain routing (CIDR). Which RFC deals with subnet masking?

    A. 1812
    B. 1009
    C. 1918
    D. 1631
    E. 1518 and 1519

23. Which routing protocols do not have a formal method of determining when a neighboring router is down?

    A. RIP
    B. RTMP
    C. IGRP
    D. OSPF
    E. NLSP

24. Select the true statements about link-state routing.

    A. It sends it's routing table usually every 60 seconds, even if there are no changes.
    B. It sends its whole routing table.
    C. It uses the SPF algorithm to select the best paths.
    D. Each router calculates its own route table.

25. Which of the following default administrative distances are correct?

    A. IGRP 90
    B. OSPF 110
    C. RIP V2 120
    D. EBGP 140

26. What is the result of the following statements?

R1(config)# ip route 172.16.12.0 255.255.255.0 172.16.55.1 145

R1(config)# router igrp 5

R1(config-router)# network 172.16.0.0

    A. Creates a static route which will be used instead of the dynamic route
    B. Creates a "floating static route"
    C. Creates a static route that will be used if the dynamic route fails
    D. The first statement is not needed it is a subnet of net 172.16.0.0

27. Which of the following is required to route packets to a destination?

    A. A Routing Protocol
    B. A static route
    C. A Default route
    D. A source address
    E. No answer is correct.

28. A router is attempting to deliver a packet to a remote network that is summarized. How does the destinations networks summary address affect delivery assuming that all configurations are correct?

A. You can't route to a summarized network.
B. This will make no difference.
C. The summary network will cause additional routing.
D. The subnet mask will be modified by the sending system prior to sending
E. The subnet mask will be modified by the first router after sending.

29. Which of the following use dynamically discovered routing table entries? Select all that apply.

A. Default route
B. Routing Information Protocol (RIP) Route
C. Interior Gateway Routing Protocol (IGRP) Route
D. Static Route

30. Select the true statements regarding network routing protocols

A. OSPF has a greater speed to convergence than RIP.
B. OSPF uses less bandwidth for routing updates.
C. OSPF supports VLSMs.
D. RIP supports VLSMs.
E. RIP has a greater speed to convergence than OSPF.

31. Which of the following is a classless, link-state, interior gateway routing protocol?

A. Enhanced IGRP (EIGRP)
B. Interior Gateway Routing Protocol (IGRP)
C. Open Shortest Path First (OSPF)
D. RIP Routing Information Protocol 2 (RIP2)

32. Select the information that a router needs in order to route data.

A. Final destination address
B. A routing entry for that destination.
C. Possible convergence errors to the destination
D. Best protocol to use to arrive at the destination
E. Best route to the source

33. Routers learn about routes and destinations through static routes, default, or dynamic routing. If all of the following routing processes were configured for a given network, what would be the source of the route placed in the routing table?

A. Routing Information Protocol (RIP)
B. Internal BGP (IBGP)
C. Interior Gateway Routing Protocol (IGRP)
D. Open Shortest Path First (OSPF)

Answers

1. *B. RIP V1 and IGRP

   Explanation: OSPF and ISIS are Link State protocols Rip (v1&v2) and IGRP are Distance Vector Protocols.

   Notes:
2. *B. ISIS

   Explanation: PIM is Multicast, RIP is classful, RTMP is AppleTalk routing. ISIS is classless

   Notes:
3. *C. Periodic

   Explanation: Incremental routing updates are used by Link State protocols. Event driven is the same as incremental. Distance Vector protocols use periodic updates. There is no such process as On-Demand updates.

   Notes:
4. *A. When traversing a different network

   Explanation: If a network announcement for subnet 172.16.1.0/24 is sent to a neighboring router using RIP or IGRP over the same major network (172.16.X.0/24) the subnet is included within the update. If the update were sent over a different network (e.g. 192.168.1.0/24) the announcement would be automatically summarized to the class boundary 172.16.0.0/16

   Notes:
5. *C. classless protocols support discontiguous network routing

   Explanation: Classful routing protocols do not include the subnet mask within the routing update, use periodic updates, and send the complete routing table for each update. Classless protocols use incremental updates, include the subnet mask, and do not summarize at the class boundary, which allows support for discontiguous networks.

   Notes:
6. *D. Network Status Table

   Explanation: The Link State announcement table and the topology table are both names for the link state database. There is no such table as the network status table in OSPF or ISIS.

   Notes:
7. *A. Information about all routers in the area

   Explanation: The Link State Database contains information about all routers in the area. The Routing table and route forwarding information is maintained in the routing table. The LSBPE does not exist.

Notes:

8. *C. Hello Packets

Explanation: Link State routers establish a neighbor relationship via hello packets. LSAs are not sent until the neighbor relationship has been formed.

Notes:

9. *B. Multicast

Explanation: Link State Updates are multicast; OSPF and ISIS do not use udp or tcp. They use their own IP protocol.

Notes:

10. *A. A-B-C

Explanation: Since RIP bases its connections on hops A-B-C will be selected as the path.

Notes:

11. *A. Administrative distance

Explanation: The administrative distance of a routing protocol is the "believability factor" for that protocol. The lower the administrative distance, the more believable the protocol. When the route to a given network is learned by multiple sources, the source with the lowest administrative distance is the route placed into the routing table.

Notes:

12. *D. All of the above

Explanation: This command creates a static route. All traffic destined for 172.68.0.0/16 will exit this router via S1. The only exception would be such that if there were another route learned for 172.68.1.0/24 via e0, that would be routed via E0 doe to the longer match of the network mask. (/24 vs/16)

Notes:

13. *A. ip route 172.10.0.0 255.255.0.0 172.16.0.1

Explanation: The appropriate syntax is "ip route prefix mask {address|interface} [distance] [permanent]. The correct static route is - ip route 172.10.0.0 255.255.0.0 172.16.0.1

14.

Explanation: OSPF - 110, IGRP - 100, RIP - 120, and connected - 0

With this type of problem, you should work backwards from what you know. For example, memorize that Connected is always 0. Now, if you know connected is zero, you should be able to remove all answers that do not agree with this setting, Next, match RIP = 120, Once narrowed down, you should be able to get the correct answer - assuming you don't know them all.

15. *D. IPX

*E. AppleTalk

Explanation: IPX and AppleTalk are routable protocols. DEC LAT, NETBEUI and SNA have no layer three address, therefore they are not routable.

Notes:

16. *C. This would enter an static route in the routing table.

Explanation: This is a method to enter a static route into the routing table. All traffic for network 172.68.0.0/16 exits via s1

Notes:

17. *E. All of the above

Explanation: All of the advanced protocols such as OSPF,IS-IS,BGP, and EIGRP need to support very large networks.

Notes:

18. *C. 172.16.0.0 to 172.31.255.255

Explanation: The following are the Private IP Ranges:

Private Class A - 10.x.x.x

Private Class B - 172.16-31.x.x

Private Class C - 192.168.x.x

Remember, it includes all addresses within the range where x = 0-255

Notes:

19. *A. Routing Information Protocol 1 (RIP1)

*B. Routing Information Protocol 2 (RIP2)

Explanation: RIP still uses the hop count as a factor known as the "metric". The metric is used to help determine the best route to the destination. The newer protocols such as IGRP and EIGRP consider a number of different factors such as bandwidth, delay, reliability and load.

Notes:

20. *A. Each set of neighboring routers establish formal communications.

*D. All information received by each neighbor is copied to the topology database.

Explanation: Remember that link state databases must know the entire network. From this information, a database is constructed which describes the entire network. Each neighboring router maintain formal communications with their neighbors.

Notes:

21. *D. Static route

Explanation: If you are using a IGP that does not take link speed into consideration, which could possibly cause sub-optimal path selection, you have at least two options that

you might explore. One would be to upgrade your routing process to a more advanced protocol, or secondly, implement a static route to re-direct the traffic over a more optimum path.

Notes:

22. *A. 1812

Explanation: RFC 1812 addresses subnet masking, 1009 addresses variable-length subnet masks, 1918 addresses address allocation for private internets, 1631 addresses network address translation, and 1518 and 1519 address classless inter-domain routing (CIDR).

Notes:

23. *A. RIP

*B. RTMP

*C. IGRP

Explanation: One of the differences between distance vector and link-state routing protocols is that a link-state protocol has a formal neighbor relationship with each directly connected neighbor. It detects when a neighbor is unavailable when a hello is not received in the defined "dead time " interval (typically 40 seconds). The routing protocols based on link-state are OPSF, NLSP, and IS-IS. Distance vector protocol have no formal connection, they assume that a neighbor is down when 3 consecutive routing updates have not been received. The routing protocols based on distance vector are RIP, RTMP, and IGRP.

Notes:

24. *C. It uses the SPF algorithm to select the best paths.

*D. Each router calculates its own route table.

Explanation: Link-state routing only sends the change information to its neighbors and it uses the SPF algorithm to generate its own routing table. Distance vector protocols send the complete table for each update cycle, even if there are no changes.

Notes:

25. *B. OSPF 110

*C. RIP V2 120

Explanation: The administrative distance is used to compare the reliability of routing information when a route is learned from multiple routing sources. The lower the AD the more reliable the information is considered to be. The correct default value for IGRP is 100, OSPF 110, Rip V1 & V2 120, and EBGP 20.

26. *B. Creates a "floating static route"

*C. Creates a static route that will be used if the dynamic route fails

Explanation: The static route has been assigned an administrative distance of 145 - the last entry in the static route statement. This creates a route that has a higher administrative distance than the igrp route (administrative distance of 100). The dynamically learned route takes precedence over the static route, but if the dynamic route should be lost, the static route would then be active. This is a floating static route.

Notes:

27. *E. No answer is correct.

Explanation: All that is required is a valid route. You are not required to specifically use a routing protocol or a static route. You must simply have valid a route and a destination.

Notes:

28. *B. This will make no difference.

Explanation: The final routing decision will be made base upon the actual destination address in the packet. The summarized routes are used to reduce the size of the routing tables and localize the impact of a route flap. This is the basic concept of hierarchical addressing.

Notes:

29. *B. Routing Information Protocol (RIP) Route

*C. Interior Gateway Routing Protocol (IGRP) Route

Explanation: RIP and IGRP are both dynamic routing protocols that allow routers to discover routes on an internetwork automatically. Static route and default route are both manual entries.

Notes:

30. *A. OSPF has a greater speed to convergence than RIP.

*B. OSPF uses less bandwidth for routing updates.

*C. OSPF supports VLSMs.

Explanation: OSPF has a greater speed of convergence. RIP convergence can take several minutes. OSPF floods routing changes immediately and computes them in parallel. OSPF supports VLSMs. OSPF uses less bandwidth. RIP broadcasts full routing tables every 30 seconds. OSPF sends only changes and these changes trigger a SPF calculation.

Notes:

31. *C. Open Shortest Path First (OSPF)

Explanation: OSPF is the only one that is link state. They are all interior gateway routing protocols.

Notes:

32. *A. Final destination address

*B. A routing entry for that destination.

Explanation: A router needs to know the final destination address and it needs to have a routing entry for that destination.

Notes:

33. *C. Interior Gateway Routing Protocol (IGRP)

Explanation: The path selection algorithm for an IGP process is a two step process. The route with the lowest administrative distance and lowest metric within administrative distance is the preferred route. In this example the default administrative distances are:

IBGP 200

RIP 120

OSPF 110

IGRP 100

Notes:

Chapter 2: Extending IP Addresses

The objective of this chapter is to provide the reader with an understanding of the following:

- Use VLSMs to extend the use of the IP addresses
- Explain if route summarization is or is not possible for a specific addressing scheme
- Configure an IP helper address to manage broadcasts

1. The ip address 172.16.1.1 255.255.255.0 is a:

    A. Class A address
    B. Class B address
    C. Class C address
    D. Class D address

2. The broadcast address for network 172.16.21.0/25 is

    A. 172.16.21.255
    B. 172.16.21.63
    C. 172.16.255.255
    D. 172.16.21.127

3. What is the summarized network address and mask for the block of addresses

172.168.64.0/24 through 172.168.71.0/24

    A. 172.168.64.0 255.255.248.0
    B. 172.168.0.0 255.255.0.0
    C. 172.168.64.0 255.255.224.0
    D. 172.168.64.0 255.255.252.0

4. To be able to support 16 subnets with a Class B address the number of subnet bits required are

    A. 4
    B. 12
    C. 20
    D. 28

5. To be able to support 16 hosts with a Class B address the number of host bits required are

    A. 4
    B. 5
    C. 20
    D. 21

6. VLSM provides

    A. smaller routing tables
    B. better utilization of network address space
    C. lesser utilization of network address space
    D. Larger routing tables

7. To utilize VLSM, a routing protocol must

    A. use incremental updates
    B. automatically summarize
    C. include the subnet mask
    D. use multicast addresses for updates

8. The IP Classless command

    A. can only be used with classless routing protocols
    B. uses the longest mask for network selection
    C. uses the shortest mask for network selection
    D. can only be used with classful routing protocols

9. A new router has replaced a bridge in your network. Since the router has been installed users on ethernet 172.16.1.0/24 are not able to reach the DHCP of TFTP servers which are located on network 172.16.2.0/24. Which of the following will resolve the problem.

A. R1(config-router) network 172.16.2.0
B. R1(config-router) ip helper-address 172.16.2.255
C. R1(config-if) ip helper-address 172.16.2.255
D. R1(config) ip helper-address 172.16.2.255

10. VLSM allows _____ ability for route summarization than a fixed address allocation.

    A. limited
    B. better
    C. worse
    D. the same

11. CIDR stands for

    A. Classful Interdomain Routing
    B. Classical Interdomain Routes
    C. classless Interdomain Routes
    D. Classless Interdomain Routing

12. How can the following subnets be summarized?

    172.16.112.0 through 172.16.126.0

    A. 172.16.112.0/20
    B. 172.16.112.0/22
       172.16.120.0/22
    C. 172.16.112.0/21
       172.16.120.0/22
       172.16.124.0/23
       172.16.126.0/24
    D. 172.16.112.0/21
       172.16.120.0/21
    E. They Can't.

13. The CIDR block of 192.168.64.0/19 contains ___ class C networks

    A. 8
    B. 16
    C. 32
    D. 64

14. Classful routing protocols automatically summarize routes at network boundaries

    A. True
    B. False

15. Which one of the following statements relating to route summarization is true

A. Multiple IP addresses must have the same high order bits
B. Multiple IP addresses must have the same low order bits
C. The routing decision is made base on the greatest summary route
D. None of the above

16. Which of the following represent private addresses (RFC 1918)?

A. 192.168.10.0
B. 10.1.1.0
C. 127.0.0.1
D. 172.16.1.0
E. 224.0.0.5

17. You are working in an environment where you have a leased line connecting two routers. You are required to assign IP address to each router. There will never be more than two devices on this network. Which network mask should you select?

A. /30
B. /26
C. /18
D. /2
E. /12

18. You are working in an environment where you have 12 systems per network in your branch offices. No office will ever require more than 28 addresses. Which subnet mask should you use to provide the maximum number of subnets assuming that you have a class B network?

A. /27
B. /26
C. /18
D. /19
E. /12

19. You are working in an environment where you have 12 systems per network in your branch offices. No office will ever require more than 28 addresses. Which subnet mask should you use assuming that you have a class C Network?

A. /27
B. /26
C. /18
D. /5
E. /12

20. Given that your company uses a live class B network, what happens from the view of the outside world when you summarize remote offices inside the company assuming that every one access is the Internet via the corporate office's connection?

A. Nothing.
B. You lose connections internally.
C. External Routes fail.
D. You create a situation, which require more routing information to access.
E. You interfere with other companies addressing schemes.

21. Given the following address of 172.16.0.0 /16 can you send traffic to 172.16.25.0 / 24? And Why?

    A. Yes. The /24 designation falls within the /16 designation
    B. No. The /24 designation falls outside the /16 designation
    C. Yes. The /24 designation falls outside the /16 designation
    D. No. These are two incompatible masks.

22. Given the address of 192.168.10.0, what can you do to gain the most effective use of the address space?

    A. Nothing.
    B. Assign a mask of /24 to it.
    C. Assign a mask of /20 to it.
    D. Assign a mask of /16 to it.
    E. Assign different masks according to your requirements.

23. You have a range of addresses 192.168.49.32/27 which gives you 6 subnets. You want to further divide one of the subnets for a serial connection. What is the broadcast addresses for subnet 192.168.49.32?

    A. 192.168.49.35
    B. 192.168.49.34
    C. 192.168.49.33
    D. 192.168.49.32

24. How can the following subnets be summarized?

172.16.168.0

172.16.169.0

172.16.170.0

172.16.171.0

172.16.172.0

172.16.173.0

    A. 172.16.168.0/21
    B. 172.16.168.0/22
       172.16.172.0/23

C. 172.16.168.0/22
D. 172.16.168.0/20
E. They Can't.

25. The CIDR block of 192.168.0.0 thru 192.168.15.0 would be represented by

A. 192.168.0.0 255.255.252.0
B. 192.168.0.0 255.255.240.0
C. 192.168.0.0 255.255.224.0
D. 192.168.0.0 255.255.248.0

26. Which of the following protocols provide support for variable-length subnet masks (VLSMs)

A. Enhanced IGRP (EIGRP)
B. Open Shortest Path First (OSPF)
C. Routing Information Protocol 1 (RIP1)
D. Enhanced Routing Information Protocol (ERIP)

27. Which of the following would best define "variable length subnetting"?

A. The use of the same mask for the same network number on different interfaces,
B. The use of different masks for the same network number on the same interfaces,
C. The use of different masks for different network numbers on the same interfaces,
D. The use of different masks for the same network number on different interfaces,

28. What is the importance of subnet mask support in routing updates?

A. It allows for more IP addresses to be created in the subnet
B. It creates a system that can join multiple subnets into a single subnet
C. It allows subnetting information to be sent with the IP address.
D. It is a requirement in order to route IP packets.

29. What would be the main advantage to using a routing protocol that supports variable-length subnet masks (VLSMs)?

A. It provides faster switching and processing power
B. It allows more efficient utilization of available network address space
C. Variable-length subnet masks (VLSMs)use a shorter number of hops to reach their destinations
D. Latency is reduced at the route processing level

30. Routing Protocols that support Variable-length subnet masks (VLSMs)make it possible to implement route summarization. What is the benefit of using route

summarization in a network that uses only one major network?

    A. Routers no longer need to read the packet in order to pass it.
    B. It provides for a major reduction in latency when broadcasting.
    C. It extends the size of the reachable network by reducing the number of hops to a destination
    D. It can provide a significant reduction in route propagation and routing information overhead

31. Which of the following best describes hierarchical routing?

    A. Assigning numbers to identify each router
    B. Creating groups called areas and allocating specific addressees to them
    C. Creating a virtual IP address that works for all routers in multicast
    D. The assignment of MAC addresses to create BVI Bridge groups with ospf areas.
    E. No answer is correct.

32. The IP address 192.16.0.0/29 has been subnetted (into 32 subnets). How many point-to-Point subnets could be supported by further subnetting this address segment.

    A. 0
    B. 2
    C. 4
    D. 8

Answers

1. *B. Class B address

Explanation: Using the first octet rule, Class A addresses are 0 through 127 (127 is a reserved address and 0 is not valid), Class B addresses are 128 through 191, Class C addresses are 192 through 223, and Class D - Multicast Addresses are 224 through 239. The /24 is not considered when determining the network class, it is only used to identify the number of bits used for the routing process.

Notes:
2. *D. 172.16.21.127

Explanation: The network mask, in dotted decimal notation is 255.255.255.128. The subnet mask for the last eight bits is 10000000. The broadcast address is established by setting all host bits in the subnet mask to zeros Therefore, the broadcast address would be 01111111 added to the network address of 172.16.21.0, which would become 172.16.21.127. Remember that bit 25 - the first bit of the last octet - is part of the subnet address and it is a zero in this example.

Notes:

3. *A. 172.168.64.0 255.255.248.0

Explanation: The address 172.168.64.0 255.255.248.0 identifies a prefix which is only satisfied by the networks 172.168.64.0/24 through 172.168.71.0.

Notes:

4. *A. 4

Explanation: 4 subnet bits will allow 16 subnets. This requires use of subnet zero and the subnet of all 1s. The total number of network bits is 20, 16 for the class B address plus 4 subnet bits.

Notes:

5. *B. 5

Explanation: The number of hosts is derived by using the formula 2 to the nth - 2., where n = the number of bits in the host field (0s). It is necessary to provide for a network address (Host bits all zeros) and a broadcast address (Host bits all ones). Therefore four bits would allow only 14 host addresses. Five would accommodate the required 16, plus allow for growth of 14 additional addresses.

Notes:

6. *B. better utilization of network address space

Explanation: Using VLSM allows better utilization of address space. When using Fixed Length Subnet Masking (FLSM), you must allocate the same network address space to the smallest subnet as that which was allocated to the largest network. Using either VLSM or FLSM should have no effect on the size of the routing table, as you still need to allocate one subnet for each network either way.

Notes:

7. *C. include the subnet mask

Explanation: In order to use VLSM, the routing protocol must include the subnet mask in the routing update. IGRP and RIP v1 do not include the subnet mask and therefore cannot support VLSM.

Notes:

8. *B. uses the longest mask for network selection

Explanation: The IP classless command causes the router to examine the routing table and find the best path for any address by using the longest match. This command is a default setting in IOS 12.0 and later.

Notes:

9. *C. R1(config-if) ip helper-address 172.16.2.255

Explanation: The helper address is assigned to the interface on which the router receives the local broadcast. There are two servers that have to be reached on network 172.16.2.0,

therefore the helper address will be the broadcast address for the network. (172.16.2.255)

Notes:
10. *B. better

Explanation: If the VLSM addressing scheme use a hierarchical structure, it should provide a better ability to summarize addresses.

Notes:
11. *D. Classless Interdomain Routing

Explanation: CIDR is Classless Interdomain Routing

Notes:
12. *C. 172.16.112.0/21
172.16.120.0/22
172.16.124.0/23
172.16.126.0/24

Explanation: This is a little more complex than meets the eye. There are 15 /24 networks in this range. They cannot be summarized into a single statement. The best summary that can be accomplished would be to summarize 172.16.112.0 through 119.0 into a /21, 172.16.120.0 through 123.0 into a /22, 172.16.124 and 125.0 into a /23 and 172.16.126.0 as a /24. Would it have made any difference if 172.16.127.0 were included within the range?

Notes:
13. *C. 32

Explanation: The /19 mask is 255.255.224.0. The third octet (bit positions 17 through 24) in this mask is 11100000. The five zero bits identify the number of networks contained in this block (Class C address is 24 bits minus the number of one bits in the CIDR mask = 5). Therefore, the number of networks contained in this block is 32.

Notes:
14. *A. True

Explanation: Classful routing protocols summarize all subnets to the class boundary when the routing update traverses a different major network

Notes:
15. *A. Multiple IP addresses must have the same high order bits

Explanation: When summarizing routes the high order bits of the summarized routes must be the same. Additionally, you should verify that the summary range contains only the intended routes. For example It might appear valid to summarize networks 172.16. 4.0, 172.16.5.0 and 172.16.6.0 into the following announcement 172.16.4.0 255.255.252.0. Inspection of this would reveal that the summary does combine these three networks into the summary, but also the summary includes network 172.16.7.0, which is not part of the

intended summary.

Notes:

*A. 192.168.10.0

*B. 10.1.1.0

*D. 172.16.1.0

Explanation: The following are the Private IP Ranges:

Private Class A - 10.x.x.x

Private Class B - 172.16-31.x.x

Private Class C - 192.168.x.x

Notes:

*A. /30

Explanation: The (/30) is the subnet mask of 255.255.255.252. This allows exactly 2 hosts per subnetwork.

Notes:

*A. /27

Explanation: This is the equivalent of a subnet mask of 255.255.255.224 and supports up to 30 nodes and 2046 networks. This calculation is the same as defining subnet masks.

Notes:

*A. /27

Explanation: This is the equivalent of a subnet mask of 255.255.255.224 and supports up to 30 nodes and 7 networks.

Notes:

*A. Nothing.

Explanation: To the rest of the world, you network is usually summarized to the class boundary.

Notes:

*A. Yes. The /24 designation falls within the /16 designation

Explanation: A typical situation where this would occur would be that your company has been assigned a class B network (172.16.0.0). This is sub divided throughout you organization. When this network is advertised to the outside world, it has been summarized to the class boundary by the gateway. The outside world has no concern as to how the network has been subnetted within your organization. Outside world devices

would route return traffic based upon the /16 prefix to the gateway. The gateway would have the internal detail routes to allow proper internal routing within your organization.

Notes:

22. *E. Assign different masks according to your requirements.

Explanation: Assigning a mask of /16 would not improve its utilization, rather it would represent a CIDR block of 256 class C addresses. Assigning a mask of /24 to a class C accomplishes nothing - that is the default mask for a class C network. Additional network utilization would be gained by assigning a /20 mask. This would provide for 16 subnets, each supporting 14 hosts. The key word here is the most effective utilization of the address space. This can only be accomplished by usage of VLSM, but this also requires a routing protocol that supports VLSM.

Notes:

23. *A. 192.168.49.35

Explanation: If you subnet the address space 192.168.49.32/27 to a /30 you get 8 subnets (192.168.49.32, 192.168.49.36, 192.168.49.40, etc.). Subnet 192.168.49.32/30 has a broadcast address of 192.168.49.35 and two hosts 192.168.49.33 and 192.168.49.34.

Notes:

24. *B. 172.16.168.0/22
172.16.172.0/23

Explanation: The first 21 bits of all network address are the same but if they were summarized to the /21 boundary two additional routes would be included. 172.16.174.0 and 175.0. This requires two summary statements to advertise only these six routes. one summary for 172.16.168.0 through 171.0 and one additional summary for 172.16.172.0 and 173.0. The correct summary statements are 172.16.168.0/22 and 172.16.73.0/23

Notes:

25. *B. 192.168.0.0 255.255.240.0

Explanation: The networks included in this block have the first 20 bits identical. (11000000.1010100.0000xxxx.xxxxxxxx). The mask 255.255.240.0 requires that bit positions 1 through 20 must be the same and the other 12 bits are ignored. The starting address of a CIDR block must be the first address of the group. Therefore the answer is 192.168.0.0 255.255.240.0. This block would contain exactly the 16 Class C networks 192.168.0 through 192.168.15.0.

Notes:

26. *A. Enhanced IGRP (EIGRP)

*B. Open Shortest Path First (OSPF)

Explanation: Both Enhanced IGRP (EIGRP) and Open Shortest Path First (OSPF)support the use of VLAMs.

Notes:

27. *D. The use of different masks for the same network number on different interfaces,

Explanation: With Variable length subnetting you can use different masks for the same network number on different interfaces, which allows you to more efficiently use your available address space

Notes:

28. *C. It allows subnetting information to be sent with the IP address.

Explanation: By including the subnet mask information within the routing update allows subnetting information to be sent with the IP address, thus removing the classful routing constraints that are imposed by RIP and IGRP>

Notes:

29. *B. It allows more efficient utilization of available network address space.

Explanation: Using a routing protocol that supports Variable-length subnet masks (VLSMs) allows you to more efficiently allocate your address space by assigning only the needed address range to each subnetwork.

Notes:

30. *D. It can provide a significant reduction in route propagation and routing information overhead.

Explanation: When you implement a routing protocol that supports Variable-length subnet masks (VLSMs)you can now use route summarization to condense multiple routes to a single advertisement producing a significant reduction in routing information overhead. Remember that classful routing processes automatically summarize at a major network boundary, but do not allow the option of summarizing within the network structure.

Notes:

31. *B. Creating groups called areas and allocating specific addressees to them

Explanation: Hierarchical routing is the process of assigning certain specific addresses to differing areas in such a manner as that they may be summarized.

Notes:

32. *B. 2

Explanation: The ip address 192.168.0.0/29 encompasses the addresses of 192.169.0.0 through 192.168.0.7. This could be further subdivided into two /30 segments. 192.169.0.0/30 and 192.168.0.4/30

Notes:

Chapter 3: Configuring OSPF in Single Area

The objective of this chapter is to provide the reader with an understanding of the following:

- Explain why OSPF is better than RIP in a large internetwork
- Explain how OSPF discovers, chooses, and maintains routes
- Explain how OSPF operates in an single area NBMA environment
- Configure OSPF for proper operation in a single area
- Verify OSPF operation in a single area

1. S1 is a T1 interface. The command to set the bandwidth for this interface is

    A. router (config-router)# bandwidth T1
    B. router (config-if)# bandwidth 1.544
    C. router (config-router)# bandwidth 1544000
    D. not required

2. OSPF selects the best path based upon _____.

    A. Hops
    B. Link Speed
    C. Cost
    D. Load

3. OSPF was written to address the needs of large, scalable internetworks that RIP could not support. These include all the following except

    A. Speed of convergence
    B. Route summarization
    C. VLSM
    D. Network reachability

4. The ip protocol id for OSPF updates is

    A. 21
    B. 25
    C. 89
    D. 520

5. OSPF neighbors are discovered by _____

    A. adjacencies
    B. broadcasts
    C. hello
    D. The Dykstra Algorithm

6. OSPF cost is assigned to the _____ interface.

    A. highest numbered
    B. incoming
    C. outgoing
    D. console

7. The cost assigned to an OSPF interface is associated with the

    A. outbound interface
    B. inbound interface
    C. designated router
    D. line utilization

8. The purpose of the Designated Router in OSPF is to

    A. control traffic for an area
    B. coordinate all activity for the OSPF domain
    C. reduce overhead
    D. assign path priority

9. An OSPF router with a higher priority than the current DR is activated. What effect does this have on the network?

    A. None
    B. The new router pre-empts the current BR
    C. The new router becomes the BDR
    D. The new router's priority is reduced to a value lower than the current DR

10. On a OSPF Point-to-Multipoint NBMA

    A. Neighbors must be statically configured
    B. A unique subnet is configured for each remote location
    C. DR and BDR elections are eliminated
    D. Neighbors must be fully meshed

11. R1 is attached to multiple Ethernets and its cpu utilization is excessive. What is the best way to ensure that this device does not become a DR?

    A. use secondary addressing on each ethernet
    B. use passive interfaces
    C. set priority to zero
    D. issue the OSPF interface command of No DR

12. Can routers with different OSPF Process ids on the same network establish a neighbor relationship

    A. Yes

B. No

13. The OSPF cost for a 16 Mbps Token Ring interface is

    A. 1
    B. 10
    C. 6
    D. 64

14. Which command should be used to view OSPF timers

    A. show ip ospf timers
    B. debug ip ospf events
    C. sh ip ospf status
    D. sh ip ospf

15. Which statement is valid for an OSPF Broadcast NBMA

    A. all points are on the same subnet
    B. neighbors must be statically defined
    C. must be fully meshed
    D. Every answer is correct.

16. You are talking with a colleague about choosing a link state routing protocol for IP. Which of the following would meet this requirement?

    A. RIP
    B. OSPF
    C. RTMP
    D. NLSP
    E. EIGRP

17. Draw a line between the OSPF term to its closest related meaning.

Adjacencies DataBase	Always the same on all routers in the area
Topology Database	Established Bidirectional Communications
Routing Table	Best Path
	List of remote neighbors

18. If a DR in an OSPF environment fails, the BDR takes over. What happens when the DR is re-started?

    A. Nothing
    B. The DR reclaims it old standing
    C. The BDR demotes the DR to BDR and changes its title to DR
    D. An election is held to determine the DR.

E. The OSPF environment is divided into two areas defined which router that believe to be the DR.

19. When is a router in Exstart State?

    A. Upon Startup of the network, after the DR and BDR routers have established neighbors.
    B. While processing links.
    C. While forwarding packets.
    D. While sending a summary of it's link state database
    E. No answer is correct.

20. When are Database Description Packets sent?

    A. During ExStart State
    B. During the Exchange State.
    C. During the Load state.
    D. During the Full State
    E. No answer is correct.

21. Which of the following commands will enable OSPF?

    A. Route IP OSPF Enable
    B. Router ospf process-id#
    C. OSPF Enable
    D. Route OSPF On #
    E. Router ospf area#

22. What is the effect of the following command set?

Router OSPF 1

Network 10.1.1.1 0.0.0.0 area 0

Network 10.1.2.1 0.0.0.0 area 0

    A. Nothing. The commands are incorrect.
    B. All traffic for 10.1.1.1 and 10.1.2.1 will be routed to area 0.
    C. The router will activate OSPF on these two interfaces and assign the interfaces to area 0.
    D. The router will reject the Network commands.
    E. The area ID will generate an error as 0 is reserved for system functions

23. Which of the following commands can be used to define a higher priority for a router that participates in OSPF functions?

    A. Router ospf process-id
    B. Ospf map id process-id
    C. Network area number

D. IP ospf priority number
E. Interface loopback number

24. What is the command that will show the most detailed information for your OSPF neighbors.

Do not use short cuts.

25. Which area is always at the core or backbone of OSPF?

A. Area 0
B. Area 1
C. Area 100
D. Area 255
E. Area 256

26. What is the command that will allow you to view the status of a virtual links in an OSPF IP network?

27. Which of the following commands will show a summary of the database totals for process 10 area 2?

A. Show ip ospf 10 2 database database-summary
B. Show ip ospf 10 2 database
C. Show ip ospf 10 2 database summary
D. Show ip ospf 2 10 database database-summary
E. No answer is correct.

28. You would like to view a compilation of ASBR link state summary entries. Which of the following commands will show a summary for process 10 area 2?

A. Show ip ospf 10 2 database database-summary
B. Show ip ospf 10 2 database
C. Show ip ospf 10 2 database summary
D. Show ip ospf 2 10 database database-summary
E. Show ip ospf 10 2 database asbr-summary

29. When using the show IP ospf database command, what kind of information are your looking for?

A. Link State Status
B. Processes
C. Routes
D. Interfaces
E. No answer is correct.

30. During what state can an OSPF router begin routing traffic?

A. ExInit
B. Exchange
C. Load

D. Full
E. ExStart

31. Which of command will enable IP OSPF routing?

A. Router OSPF Process-ID
B. Router IP OSPF Process-ID
C. OSPF Router Process-ID
D. Router OSPF AS#
E. Enable OSPF Process-ID

32. Which of the following must be contained in an OSPF "hello".

A. Router ID
B. Hello intervals
C. Dead intervals
D. Holddown timer
E. Update interval

33. A router that is using OSPF as the router protocol by default will consider another router down if it has not received a hello response in _____ seconds.

A. 40
B. 10
C. 30
D. 90
E. 45

34. Which of the following two best compares RIP and OSPF?

A. OSPF is more CPU and memory intensive than RIP.
B. OSPF is less CPU and memory intensive than RIP.
C. OSPF is easier on the link than RIP but heavier on the router
D. OSPF is heavier on the link than RIP but easier on the router

35. What is the function of an Area Border Router (ABR) in an Open Shortest Path First (OSPF) internetwork?

A. This is a router used to connect an area to the network backbone.
B. This is a router used to connect different media types
C. This is a router used to communicate to other ABRs
D. This is a router used to signify an entry to an unreachable network (excessive hop count)

36. Which of the following commands can be used to view adjacent OSPF routers?

A. Show IP ospf neighbor
B. Show IP ospf neighbors
C. Show IP ospf adjacent

D. Show IP ospf database
E. Show ip protocol

37. A new router with a higher OSPF router priority than the current Designated Router enters the network What will happen?

A. Nothing.
B. A new election will be triggered and the new router will be elected as DR.
C. The BDR will be promoted as the new DR.
D. All routers will add one to their own priority setting.
E. The present DR will be demoted to a BDR.

38. Type the OSPF command that will display the most status information for the neighbor router.

Do not abbreviate the command.

39. Select the order of OSPF operation in routers.

1. Elect a designated router (DR) and a backup designated router (BDR).

2. Discover routers.

3. Discover routes.

4. Select appropriate routes to use.

5. Maintain routing information.

A. 2, 1, 3, 4, 5
B. 1, 2, 3, 4, 5
C. 3, 4, 5, 1, 2
D. 3, 5, 4, 2, 1

40. The follow commands have been entered at the router:

router ospf 1 network 10.0.0.0 0.255.255.255 area 0What does area 0 signify?

A. That all interfaces with an IP address of 10.x.x.x are assigned to area 0.
B. That the area is unnumbered.
C. That this covers all areas.
D. That this is a process-id.

41. Which of the following is not an OSPF LSA type?

A. Router link entry
B. Network link entry
C. Border gateway link entry
D. Autonomous system external link entry

E. Summary link entry

Answers

1. *D. not required

Explanation: To set the bandwidth for S1 you must be in the interface configuration mode and the bandwidth is listed in kilo bps. Therefore answers A, B, and C are incorrect. The default bandwidth for a synchronous serial interface is 1544 kbps, therefore it is not required.

Notes:

2. *C. Cost

Explanation: OSPF determines the best path based upon cost. The default cost is calculated by dividing the bandwidth of the interface into a constant of 10,000,000.

Notes:

3. *B. Route summarization

Explanation: OSPF as developed to address network reachability, speed of convergence and support vlsm. Classful route summarization is automatically accomplished within RIP.

Notes:

4. *C. 89

Explanation: The IP protocol id for OSPF is 89. 21 is FTP control, 25 is SMTP, and 520 is RIP.

Notes:

5. *C. hello

Explanation: OSPF forms neighbor relationships through the exchange of hello packets.

Notes:

6. *C. outgoing

Explanation: The OSPF cost is calculated by dividing the bandwidth of the out going interface into a fixed constant (default value is 100mbps).

Notes:

7. *A. outbound interface

Explanation: All OSPF costs are assigned to the outbound interface.

Notes:

8. *C. reduce overhead

Explanation: The purpose of the Designated Router is to reduce overhead on a multi-access network. Each router forms an adjacency with the DR and the BDR rather than having each router form an adjacency with all routers on this network. This reduces the number of adjacency exchanges from (n*(n-1)) to (n-1) exchanges.

Notes:

9. *A. None

Explanation: When a new router is activated on a multi-access network it has no effect on the DR and BDR assignments. The only time the DR is replaced is if the device becomes inoperative, then the BDR assumes the role of DR. When this occurs, the router with the highest priority becomes the BDR.

Notes:

10. *C. DR and BDR elections are eliminated

Explanation: If sub-interfaces are not used in a Frame Relay environment, the network is a Non Broadcast Multi-Access network. In this situation a DR and BDR are required. If the network type OSPF multipoint is selected, it allows the network to still be a NBMA but eliminates the need for a DR and BDR.

Notes:

11. *C. set priority to zero

Explanation: A router with an interface that has been set to zero is excluded from the DR and BDR election process. A typical candidate for this setting is an ASBR or ABR.

Notes:

12. *A. Yes

Explanation: The process ID is used only to identify each instance of OSPF that is running on a single router. It has no bearing on the establishment of a neighbor relationship.

Notes:

13. *C. 6

Explanation: The cost for an OSPF interface is derived by dividing a constant of 100,000,000 by the bandwidth of the interface. In this example 100m/16m = 6.25 rounded = 6.

Notes:

14. *D. sh ip ospf

Explanation: The show ip OSPF timers and status commands are no valid. The debug IP OSPF events produces a real time listing of OSPF events. The show IP OSPF command

lists, among other items, the values of the various timers.

Notes:
15. *D. Every answer is correct.

Explanation: In order for OSPF to support a Broadcast NBMA network, all locations must be on the same subnet, they must be fully meshed, and the neighbors have to be statically defined.

Notes:
16. *B. OSPF

Explanation: OSPF is a link state protocol that supports IP.

Notes:
17.
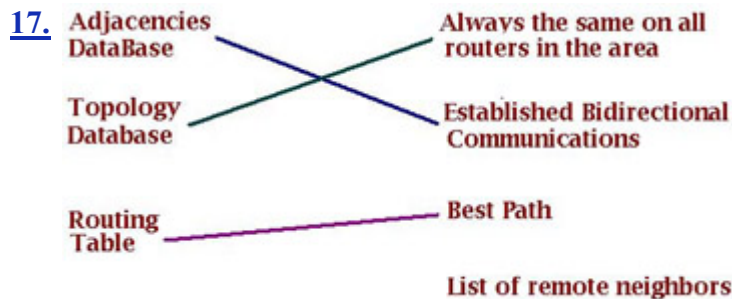
Explanation: The adjacencies database is a list of all neighbors connect by bidirectional communications. The topology database is a list of all routes on the network and is shared by all routers. The routing table contains the best path to a destination

Notes:
18. *A. Nothing

Explanation: The only time a new DR is established is when it is replaced by a BDR. Then a new BDR gets elected. This is based on each routers priority.

Notes:
19. *A. Upon Startup of the network, after the DR and BDR routers have established neighbors.

Explanation: Before are router is ready to forward packets it must first go through a startup procedure. Upon initial exchange of the Hello packets allow the election of the DR and BDR routers. Once they have been elected and neighbor relationships have been formed with all other routers on the network, then the exchange process begins. At this time a given router would be in the exstart start state.

Notes:
20. *B. During the Exchange State.

Explanation: Database Description Packets are sent during the exchange state to identify the list of networks that each router knows. It is from this list that the receiving router

generates the Link State Requests (LSRs) for the detail information about the networks that it does not know. One key element in OSPF design is that only the needed information is exchanged between routers.

Notes:

21. *B. Router ospf process-id#

Explanation: The Router ospf process-id# is the command that will enable OSPF. The process ID is used to identify which OSPF session is active when multiple copies of OSPF are in use on a single router.

Notes:

22. *C. The router will activate OSPF on these two interfaces and assign the interfaces to area 0.

Explanation: The network statement in OSPF tests the address argument as defined by the address and mask, searches all interfaces on the router for a match. If the interface address satisfies the match, OSPF is activated on the interface, the interfaces is assigned to the specified area (in this instance area 0), and the network identified by the ip address statement on the interface will be advertised.

Notes:

23. *D. IP ospf priority number

Explanation: IP ospf priority number - This is a command that helps to determine if a router will become a DR or BDR. The number should range from 0 to 255. A 0 defines that a router can never become a designated router.

Notes:

24. show ip ospf neighbor detail

Explanation: Show ip OSPF neighbor detail- This command will display all information regarding neighbors and their status such as Exstart, Init, full, etc.).

Notes:

25. *A. Area 0

Explanation: Area 0 is defined as the OSPF Backbone area.

Notes:

26. show ip ospf virtual-links

Explanation: Show IP Ospf virtual-links - This command will display the settings and state of your link links.

Notes:

27. *A. Show ip ospf 10 2 database database-summary

Explanation: The command to show a summary of the database with totals is shown

above. Do not confuse this with the summary command which is used to display information about router link states.

Notes:

28. *E. Show ip ospf 10 2 database asbr-summary

Explanation: Show ip ospf 10 2 database asbr-summary - This command will show summaries regarding asbr link states

Notes:

29. *A. Link State Status

Explanation: Link State Status is the primary reason for looking at the database.

Notes:

30. *D. Full

Explanation: Routes must be in full mode before they can begin to route data.

Notes:

31. *A. Router OSPF Process-ID

Explanation: Router OSPF Process-ID will enable IP OSPF routing. Note that additional commands are required for OSPF to actually function.

Notes:

32. *A. Router ID

*B. Hello intervals

*C. Dead intervals

Explanation: The hello packet contains the router ID; hello and dead intervals; its neighbors; area-ID; router priority; the DR and BDR; authentication password; and stub area flag. Routers send hello packets every 10 seconds by default; if a response is not received in 40 seconds, the other router is considered down - the default "dead time".

Notes:

33. *A. 40

Explanation: Routers send hello packets every 10 seconds by default; if a response is not received in 40 seconds, the other router is considered down - the default "dead time".

Notes:

34. *A. OSPF is more CPU and memory intensive than RIP.

*C. OSPF is easier on the link than RIP but heavier on the router

Explanation: OSPF uses more router memory than RIP, but it puts a heavier load on the

router.

Notes:

35. *A. This is a router used to connect an area to the network backbone.

Explanation: An ABR is used to connect an area to the backbone. If requires no special configuration other than identifying which interfaces belong to the each area.

Notes:

36. *A. Show IP ospf neighbor

Explanation: The command is singular under OSPF (Neighbor). This command will show the list of neighbors and their current state.

Notes:

37. *A. Nothing.

Explanation: If a new router, with a higher priority is activated on a link that already has elected a DR and BDR, nothing happens. The only time that a new DR is activated is if the existing one goes down, then the current BDR assumes the role of DR. The router with the highest priority would then become the new BDR>

Notes:

38. show ip ospf neighbor detail

Explanation: Show ip ospf neighbor detail - This command will show the details of neighboring routers and their state.

Notes:

39. *A. 2, 1, 3, 4, 5

Explanation: · Discover Neighbors!

2. To establish this relationship, routers use hello packets to discover their neighbors. To establish this relationship, routers use hello packets to discover their neighbors.
1. Elect a designated router (DR) and a backup designated router (BDR).
3. Discover routes. The DR sends all of its information, the slave router compares the information with its table and updates its table.
4. Select appropriate routes to use. The Dijkstra algorithm is used to calculate the best path.
5. Maintain routing information. Changes are sent to the DR who then floods the information out to all other routers.

Notes:

40. *A. That all interfaces with an IP address of 10.x.x.x are assigned to area 0.

Explanation: The network statement causes the router to scan all interfaces and any interface that matches the network argument and mask is activated under OSPF, the network defined by the ip address and mask on the interface are advertised, and the

interface is assigned to the area specified in the network statement. Therefore, all interfaces with an IP address of 10.x.x.x are assigned to area 0.

Notes:

41. *C. Border gateway link entry

Explanation:

The types of LSAs (Link State Advertisements)are Router link entry (type 1), Network link entry (type 2), Summary link entry (type 3&4), and Autonomous system external link entry (type 5).

Notes:

Chapter 4: Interconnecting Multiple OSPF Areas

The objective of this chapter is to provide the reader with an understanding of the following:

- Describe the issues with interconnecting multiple areas and how OSPF addresses each
- Explain the differences between the possible types of areas, routers, and LSAs
- Explain how OSPF supports the use of VLSM
- Explain how OSPF supports the use of route summarization in multiple areas
- Explain how OSPF operates in a multiple area NBMA environment
- Configure a multiarea OSPF network
- Verify OSPF operation in multiple areas

1. An OSPF router with all interfaces in area 2 is called a(n) _____ router

   A. Internal
   B. external
   C. designated
   D. border

2. An ASBR interfaces between

   A. different OSPF user areas
   B. a user area and the backbone
   C. a user area and area 0
   D. OSPF and a different routing domain

3. A type 2 LSA is generated by a(n) _____ router

   A. Internal
   B. external
   C. designated

D. area border

4. Summary route LSAs are created by

   A. ABR
   B. ASBR
   C. DR
   D. BDR

5. An ABR has at least one interface in area __ .

   A. 3
   B. 2
   C. 1
   D. 0

6. What routing information does an ABR send into a Totally Stubby Area?

   A. Type 3, type 4, and Type 5 LSAs
   B. Type 3 and type 4LSAs, and a default route
   C. Type 5 LSAs only
   D. default route

7. An ABR sends which LSAs into a Stubby Area

   A. Type 3, type 4, and Type 5
   B. Type 3, type 4, and default
   C. Type 5
   D. default

8. An ABR sends which LSAs into a Standard area

   A. Type 3, type 4, and Type 5
   B. Type 3, type 4, and default
   C. Type 5
   D. all

9. Which LSAs identify an inter-area route

   A. Type 1
   B. Type 2
   C. Type 3
   D. Type 5

10. A Virtual Link is constructed between two

   A. router interfaces within the same area
   B. router interfaces within different areas
   C. router Ids within the same area

D. router ids within different areas

11. In order to construct a virtual link between two routers in the same area, the area must be a _____ area

    A. stub
    B. backbone
    C. standard
    D. totally stubby

12. To create a Totally Stubby area

    A. all routers in the area specify the area as stub
    B. all routers in the area specify the area as stub no summary
    C. all routers in the backbone specify the area as stub
    D. all routers in the area specify the area as stub and the ABR specifies no summary

13. To summarize network 10.1.0.0/16 for area 1, the correct command is

    A. config (router)# Summary Address 10.1.0.0.255.255.0.0
    B. config (if)# Summary Address 10.1.0.0.255.255.0.0
    C. config (router)# Area 1 range 10.1.0.0.255.255.0.0
    D. config (if)# Area 1 range 10.1.0.0.255.255.0.0

14. Which of the following are not sent into stubby or totally stubby areas?

    A. LSA-TYPE 1
    B. LSA-TYPE 2
    C. LSA-TYPE 3
    D. LSA-TYPE 4
    E. LSA-TYPE 5

15. The difference between an E1 and an E2 route is

    A. An E1 route is generated by an ASBR and the internal cost is accumulated
    B. An E1 route is generated by an ASBR and the internal cost is not accumulated
    C. An E1 route is generated by an ABR and the internal cost is accumulated
    D. An E1 route is generated by an ABR and the internal cost is not accumulated

16. You have a stub area that you would like to convert to a totally stubby area. Which routers need to be re-configured?

    A. Interior routers and the ABR
    B. Interior routers
    C. ASBR
    D. ABR

E. No other configuration is required

17. In a network that uses the Open Shortest Path First (OSPF) routing protocol, what command would be used to configure the virtual link?

   A. virtual-link (link-id)
   B. area (area-id) virtual-link (router-ID)
   C. virtual-link (router-ID)
   D. network (address) virtual-link (router-ID

18. You plan a network redesign intending to institute Open Shortest Path First (OSPF) on the routers. Which of the following should be done first?

   A. Verify all segments of the network are Ethernet as it is a requirement for OSPF.
   B. Reconfigure your network addressing so that route summarization can be use
   C. All non-Cisco routers should be replaced with Cisco routers.
   D. Configure all routers into the same VLAN domain.

19. Draw a line between the OSPF term to its closest related meaning.

Link	Value representing path metric
SPF	A network
Cost	Network Status
Area	Group of routers
	Algorithm to determine Best Route

20. Review the attached diagram. You would like to communicate from router A to C. Which path will OSPF choose and why?

Assume light traffic
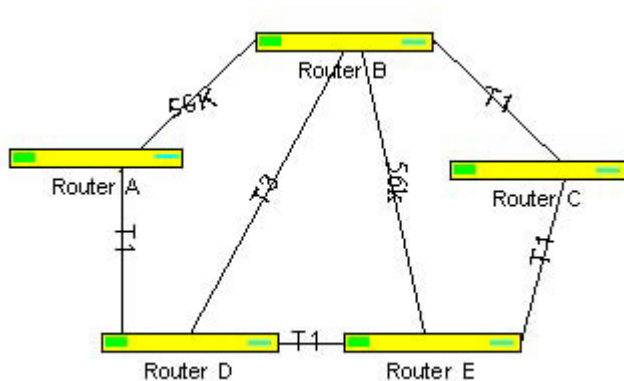
   A. A-B-C

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

21. In which two ways can OSPF be better than rip in an environment with more than 50 routers?

    A. Required resources on the router
    B. Faster Convergence Time
    C. Ease of Configuring
    D. Ability to summarize internal routes
    E. Ability to work over a DDR link.

22. Which of the following are NOT required to match in order to form an adjacency with other OSPF routers?

    A. Hello/Dead Intervals
    B. Area-ID
    C. Authentication Password
    D. DR IP address
    E. Stub Area Flag

23. Assuming that security has been enabled on all OSPF routers, which of the following is NOT required to be a match between neighbors in order to establish communications?

    A. Hello/Dead Intervals
    B. Area-ID
    C. Authentication Password
    D. DR IP address
    E. Stub Area Flag

24. Which multicast address represents all routers in an OSPF areas?

    A. 224.0.0.6
    B. 224.0.0.5
    C. 224.255.255.255
    D. 127.0.0.1
    E. 255.255.255.255

25. When a LSA is received with a lower sequence number than one that already exist in a router, what happens?

    A. The LSA is Ignored.
    B. The router sends back an LSAck to notify the sending router the message was received
    C. A LSU is sent to the source with the newer information.
    D. All routers re-exchange topology databases to update all entries.

E. The newer entry is discarded in favor of the older entry.

26. Which of the following commands can be used to define a higher interface cost for a router that participates in OSPF functions?

    A. Router ospf process-id
    B. Ospf map id process-id
    C. Ip ospf cost {value}
    D. IP ospf priority {value}
    E. Interface loopback number

27. Which of the following commands can be used to show OSPF routes?

    A. Show IP ospf database
    B. Show IP route
    C. Show IP interface
    D. Show IP ospf interface
    E. Show ip OSPF route

28. You have just merged two OSPF areas together, but seem to be experiencing some problems. To begin, you would like to remove all routes from the ip forwarding table so that only the current routes are identified. Which of the following commands will produce this result.

    A. Clear IP route 0.0.0.0
    B. Clear IP route 255.255.255.255
    C. Clear ip route *
    D. Clear IP route all
    E. No answer is correct.

29. When separating a single OSPF area into two OSPF areas, which database(s) are likely to expand in size significantly?

    A. Routing database
    B. Topology Database
    C. Neighbor database
    D. Focal Memory Allocation Database
    E. Router Information Protocol Database.

30. What are some of the possible advantages of OSPF hierarchical routing?

    A. Reduced occurrences of SPF calculations
    B. Additional CPU processing
    C. Smaller Routing Tables
    D. Router can be summarized according to area groupings
    E. Reduced Link State Update Messages

31. An Area Border router can best be described by which of the following?

A. All interfaces are in the same area.
B. At least one interface is in area 0.
C. Interfaces are in multiple areas
D. At least one interfaces is in a different autonomous system.
E. No answer is correct.

32. An ASBR can best be described as which of the following?

A. All interfaces are in the same area.
B. At least one interface is in area 0.
C. Interfaces are in multiple Autonomous Systems
D. At least one interfaces is in a different autonomous system.
E. No answer is correct.

33. Which of the following are not sent into totally stubby areas, but are sent into stubby areas?

A. LSA-TYPE 1
B. LSA-TYPE 2
C. LSA-TYPE 3
D. LSA-TYPE 4
E. LSA-TYPE 5

34. Which of the following best describes a stub area?

A. An area that does not accept information regarding routes that are outside of the Autonomous system
B. An area that receives information regarding routes that are outside of the Autonomous system
C. An area that is not attached to the main network
D. An area that does not accept information regarding routes that are outside of the Autonomous system or internal summary routes.
E. No answer is correct.

35. Which of the following commands can be used for route summarization of an OSPF network?

A. Area area-id range address mask
B. Summary Address address mask
C. IP OSPF Summary-address address mask area
D. Area range address mask area
E. No answer is correct.

36. Which of the following OSPF commands will configure a stub area for area 2?

A. Area 2 stub on all routers within the area
B. Stub area 2 no-summary on all interior routers
C. Stub area 2 on all interior routers
D. Area 2 stub no-summary only on the ABR

E. No answer is correct.

37. You would like to configure route re-distribution between your OSPF network and a RIP subnetwork. Which of the following is true?

A. Redistribution can only be preformed on an ASBR.
B. Redistribution can only be preformed at an ABR.
C. This is not possible
D. The passive-interface command should be used.
E. IOS 11.3 is required.

38. Which of the following are reasons in which you will need to establish a Virtual Link for your OSPF network.

A. You have just merged two OSPF networks together.
B. Your backbone is discontinuous.
C. An area is not connected to the backbone
D. Your router is currently in area 0.
E. None of these

39. Which of the following are only generated by an ASBR?

A. LSA Type 1
B. LSA Type 2
C. LSA Type 3
D. LSA Type 4
E. LSA Type 5

40. You want to verify that your redistributed RIP paths are included within your OSPF network. Without using the show ip route command, there is one other command that you can use to verify these routes are in OSPF. What is it?

Do not use abbreviations

41. When using OSPF, what are adjacencies?

A. They are established with other routers that are connected to the same network.
B. They are established with other routers on different networks.
C. The distance to the Designated Router.
D. The distance to the Backup Designated Router.
E. The closet network that has been discovered through hello packets.

42. Which algorithm is used to calculate the best path when using OSPF?

A. Dijkstra
B. Bellman-Ford
C. Priority queuing
D. Spanning Tree

43. Which kind of router must have interfaces attached to multiple OSPF areas?

    A. ABR
    B. Internal router
    C. Backbone router
    D. ASBR

44. You have a router that is configured as follows:

Example:
R1#Router ospf 100
Network 172.16.32.1 0.0.0.0 area 1
Network 172.16.96.1 0.0.0.0 area 0
Area 0 range 172.16.96.0 255.255.224.0
Area 1 range 172.16.32.0 255.255.224.0
Select the lower and higher address ranges that are summarized in Area 1.

    A. 172.16.32.0
    B. 172.16.63.0
    C. 172.16.63.255
    D. 172.16.127.0

45. The "default-information originate always" command in OSPF, allows what?

    A. Causes OSPF to accept routing protocol as it was originally provided
    B. This is not a valid OSPF command
    C. OSPF will always advertise a default route
    D. Is applicable only on ASBR's for Internet default routes

46. You are talking with a colleague about the reasons that the company should use OSPF rather than RIP. Which of the following reasons might you talk about?

    A. OSPF offers faster convergence
    B. OSPF supports VLSM
    C. OSPF requires less processing on the router
    D. What are you thinking, RIP is much better than OSPF
    E. OSPF offers a far simpler Configuration than RIP

47. Type the command that is required on the ABR to configure area 2 as a totally stubby area?

    A. area 2 stub no-summary
    B. area 2 stub-no summary
    C. stub area 2 no-summary
    D. none of the above

48. What is the OSPF command that will show the area each interface has been assigned to and the current value of the interface timers.

A. show ip ospf interface.
B. show ospf interface
C. show ospf interface summary
D. show interface ospf

49. Draw a line between the OSPF LSA type and their definitions.

LSA-1	Autonomous System
	External link entry
LSA-2	
	Summary link entry to ASBRs'
LSA-3	
	Summary link entry to
LSA-4	internal routes
LSA-5	
	Router link entry record
	Network link entry record

50. R1 is an ABR. E1 address 10.1.1.1 is in area 1 and S0 address 10.1.2.1 is in area 0. The correct configuration for this is

A. config (router)# network 10.1.1.1 255.255.255.255 area 1
config (router)# network 10.1.2.1 255.255.255.255 area 0
B. config (router)# network 10.1.1.1 255.255.255.0 area 1
config (router)# network 10.1.2.1 255.255.255.0 area 0
C. config (router)# network 10.1.1.1 0.0.0.0. area 1
config (router)# network 10.1.2.1 0.0.0.0 area 0
D. config (router)# network 10.1.1.1 0.0.255.255 area 1
config (router)# network 10.1.2.1 0.0.255.255 area 0

51. Which command(s)would you use to define a totally stubby area?

A. area 2 stub no-summary on the ABR
B. area 2 totally-stubby on all routers
C. area 2 totally stubby on the ABR
D. area 2 stub on the interior routers

52. When dealing with OSPF and extremely large routing tables, what is one of the ways to reduce routing table entries on your interior routers?

A. Segment the network.
B. Use Route Summarization
C. Implement Standard areas
D. Create a single network of all smaller networks.
E. No answer is correct.

53. Your network configuration is such that one of your areas is not directly connected to the backbone area. What must you do to make the configuration work?

A. You created a totally stubby area.

B. You did nothing.
C. You used IP tunnel and create a link to the backbone.
D. Create a virtual link to connect it to the backbone.
E. No answer is correct.

54. Which type of area within OSPF does not accept external or summary LSAs?

A. Totally stubby area
B. Stub area
C. Standard area
D. Backbone area
E. Border area

55. Which of the following best describes a totally stubby area?

A. An area that does accept information regarding routes that are outside of the Autonomous system
B. An area that does not accept information regarding routes that are outside of the Autonomous system
C. An area that is not attached to the main network
D. An area that does not accept information regarding routes that are outside of the Autonomous system or internal summary routes.
E. No answer is correct.

Answers

1. *A. Internal

Explanation: A router with all interfaces in the same user area is called an internal (or interior) router.

Notes:

2. *D. OSPF and a different routing domain

Explanation: An Autonomous System Border Router is a router that is running two routing protocols and redistributing routes into OSPF.

Notes:

3. *C. designated

Explanation: Type 2 LSAs are net link state entries. The DR for the multi-access network originates these entries.

Notes:

4. *A. ABR

Explanation: Summary routes are generated by an ABR. This occurs when the ABR inserts routes from within an area (local routes) into another area (IA) routes. It is at this

time that an ABR could summarize the routes. Remember that OSPF does not automatically summarize routes. It is accomplished manually with the Range command.

Notes:

5. *D. 0

Explanation: The definition of an Area Border Router is that it has one or more interfaces in area zero and other interfaces in one or more user areas.

Notes:

6. *D. default route

Explanation: A Totally Stubby area is the most efficient of all the area types in OSPF. The routing table contains only the routes learned from within the area (Type 1 & 2 LSAs) and a default rout pointing to the ABR. The only route that the ABR sends into the area is the default route.

Notes:

7. *B. Type 3, type 4, and default

Explanation: A Stub area contains all routes originating from within the OSPF process, but none of the external routes. To access the external routes the ABR injects a default route into the stub area. Therefore, the ABR injects the IA OSPF routes (Type 3 &4) and a default route.

Notes:

8. *A. Type 3, type 4, and Type 5

Explanation: A standard area maintains a route for every internal and external route known to the OSPF Process. A standard area knows its internal routes (Types 1 & 2), and learns the IA routes and the External routes (Types 3, 4, and 5) from the ABR.

Notes:

9. *C. Type 3

Explanation: Types 1 and 2 are internal routes, a type 5 is external, type 3 and 4 are IA routes

Notes:

10. *C. router Ids within the same area

Explanation: Creating a path through a common area between two routers forms a Virtual Link. The address used to identify the routers is the router ID - not the interface address.

Notes:

11. *C. standard

Explanation: A Virtual Link can not be created through any type of a stub area. The purpose of the virtual link is to extend the backbone through a user area to provide access

to area 0 for an area that has lost its ABR or to reconnect the backbone area if for some reason it has become segmented. It must be constructed through a standard user area.

Notes:

12. *D. all routers in the area specify the area as stub and the ABR specifies no summary

Explanation: A Totally Stubby area is an extension of the stub area. To form a stub area all routers within the area (interior and ABRs) must specify that the area is a stub area. Additionally, the ABRs must specify that no summaries (Type 3,4 and 5 LSAs) are to be inserted into the area.

Notes:

13. *C. config (router)# Area 1 range 10.1.0.0.255.255.0.0

Explanation: OSPF Route summarization is accomplished by using the Range command within the OSPF router configuration. This is different than EIGRP where the summarization is done at the interface level with the Summary Address command.

Notes:

14. *A. LSA-TYPE 1

*B. LSA-TYPE 2

*E. LSA-TYPE 5

Explanation: External LSAs (Type5) are not sent into a Stub or Totally Stubby Area. Type 1 and Type 2 LSAs are generated and distribute between Routers in an area. Than saved. They are not sent into the area by the ABR. Type 3 and Type 4 LSA are sent into a Stub Area but not into a Totally Stubby Area

Notes:

15. *A. An E1 route is generated by an ASBR and the internal cost is accumulated

Explanation: When an ASBR redistributes a route into OSPF an External Type is assigned to the route - either an E1 or an E2. The default is E2, which does not increment the default metric - The E1 does increment the metric.

Notes:

16. *D. ABR

Explanation: All routers in the area have the OSPF config statement "Area n Stub" the ABR additionally requires the added the Keywork "no-summary" to convert to a Totally Stubby Area

Notes:

17. *B. area (area-id) virtual-link (router-ID)

Explanation: Use the command "area (area-id) virtual-link (router-ID) to point to the

router ID of the router at the other end of the virtual link.

Notes:

18. *B. Reconfigure your network addressing so that route summarization can be used.

Explanation: OSPF should be designed with an addressing scheme that provides for a hierarchical addressing.

Notes:

19.

Explanation: A link is connection between two or more routers. The Dykstra SPF Algorithm is used to determine the Best Path through the network. Cost is a metric derived by dividing the interface bandwidth into a default constant of 100,000,000. An area is a group of routers and networks.

Notes:

20.
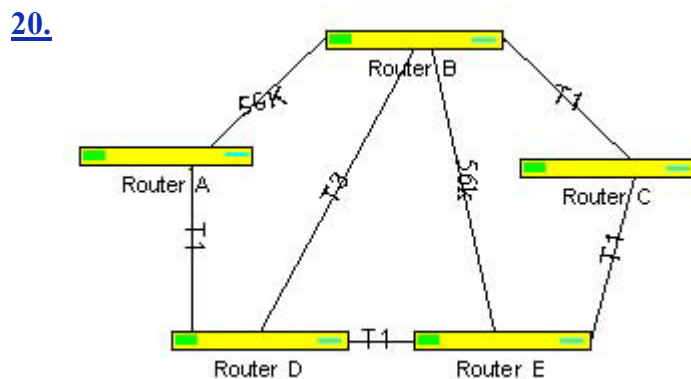
*B. A-D-B-C

Explanation: The shortest path is not necessarily the least number of hops but rather the lowest cost between two points. OSPF derives it's cost for a link by dividing the bandwidth of an output interface into a default constant of 100,000,000. Thus the higher the bandwidth of the interface, the lower the cost.

Notes:

21. *B. Faster Convergence Time

*D. Ability to summarize internal routes

Explanation: When changes occur, OSPF has a relatively short convergence time. Meaning that while RIP may take several minutes for all routers to learn that a network is down, OSPF will accomplish this in seconds. The abr in OSPF has the ability to summarize internal area routes before advertising them to other areas.

Notes:

22. *D. DR IP address

Explanation: The DR IP address is the only option listed that is not required. The other four listings are four of the required entries that are needed for an adjacency to be established between two OSPF routers. Remember that there is no DR election on a Point-to-Point link, but the routers still exchange hello packets and form an adjacency.

Notes:

23. *D. DR IP address

Explanation: The DR IP address is the only option listed that is not required. The other four listings are four of the required entries that are needed for an adjacency to be established between two OSPF routers.

Notes:

24. *B. 224.0.0.5

Explanation: 224.0.0.5 is the registered ip multicast address that OSPF uses to communicate with all routers in an area. Regardless of which vendor's implementation of this protocol, the 224.0.0.5 address will be used for this function.

Notes:

25. *C. A LSU is sent to the source with the newer information.

Explanation: When an OSPF router received an out dated (lower sequence number) entry, an update is sent back to the sender with the current information so that it may update its table with the correct information.

Notes:

26. *C. Ip ospf cost {value}

Explanation: This function is used to override the default cost which is generated by dividing the interface bandwidth into a default constant of 100,000,000. Using the interface command ip ospf cost, you manually assign a outbound cost to the interface.

Notes:

27. *B. Show IP route

Explanation: Show IP route - This is the command to show the routing table regardless as to the protocol. If you wanted to be more specific and display only OSPF routes, you can add the key word OSPF following this statement to qualify only the OSPF routes.

Notes:

28. *C. Clear ip route *

Explanation: Clear ip route * - This command will clear all routes. This will also cause OSPF to recreate the routing table from the information stored in the Link State Data Base, thus removing all previous routes from the table. Without using this method, you would have to wait for the routes to age and then be removed from the table. In OSPF, this could be greater than 30 minutes.

Notes:

29. *B. Topology Database

Explanation: Every router must still maintain a route to each network, as before, so the routing table will not increase. Every router's link-state database must be aware of the entire network. The database will expand significantly with the introduction of the inter-area LSAs (Type 3 and 4), which were not present in a single area database.

Notes:

30. *A. Reduced occurrences of SPF calculations

*C. Smaller Routing Tables

*D. Router can be summarized according to area groupings

*E. Reduced Link State Update Messages

Explanation: If summarization is used by the ABR, smaller routing tables and reduced LSA messages are required, and therefore fewer SPF calculations are required. If summarization is not used, There would be no difference in the routing tables, LSA generation, or SPF calculations.

Notes:

31. *B. At least one interface is in area 0.

Explanation: An ABR connects a user area or multiple user areas to the backbone. Therefore, one interface must be in area 0. It is not possible for an OSPF router to have interfaces in multiple areas, if one area is not area 0, unless it is connected to area 0 through a virtual link.

Notes:

32. *D. At least one interfaces is in a different autonomous system.

Explanation: These router connect to different systems and redistribute routes between this instance of OSPF and the other routing protocol.. The different systems might be another OSPF domain or any other routing process. Remember that ASBR stands for Autonomous System Boundary Router.

Notes:

33. *C. LSA-TYPE 3

*D. LSA-TYPE 4

Explanation: Stubby areas receive types 3 and type 4 LSAs. The ARB for a stub or a totally stubby area do not propagate type 5 LSAs into the area. Type 1 and Type 2 LSAs are internal to the area, so therefore are nor sent into the area by the ABR.

Notes:

34. *A. An area that does not accept information regarding routes that are outside of the Autonomous system

Explanation: Type 5 LSAs (External) are not sent into any type of stub area.

Notes:

35. *A. Area area-id range address mask

Explanation: Area area-id range address mask. Assume that you had allocated an the address space of 172.16.32.0 through 172.16.63.255 to area of 3, your summarization command would appear as Area 3 range 172.16.32.0 255.255.224.0.

Notes:

36. *A. Area 2 stub on all routers within the area

Explanation: This command is required on all interior routers and the ABR(s) to define the area as a stub area.

Notes:

37. *A. Redistribution can only be preformed on an ASBR.

Explanation: Redistribution must take place on a router that is running both protocols. By definition, the only place it can occur is on an ASBR.

Notes:

38. *B. Your backbone is discontinuous.

*C. An area is not connected to the backbone

Explanation: You will be required to create a virtual link if your back bone is discontinuous, or if an areas has lost its connectivity to the back bone . Remember, you should use virtual links only as temporary measures to provide service during problem resolution. In most instances. They can be avoided by proper OSPF network design.

Notes:

39. *E. LSA Type 5

Explanation: LSA Type 5 are originated by the ASBR and describes routes outside of the AS.

Notes:

40. show ip ospf database

Explanation: The show IP ospf database will display information regarding the entire network. This will include redistributed information (Type 5 LSAs) from other routing protocols.

Notes:

41. *A. They are established with other routers that are connected to the same network.

Explanation: Adjacencies are established with other routers that are connected to the same network.

Notes:

42. *A. Dijkstra

Explanation: The Dijkstra algorithm is used to calculate the best path for OSPF. This algorithm is also known as the Shortest Path First (SPF).

Notes:

43. *A. ABR

Explanation: ABR (within an area and with one interface to the backbone). ABRs maintain separate link-state databases for each area. ABRs can send summary information to the backbone

Notes:

44. *A. 172.16.32.0

*C. 172.16.63.255

Explanation: The route summary contains the address space of 172.16.32.0 through 172.16.63.255. Remember the mask identified that the first 21 bits must be constant, and the last 11 are ignored. therefore the last 11 bits of the address to be summarized could be all 1s and still be summarized by this statement.

Notes:

45. *C. OSPF will always advertise a default route

Explanation: The "default-information originate always" command in OSPF is the advertising of the default route. The "always" keyword causes the default route to always be advertised.

Notes:

46. *A. OSPF offers faster convergence

*B. OSPF supports VLSM

Explanation: As a link state protocol, OSPF has a faster convergence for network changes than RIP. RIP does not support VLSM, however, OSPF does. Note that although RIP v2

supports VLSM, unless you are specifically asked about RIP v2, always assume version 1 which does not support VLSM.

Notes:

47. *B. area 2 stub no summary

Explanation: When placed on all ABR routers in an area, no routes from other areas or routes external to the autonomous system are added to the interior routers routing tables. (Remember that Area 2 is a Totally Stubby Area - all interior routers also need to have the area 2 stub command.)

Notes:

48. *A. show ip ospf interface.

Explanation: This is the command that you use to verify that your interfaces have been added to the appropriate areas and the timer information..

Notes:

49.

LSA-1 — Autonomous System External link entry
LSA-2 — Summary link entry to ASBRs'
LSA-3 — Summary link entry to internal routes
LSA-4 — Router link entry record
LSA-5 — Network link entry record
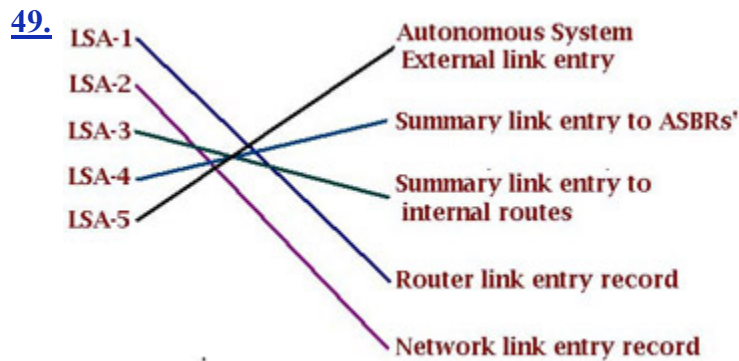
Explanation: This is an important testing item. If you are having problems with this, review the OSPF white paper on OSPF design.

Notes:

50. *C. config (router)# network 10.1.1.1 0.0.0.0. area 1

config (router)# network 10.1.2.1 0.0.0.0 area 0

Explanation: The inverse mask in the network statement is used to identify the number of bits in the argument address to be compared against each interface address on the router. If the interface address matches the identified argument address, OSPF is activated on that interface, the network identified by the interface address is advertised and the interface is assigned to the area specified in the network command. The only correct solution offered is the one using the host specific address and the mask of 0.0.0.0. There are other valid solutions, but none are listed.

Notes:

51. *A. area 2 stub no-summary on the ABR

*D. area 2 stub on the interior routers

Explanation: To configure a totally stubby area, the ABR must have the Area n stub no-summary command and the interior routers must have the Area n stub command.

Notes:

52. *B. Use Route Summarization

Explanation: Route summarization would reduce entries require less CPU over head for route re-calculation, but the most effective would be to implement totally stubby areas. Route summarization reduces the total number of routes being advertised between areas, and as such reduces the load on the ABRs. By using totally stubby areas, the interior routers in all user areas know and maintain only the routes within the area and default rout pointing to the ABR. This is the smallest and most stable configuration.

Notes:

53. *D. Create a virtual link to connect it to the backbone.

Explanation: OSPF rules state that all areas must be connected to the backbone. In situations where this is physically impossible, a transit area can be configured to extend the link to area 0 (the backbone). Remember that virtual links should only be used as a temporary fix.

Notes:

54. *A. Totally stubby area

Explanation: A Totally Stubby Area does not accept external or summary LSAs (type 3,4 or 5). A totally stubby area send packets to outside areas and to external ASs through a default route which was inserted by the ABR.

Notes:

55. *D. An area that does not accept information regarding routes that are outside of the Autonomous system or internal summary routes.

Explanation: These routers use a default route pointing to the ABR. The ABRs are members of area 0 and as such have all LSAs in their database. The key point is that the interior routers do not need to know every route within the system, they only need to know how to reach a router that does. Note that LSA's do not go into the Totally Stubby Area.

Notes:

Chapter 5: Configuring EIGRP

The objective of this chapter is to provide the reader with an understanding of the following:

- Describe Enhanced IGRP features and operation

- Explain how EIGRP discovers, chooses, and maintains routes
- Explain how EIGRP supports the use of VLSM
- Explain how EIGRP operates in an NBMA environment
- Explain how EIGRP supports the use of route summarization
- Describe how EIGRP supports large networks
- Configure Enhanced IGRP
- Verify Enhanced IGRP operation

1. EIGRP Hello packets are sent every _____ seconds by default on Point-to-Point serial links with a bandwidth of 1.544 Mbps

   A. 5
   B. 15
   C. 60
   D. 180

2. EIGRP will form a neighbor relationship if

   A. the K values are different
   B. the AS numbers are different
   C. the hello intervals are different
   D. the networks are different

3. To be eligible to become a Feasible Successor

   A. the FD must be less than the AD
   B. the FD must be greater than the AD
   C. the AD must be less than the FD
   D. the AD must be greater than the FD

4. EIGRP updates use the destination address of

   A. 224.0.0.1
   B. 224.0.0.5
   C. 224.0.0.8
   D. 224.0.0.10

5. When a router is performing route computation, and does not have a feasible successor, it sends a _____ packet to its neighbors.

   A. Hello
   B. Request
   C. Query
   D. Update

6. The maximum number of paths that EIGRP will use for load balancing by default is

   A. 2

B. 4

C. 6

D. 8

7. In an EIGRP environment, R1 shows network 10.1.1.0/24 Active. This means the path to this network is available.

A. True

B. False

8. The most efficient method to restrict the scope of a query is to

A. reduce the number of parallel paths

B. set the scope at a lower value

C. establish route summarization boundaries

D. increase the number of parallel paths

9. By default EIGRP will use up to _____ percent of available WAN bandwidth

A. 50

B. 40

C. 30

D. 20

10. Using IGRP and Enhanced IGRP, subnet routes of directly connected networks are automatically summarized at network number boundaries. Which of the following functions allow EIGRP to support discontiguous networks.

A. Support for static route configuration

B. Support for Area Border Routing (ABR)

C. Support for variable-length subnet masks (VLSMs)

D. Support for fragment-free switching

11. Your NetWare 4.x environment is working rather slowly and you would like to see if your router is configured correctly for EIGRP communications. How can you display all neighbor routers?

A. Show IPX Eigrp

B. Show IPX EIGRP neighbors

C. Show IPX route

D. Show IPX Eigrp traffic

E. Show IPX EIGRP topology

12. When configuring default-metrics for route redistribution what order should the options appear?

A. Bandwidth, delay, reliability, loading, MTU

B. Bandwidth, reliability, delay, loading, MTU

C. Delay, Reliability, Bandwidth, loading, MTU

D. MTU, Delay, Reliability, Bandwidth, loading
E. MTU, Delay, Reliability, loading, , Bandwidth

13. Which routing protocols send a subnet mask along with the address?

A. RIP2
B. OSPF
C. EIGRP
D. RIP1
E. IGRP

14. Which type of routing protocol is EIGRP?

A. Link State
B. Distance Vector
C. D.U.A.L.
D. Industry Standard
E. No answer is correct.

15. You are a NetWare engineer trying to implement EIGRP as a solution to your routing woes. Which of EIGRPs features can best help you with your NetWare environment?

A. Use of Memory
B. Frequency at which SAP and RIP updates occur
C. Establishment of formal negotiations with neighbors.
D. Support for more than 224 hops.
E. Ability to be redistributed over RTMP.

16. Draw a line between the EIGRP term to the related definition:

Neighbor Table	Path used if primary fails
Topology Table	Entries for all routes
Routing Table	Best Route
Successor	Lists adjacent routers
Feasible Successor	Primary Route

17. You are analyzing how EIGRP determines metrics and which factors you can change. Of the list shown below which are EIGRP metric factors?

A. Bandwidth
B. Delay
C. Reliability
D. Loading
E. Hop Count

18. Which of the following statements regarding EIGRP are false?

A. Uses the same composite metric as IGRP
B. Uses hello packets as does OSPF
C. Maintains a Neighbor table like OSPF
D. Can communicate and redistribute IGRP if set to the same Autonomous system ID.
E. Like IGRP, it does not use nor is compatible with VLSM.

19. Your network is completely meshed. As such if any link fails, others can take over. You are running EIGRP. How many alternate routes can be stored?

A. One
B. Two
C. Five
D. Six
E. Ten

20. What is the command that will activate EIGRP routing for IPX autonomous system 4.

A. ipx router eigrp 4
B. ipx routing
C. router ipx
D. router ipx eigrp 4
E. None of the above

21. Which command will disable automatic network summarization?

A. no auto-summary
B. no eigrp auto summary
C. no eigrp auto-summary
D. auto-summary off

22. You are working with the addresses 172.16.16.0, through 172.16.31.255 in Autonomous System 4. What is the EIGRP command that will summarize these addresses into a single update announcement?

A. summary-address ip 172.16.16.0.255.255.240.0
B. ip summary address eigrp 172.16.16.0 2155.255.240.0
C. ip summary-address eigrp 4 172.16.10.0 255.255.240.0
D. eigrp 4 ip summary-address 172.16.16.0 255.255.240.0

23. You are using EIGRP 4 with Novell NetWare. You have an ethernet with no native Novell devices attached, but is used to transport Sap updates. What command should you enter to allow sap traffic to be passed over the interface, but only when there is a change in the SAP information.

A. ipx sap tunnel eigrp 4
B. ipx eigrp 4
C. ipx sap incremental 4

D. ipx sap-incremental eigrp 4

24. How can you display neighbors that have been discovered by EIGRP?

    A. Show IP Eigrp
    B. Show IP EIGRP neighbors
    C. Show IP route
    D. Show IP Eigrp traffic
    E. Show IP EIGRP topology neighbors

25. You would like to see if your router is configured correctly for EIGRP communications. How can you display all routers in an AS?

    A. Show IP Eigrp
    B. Show IP EIGRP neighbors
    C. Show IP route
    D. Show IP Eigrp traffic
    E. Show IP EIGRP topology

26. Which of the following commands will display the Autonomous System Number?

    A. Show IPX Eigrp
    B. Show IPX EIGRP neighbors
    C. Show IP route EIGRP
    D. Show IP protocols
    E. Show IP EIGRP topology

27. You would like to display the Autonomous system number for your EIGRP process. Which command below will do this.

    A. show ip protocols
    B. Show ip eigrp
    C. Show ip protocols
    D. Show ip detail
    E. None of the above

28. You would like to display the amount of EIGRP information processed by your router including the number of ip updates and queries, replies and acknowledgements. What is the command to do this?

    A. update
    B. ow ip traffic
    C. show ip eigrp traffic
    D. show eigrp traffic
    E. none of the above

29. When configuring redistribution from IGRP or EIGRP into OSPF, which of the following commands are mandatory

A. Default-metric
B. Default-Network
C. Cisco-ISO
D. IP Classless
E. Cost

30. What is missing from the following configuration?

Router EIGRP 10
Redistribute RIP
Redistribute OSPF 15
Network 172.16.0.0
Passive-Interface Serial 0

A. You must define a subnet mask for the network command.
B. You must define an inverted mask for the network command.
C. You must define a default metric.
D. You can not re-distribute more than one routing protocol
E. Nothing, Every thing should be fine as is.

31. Which routing protocol maintains a backup route in its topology table?

A. RIP
B. IGRP
C. OSPF
D. EIGRP
E. ISIS

32. You need to view the active/passive state of eigrp on your routers. What command would you use?

A. show ip eigrp topology
B. show ip protocols state
C. show route eigrp
D. show ip eigrp neighbors

33. A major benefit of Enhanced IGRP (EIGRP) is very quick convergence. This is accomplished through which feature unique to EIGRP?

A. A new convergence algorithm known as STA (Spanning Tree Algorithm).
B. A new routing algorithm known as DUAL (Diffusing Update ALgorithm).
C. Process Switching
D. Fragment-Free Processing

34. Which concept assists Enhanced IGRP (EIGRP) to find a route when the one in its table fails?

A. feasible successor
B. hot swappable routing

C. spanning tree

D. hold down times

35. Which of the following does Enhanced IGRP (EIGRP) use to make routing decisions?

    A. hop count

    B. delay

    C. The DUAL finite state machine

    D. Bandwidth information

36. Which two of the following are properties of Enhanced IGRP (EIGRP)?

    A. EIGRP is a high-speed routed protocol

    B. EIGRP provides support for variable-length subnet masks (VLSMs)

    C. EIGRP does not send notifications to devices that are not affected by the changes

    D. EIGRP has mostly been replaced by Interior Gateway Routing Protocol (IGRP)

37. What type of routing protocol is Enhanced IGRP (EIGRP) classified as?

    A. Link State Routing Protocol

    B. Distance Vector Routing Protocol

    C. Hybrid Routing Protocol

    D. None of the above

38. Which of the following protocols can advertise information about TCP/IP and AppleTalk in the same routing update?

    A. Routing Information Protocol 2 (RIP2)

    B. Interior Gateway Routing Protocol (IGRP)

    C. Enhanced IGRP (EIGRP)

    D. Open Shortest Path First (OSPF)

39. Which of the following routing protocols supports multiple network layer routed protocols?

    A. TCP/IP

    B. Enhanced IGRP (EIGRP)

    C. Interior Gateway Routing Protocol (IGRP)

    D. Open Shortest Path First (OSPF)

40. You are an engineer trying to implement EIGRP as a solution to your routing woes. Which of EIGRPs features can best help you with your AppleTalk environment?

    A. Use of Memory

    B. Frequency at which SAP and RIP updates occur

C. Establishment of formal negotiations with neighbors.
D. Event driven update dates
E. Ability to be automatically redistributed between EIGRP and RTMP.

41. One of the factors Enhanced Interior Gateway Routing Protocol (EIGRP) uses in it's metrics is reliability. Which of the following best defines reliability?

   A. The percentage of time the link has been up VS down.
   B. The ratio of packets that have arrived error free VS those that have arrived damaged.
   C. The percentage of time a destination packet has been returned as unreachable.
   D. A calculation known as Mean Time Between Failure (MTBF)

42. What is the maximum number of paths that EIGRP will use for load sharing?

   A. 3
   B. 4
   C. 5
   D. 6

43. EIGRP uses which of the following as metrics?

   A. Delay
   B. Hop Count
   C. Load
   D. Reliability
   E. Bandwidth

44. Using EIGRP in a multi-point frame relay environment, which has multiple PVCs with different CIRs, you encounter a problem with some of the links becoming saturated with EIGRP traffic. How can this situation be avoided?

   A. Calculate the total CIR bandwidth and multiply it by 2 and assign this value as the bandwidth for the interface.
   B. Configure the bandwidth for the interface to be equal to the lowest PVC's CIR times the number of circuits.
   C. Configure the bandwidth for the interface to be equal to the lowest PVC's CIR.
   D. Calculate the total CIR bandwidth associated with this local loop and multiply it by 1.5 and assign this value as the bandwidth for the interface.

Answers

1. *C. 60

   Explanation: Hello packets are sent every 5 seconds for LANs and Serial Interfaces with a Bandwidth greater than T1. On interfaces equal to or less than T1, the updates are every

60 seconds.

Notes:
2. *C. the hello intervals are different

Explanation: EIGRP will not form a neighbor relationship if the K values or the AS do not match, but will form a neighbor relationship is the hello intervals are different. If the networks were different, it would not be possible to activate the ip protocol on the interface.

Notes:
3. *C. the AD must be less than the FD

Explanation: For a router to become a Feasible Successor, its Advertised Distance must be less than the selected Feasible Distance.

Notes:
4. *D. 224.0.0.10

Explanation: EIGRP uses the multicast address of 224.0.0.10 for routing updates.

Notes:
5. *C. Query

Explanation: If a router has a route disabled and does not have a feasible successor it queries all neighbors, except for the previous successor. If they have a path to the network they reply otherwise they query their neighbors.

Notes:
6. *B. 4

Explanation: The default maximum number of paths that EIGRP will use for load balancing is 4. The absolute maximum is 6 set with the Maximum Paths command.

Notes:
7. *B. False

Explanation: When a network is listed in the Active state, the router is attempting to locate a path to the network. When a network is available, the EIGRP state is Passive.

Notes:
8. *C. establish route summarization boundaries

Explanation: When a router receives a query for a route, it checks its routing information and if it has a record of this route, but not a better path, it forwards the query to its neighbors. Route 172.16.2.8/30 is the route in question. Router A has a detail route for this network and has summarized this on the interface to router B to 172.16.2.0/24. Router A receives a query for network 172.16.2.8/30. It has an entry for this network, but does not have a better route. It then forwards the query to router B. Router B does not have a

record of network 172.16.2.8/30 (it has a summary record for 172.16.2.0/24). It responds to Router A identifying that it has no path to the network. If the network had not been summarized, Router B would have forwarded to request to its neighbors.

Notes:

9. *A. 50

Explanation: By default, EIGRP will utilize up to 50% of the available bandwidth on a serial interface.

Notes:

10. *C. Support for variable-length subnet masks (VLSMs)

Explanation: EIGRP updates include the network mask with the routing update. This feature allows the support for discontiguous networks, but in order to avoid route summarization at the network boundary the no-summary command must be entered for the EIGRP process.

Notes:

11. *B. Show IPX EIGRP neighbors

Explanation: Show IPX EIGRP neighbors - This command will display EIGRP IPX neighbors.

Notes:

12. *A. Bandwidth, delay, reliability, loading, MTU

Explanation: The order of default metrics appears in order of importance as defined by Cisco. Considering that bandwidth is the primary factor in all transmissions, it is first. As well, delay is a common tie breaker between to links. Reliability is generally assumed, but is configurable as well as loading and MTU.

Notes:

13. *A. RIP2

*B. OSPF

*C. EIGRP

Explanation: RIP1 and IGRP do not send a subnet mask with the address. RIP2, OSPF, EIGRP, BGP and IS-IS do send the subnet mask with the address.

Notes:

14. *E. No answer is correct.

Explanation: EIGRP is a hybrid protocol that takes from both link state and from distance vector.

Notes:

15. *B. Frequency at which SAP and RIP updates occur

Explanation: Unlike NetWare which sends updates every 30 seconds, EIGRP only sends updates when changes occur.

Notes:

16.
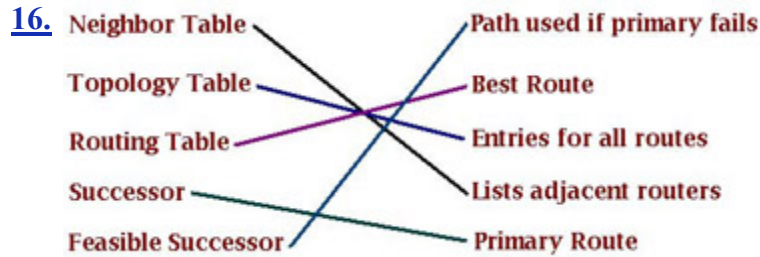
Explanation: When answering this type of question, always work from what you know and then make best effort decisions from there. In this question, a number of answers may have looked similar. After reviewing the solution, you can see that only one is truly accurate. This type of question is common on Cisco Exams.

Notes:

17. *A. Bandwidth

*B. Delay

*C. Reliability

*D. Loading

Explanation: All Items show above (and MTU) can be used to configure an EIGRP metric such as it EIGRP's DUAL algorithm. Typically only bandwidth and delay are used.

Notes:

18. *E. Like IGRP, it does not use nor is compatible with VLSM.

Explanation: VLSM support is one of the major benefits that EIGRP has over IGRP.

Notes:

19. *C. Five

Explanation: Up to six per destination may be stored. The primary and up to five backup routes (feasible successors) can be stored in the topology table.

Notes:

20. *A. ipx router eigrp 4

Explanation: Ipx router eigrp 4 - This command will enable EIGRP routing for autonomous system 4. Notice that if the command uses IPX rather than IP, you must use the key work IPX first.

Notes:

21. *A. no auto-summary

Explanation: No auto-summary will disable auto summarization such that you may work with discontinuous networks or other requirements. Remember that this command is used as a subordinate command to the routing process

router(config-router)#no auto-summary

Notes:

22. *C. ip summary-address eigrp 4 172.16.10.0 255.255.240.0

Explanation: Ip summary-address eigrp 4 172.16.10.0 255.255.240.0 will create a summary route for these addresses and suppress the detail routes for eigrp 4. This is used to reduce the number of entries in downstream routing tables and to limit the scope of queries.

Notes:

23. *D. ipx sap-incremental eigrp 4

Explanation: Ipx sap-incremental eigrp 4 instructs the router to issue SAP updates to this interface only when changes occur.

Notes:

24. *B. Show IP EIGRP neighbors

Explanation: Show IP EIGRP neighbors - This command will display all neighbors discovered by a router using EIGRP. Notice that neighbors is plural..

Notes:

25. *E. Show IP EIGRP topology

Explanation: Show IP EIGRP topology - This command will display all routers in your AS.

Notes:

26. *D. Show IP protocols

Explanation: Show IP protocols - This command will display the Autonomous system number, filtering and redistribution, neighbors and distance information.

Notes:

27. *C. Show ip protocols

Explanation: Note that the command is plural. This command will show all routing protocols that are configured on the router.

Notes:

28. *C. show ip eigrp traffic

Explanation: The show ip eigrp traffic command will display IP EIGRP activity since the activation of the routing protocol or last clearing.

Notes:
29. *A. Default-metric

Explanation: The default metric command will define the distance/cost related information. The is very important when dealing when route redistribution.

Notes:
30. *C. You must define a default metric.

Explanation: When redistributing routes from one protocol to another, you should define a metric for distributed route. If you are redistributing routes learned from OSPF into Eigrp and EIGRP routes into OSPF, you meant to eliminate the possibility of creating a routing loop, you want make sure that you primary routing protocol take precedence over the redistributed protocol. A simple method, if possible, is to assign a higher default metric than the largest native metric.

Notes:
31. *D. EIGRP

Explanation: The backup routes are known as feasible successors and are stored in the topology table under EIGRP.

Notes:
32. *A. show ip eigrp topology

Explanation: Show ip eigrp topology shows topology table, active/passive state of ip routes, # successors, feasible distance

Show ipx eigrp topology shows topology table, active/passive state of ipx routes, # successors, feasible distance

Notes:
33. *B. A new routing algorithm known as DUAL (Diffusing Update ALgorithm).

Explanation: DUAL allows Enhanced IGRP routers to converge very quickly. If the primary route fails and there is a feasible successor, the feasible successor is elevated to successor. This is done with practically no interruption of routing service. Only when no feasible successor is known does the router sends a query to each of its neighbors, except to the current successor, asking for a route to the destination.

Notes:
34. *A. feasible successor

Explanation: When using the EIGRP routing protocol, information in the routing table is

based on feasible successors. With the concept of feasible successor, alternate routes can be used in case the existing route fails. When this happens the feasible successor provides the next least-cost path available without routing loops.

Notes:

35. *B. delay

*D. Bandwidth information

Explanation: EIGRP, like all other routing protocols, uses the lowest metric to define the best path, which becomes the route entered into the routing table. EIGRP uses a composite metric derived from reliability, bandwidth, delay, and MTU divided by bandwidth.

Notes:

36. *B. EIGRP provides support for variable-length subnet masks (VLSMs)

*C. EIGRP does not send notifications to devices that are not affected by the changes

Explanation: EIGRP only sends routing updates in the event that a route changes significantly reducing overhead related bandwidth consumption. In addition, the only routers that are updated are those affected by the change.

Notes:

37. *C. Hybrid Routing Protocol

Explanation: EIGRP is different than the Link State Routing and Distance Vector Routing Protocols. Known as a Hybrid Routing Protocol, EIGRP only advertises its tables when a route has changed, it only propagates the change, and only sends to the routers that are affected by the change. this makes for faster convergence and less bandwidth consumption.

Notes:

38. *C. Enhanced IGRP (EIGRP)

Explanation: One of the distinct features of EIGRP is its support for multiple Network layer routed protocols, IP, IPX, and AppleTalk.

Notes:

39. *B. Enhanced IGRP (EIGRP)

Explanation: EIGRP provides routing support for multiple layer three protocols. These are IP, IPX, and AppleTalk.

Notes:

40. *D. Event driven update dates

*E. Ability to be automatically redistributed between EIGRP and RTMP.

Explanation: Considering that RTMP broadcast its routing table every ten seconds, EIGRP is much better WAN choice, since it only acts based on change. Since clients expect RTMP information, EIGRP can only be used in clientless environments. EIGRP will automatically redistribute AppleTalk routes between EIGRP and RTMP.

Notes:

41. *B. The ratio of packets that have arrived error free VS those that have arrived damaged.

Explanation: One of EIGRPs metric is reliability, defines as "The ratio of packets that have arrived error free VS those that have arrived damaged." It is represented by a number between 1 and 255 with the lowest number being the most reliable.

Notes:

42. *D. 6

Explanation: Eigrp has the ability to load share over six parallel paths. The default is four. paths. To utilize the maximum number of paths, the Maximum-Path command must be used. This would allow load sharing over equal cost paths. EIGRP (and IGRP) have the ability to load share and load balance over different cost paths by using the Variance and Traffic Share CLI commands.

Notes:

43. *A. Delay

*C. Load

*D. Reliability

*E. Bandwidth

Explanation: EIGRP uses MTU, delay, bandwidth, load and reliability in its metric to determine the best route to a given destination. The hop count is not considered.

Notes:

44. *B. Configure the bandwidth for the interface to be equal to the lowest PVC's CIR times the number of circuits.

Explanation: Configuring the bandwidth in this fashion reduces the amount of EIGRP traffic allowed on the interface. Thus allowing bandwidth for routable traffic.

Notes:

Chapter 6: Configuring Border Gateway Protocol

The objective of this chapter is to provide the reader with an understanding of the following:

- Describe BGP features and operation
- Describe how to connect to another autonomous system using an alternative to BGP, static routes
- Explain how BGP policy-based routing functions within an autonomous system
- Explain how BGP peering functions
- Describe BGP communities and peer groups
- Describe and configure external and internal BGP
- Describe BGP synchronization
- Configure a BGP environment and verify proper operation

1. BGP is a _____ protocol.

    A. Distance Vector
    B. Link State
    C. Advanced Distance Vector
    D. Hybrid

2. When should BGP be used?

    A. Single connection to another AS
    B. Traffic entering and leaving your AS flows unrestricted
    C. An AS allows packets to transit through it to reach other ASs
    D. Routing Policy and route selection are not a concern

3. What is the most appropriate method of connecting to an ISP if you have a single interface.

    A. BGP
    B. EIGRP
    C. static route
    D. Default route

4. Is it possible for a static route to the same network be a back-up for a dynamically learned route?

    A. Yes
    B. No

5. The AS-Path attribute is a _____ attribute

    A. well known
    B. well-known discretionary
    C. well-known mandatory
    D. vendor specific

6. The local preference attribute is used to identify the

    A. preferred exit interface on this router
    B. highest speed egress point from this AS

      C. preferred exit router for this AS

      D. recommended input interface

7. BGP Synchronization rules state that a router may not use a route learned by eBGP until

      A. it has been learned by eBGP

      B. it has been learned by iBGP

      C. it has been learned by IGP

      D. never

8. The weight attribute is

      A. a well-known mandatory attribute

      B. a well-known discretionary attribute

      C. vendor specific

      D. passed between different AS

9. BGP updates use _____ packets

      A. TCP

      B. UDP

      C. Multicast

      D. Broadcast

10. The BGP network statement is used to

      A. identify on which interfaces BGP is active

      B. activate BGP on the router

      C. allow BGP to advertise a network, if that network is present in the IGP table

      D. allow BGP to advertise a network, if that network is not present in the IGP table

11. IBGP neighbors

      A. must be directly connected

      B. are located within different AS

      C. need not to be directly connected

      D. No Answer is Correct

12. What command will allow BGP to use networks that it has learned only via BGP

      A. Network

      B. No Sync

      C. Next-Hop self

      D. Every answer is correct.

13. The clear ip bgp * command

    A. resets all neighbor sessions
    B. clears the BGP table
    C. causes routing disruptions
    D. Every answer is correct.

14. The command aggregate-address 192.168.16.0 255.255.240.0

    A. creates a summary route and does not suppress the detail routes
    B. creates a summary route and suppresses the detail routes
    C. will not work because the mask is not a class C mask
    D. No Answer is Correct

15. You need to clear all IP routes on your router. Which command would you use?

    A. clear ip route *
    B. delete ip route *
    C. purge ip route *
    D. clear ip route 131.107.4.0
    E. delete ip route 131.107.4.0

16. Which of the following will the redistribute command not support?

    A. BGP
    B. Connected
    C. Static
    D. ISIS
    E. The redistribute command works for all items listed here

17. You have a small network that does not warrant the use of BGP. Assuming you are in the correct router mode, what is the command to add a route to your RIP system such that all unknown (External) addresses are sent to the Internet via interface S 0.

Do not use short cuts or abbreviations and assume you are in the config mode.

18. In which of the following cases should you NOT use BGP?

    A. Your policy dictates that route certain traffic to ISP A and other traffic to ISP B.
    B. Your one source ISP is using BGP.
    C. You are an ISP with multiple links to the Internet
    D. You are connecting to an ISP and have different requirements than that of the ISP's policies.
    E. You do not connect to the Internet

19. Which transport protocol is used by BGP to carry its information?

    A. IP
    B. TCP

C. UDP
D. IBGP
E. SPX

20. Which of the following are reasons for using BGP?

    A. You maintain a policy that is the same as your ISP and therefore require BGP is coordinate the policies.
    B. You have a single link to the Internet that runs multiple sessions via Frame Relay to the Same ISP and therefore require BGP to manage the multiple internet streams.
    C. You are using OSPF and want your AS to flow to the Internet.
    D. You are using EIGRP and want your AS to flow to the Internet.
    E. None of the given answers.

21. How does BGP make its routing decisions?

    A. Based on bandwidth and reachability.
    B. Based on shortest hop count
    C. Based on a twelve step path selection algorithm.
    D. Based on Link State OSPF metrics
    E. BGP does not make any routing decisions.

22. You would like to enable BGP on a router located in AS 400. Assuming that you are in the correct router mode and location, type the command.

    Do not use abbreviations.

23. Review the attached diagram. You have enabled BGP for AS 400. Which of the following commands will enable you to advertise the local network?

    A. BGP Network 172.16.1.1
    B. Local-AS 400 172.16.1.1
    C. Network 400 local
    D. Network 10.0.0.0
    E. Network 172.16.0.0

24. You are attempting to verify BGP operations. Which two commands can be used to view the status of all BGP connections?

    A. Show IP BGP summary
    B. Show IP BGP Neighbors
    C. Show IP Route
    D. Show BGP connections

E. Show BGP

25. Which of the following are BGP show commands?

   A. show ip bgp
   B. show ip bgp paths
   C. show ip bgp summary
   D. show bgp ip
   E. show bgp ip summary

26. Autonomous systems are used by which protocol?

   A. IP
   B. RIP
   C. BGP
   D. Apple Talk

27. Which of the following situations would not require the use BGP?

   A. When using a default network
   B. When using a default route
   C. When there is no difference between the routing policy in your autonomous
      system and the ISP's autonomous system
   D. You are a transit AS.

28. Which of the following are the two types of BGP sessions.

   A. In & Out
   B. Active & Passive
   C. Internal & External
   D. Static & Dynamic
   E. Monitoring & Operational

29. What is the function of the network command in BGP?

   A. It enters a route in the BGP table if the exact route is present in the IP table
   B. It creates a route in the IP table if the route is present in the BGP table
   C. Creates a route in the BGP table
   D. Creates a route in both the BGP and IP table

30. As a system administrator, you have determined that your ISP has different policy
   requirements than you do. You need to configure your router with BGP. The
   configuration for your ISP's router is:

   router bgp 200
   network 15.0.0.0
   neighbor 15.1.1.1 remote-as 100

   Your internal network is 17.0.0.0. You have already assigned the serial0 interface

the IP address of 15.1.1.1. The ISPs address is 15.1.1.2. Which commands do you now need to enter at your router to establish an EBGP session between yourself and the ISP?

    A. router bgp 100
       network 17.0.0.0
       neighbor 15.1.1.2 remote-as 200
    B. router bgp 200
       network 17.0.0.0
       neighbor 15.1.1.2 remote-as 100
    C. router bgp 100
       network 17.0.0.0
       neighbor 15.1.1.1 remote-as 200
    D. router bgp 100
       network 15.0.0.0
       neighbor 15.1.1.2 remote-as 200

31. Which of the following is a Border Gateway Protocol (BGP) message type containing error condition information?

    A. open message
    B. update message
    C. notification message
    D. keep-alive message.

32. Which of the following might be the reason that Border Gateway Protocol (BGP)is not advertising a connected network?

    A. The network is beyond the 15 hop limit
    B. The network statement is missing for that network
    C. BGP does not advertise connected networks only routes
    D. BGP needs to be used in conjunction with a routing protocol in order to advertise routes and networks

33. Which of the following is used as an exterior gateway protocol?

    A. Transmission Control Protocol (TCP)
    B. Routing Information Protocol (RIP)
    C. Border Gateway Protocol (BGP)
    D. Interior Gateway Routing Protocol (IGRP)

34. Which of the following commands can be used in conjunction with Border Gateway Protocol (BGP) to specify a summary address for multiple network addresses?

    A. define address summary
    B. multiple-address
    C. address summary
    D. aggregate-address

Answers

1. *A. Distance Vector

Explanation: BGP is an exterior gateway protocol, but is still a distance vector protocol.

Notes:

2. *C. An AS allows packets to transit through it to reach other ASs

Explanation: If you have a single connection to another AS, or if you do not care what traffic enters or leaves you AS, or if there is no concern as to what path the data takes, you should not use BGP. In this instance, the only valid reason for BGP is that you are a transit area and must control how traffic traverses your AS.

Notes:

3. *D. Default route

Explanation: The most appropriate method of connecting to an ISP if you have only one connection is to use a default route.

Notes:

4. *A. Yes

Explanation: A dynamically learned route may be backed up by a static route, if the static route has a higher administrative distance than the dynamically learned route. (A floating static route) Remember, when a route is learned from multiple sources, the route with the lowest administrative distance is to one entered into the forwarding table.

Notes:

5. *C. well-known mandatory

Explanation: The AS Path Attribute is a mandatory attribute. All vendors' versions of BGP must include it as part of the update. Therefore it as a well-known mandatory attribute.

Notes:

6. *C. preferred exit router for this AS

Explanation: If there are multiple ways of exiting an autonomous system, the preferred exit path is identified by the local preference.

Notes:

7. *C. it has been learned by IGP

Explanation: Synchronization in BGP requires that any BGP route that is not in the IGP (exact match) cannot be used or advertised.

Notes:

8. *C. vendor specific

Explanation: The weight attribute is used only by Cisco. It is used to identify the preferred path out of this AS from this router, if there is more than one exit path.

Notes:

9. *A. TCP

Explanation: BGP routing updates are transported by tcp.

Notes:

10. *C. allow BGP to advertise a network, if that network is present in the IGP table

Explanation: The BGP network statement is not used to activate the routing process on any network. It is used to allow BGP to advertise a network.

Notes:

11. *C. need not to be directly connected

Explanation: BGP updates are sent via tcp, a routable update. This eliminates the necessity that the neighbors must be directly attached.

Notes:

12. *B. No Sync

Explanation: The No Sync command removes the requirement that the route must be in the IGP table before a BGP router may use or advertise the route.

Notes:

13. *D. Every answer is correct.

Explanation: The clear ip bgp * command resets every neighbor session, clears the BGP forwarding table, and causes routing disruptions while the routes are being relearned.

Notes:

14. *A. creates a summary route and does not suppress the detail routes

Explanation: This command creates a summary route for the cidr block of 192.168.16.0 through 192.168.31.0. If at least one of these routes is active, BGP will announce this route and the detail routes. One method of avoiding advertising the detail routes would be to use the summary only option of the aggregate address command.

Notes:

15. *A. clear ip route *

Explanation: The clear ip route * command clears the ip routing table and regenerates a new table based upon current updates. This command would be used to eliminate routes from the routing table that are not valid and are in the process of being aged. In a BGP environment, this command resets the neighbor relationship with all internal and external

neighbors and forces a complete re-establishment of the neighbor process, including the transfer of the complete BGP table.

Notes:

16. *E. The redistribute command works for all items listed here.

Explanation: The redistribution command works with most protocols. The largest concern when using this command is to validate that each protocol uses the proper metric such that valid routes are not over written with those which are less desirable.

Notes:

17. ip route 0.0.0.0 0.0.0.0 serial 0

Explanation: A default static route can be created in two ways, with a next hop address when known, or by specifying the output interface.

Notes:

18. *B. Your one source ISP is using BGP.

*E. You do not connect to the Internet

Explanation: BGP is an External Gateway Protocol used to define policy between different Autonomous Systems. If you have a single connection to an ISP, there is no reason to run BGP. Your policy is if the link is up use it, if it is down don't use it. You do not need BGP to determine if the link is operative. If you do not connect to an outside AS, you do not need an EGP.

Notes:

19. *B. TCP

Explanation: TCP is a connection oriented protocol that provides end to end communications for reliable delivery of information.

Notes:

20. *E. None of the given answers.

Explanation: Not a single answer listed here is a valid reason to use BGP. If you have no concern as to how you want to connect to your ISP, a default route is the best connection. If you wish to have multiple paths to the same ISP, BGP is not required. You can load share over a maximum of six parallel paths with any IGP.

Notes:

21. *C. Based on a twelve step path selection algorithm.

Explanation: IGPs use a two step process for route selection - lowest administrative cost and lowest metric within administrative distance. BGP uses a twelve step path selection algorithm.

Notes:

22. router bgp 400

Explanation: All routing processes are activated with the Router config command. The AS number in BGP identifies the Autonomous System in which the router is located.

Notes:

23. *D. Network 10.0.0.0

Explanation: Network 10.0.0.0 - This command correctly reflects the command used to define a the local network. This command takes the same format as many other routing protocols, but unlike IGPs, it does not activate the protocol. BGP activation is initiated by establishing neighbors.

Notes:

24. *A. Show IP BGP summary

*B. Show IP BGP Neighbors

Explanation: Both show IP bgp neighbors and summary will display all bgp connections. The neighbors argument will provide details whereas the summary argument will provide a simple listing of connections and their status.

Notes:

25. *A. show ip bgp

*B. show ip bgp paths

*C. show ip bgp summary

Explanation: The BGP show commands are "show ip bgp", "show ip bgp paths", and "show ip bgp summary". The "show ip bgp" displays BGP routing table. You can use the work subnet or specify a network number to attain more information. The show ip bgp paths tells you every BGP path in the database. The show ip bgp summary tells you the status on every BGP connection.

Notes:

26. *C. BGP

Explanation: BGP4 provides a loop free exchange of routing information between autonomous systems.

Notes:

27. *A. When using a default network

*B. When using a default route

*C. When there is no difference between the routing policy in your autonomous system and the ISP's autonomous system

Explanation: BGP is very complex. When possible it is better to use other alternatives such as default networks and static routes. BGP is not necessary when the policies of the ISP autonomous system and the autonomous system are the same.

Notes:

28. *C. Internal & External

Explanation: External BGP or EBGP occurs when routers in two different autonomous systems form a neighbor relationship. These routers are normally directly connected. Internal BGP or IBGP happens when routers in the same autonomous system form a neighbor relationship. Internal routers are not assumed to be directly connected.

Notes:

29. *A. It enters a route in the BGP table if the exact route is present in the IP table

Explanation: The network command creates a route in the BGP table if the exact route is present in the IP table.

Notes:

30. *A. router bgp 100
network 17.0.0.0
neighbor 15.1.1.2 remote-as 200

Explanation:

router bgp 100	Activates BGP and identifies your AS as 100
network 17.0.0.0	You will be announcing only network 17.0.0.0
neighbor 15.1.1.2 remote-as 200	Identifies the ISP's ip address and his AS.

Notes:

31. *C. notification message

Explanation: BGP notification message packets include the following type fields: Error Code; Error Subcode; and Error Data. BGP uses this packet to indicate an error condition to the peers of the originating router.

Notes:

32. *B. The network statement is missing for that network

Explanation: For BGP to advertise any network, the network must be included within the IP routing table and BGP must be aware of the network. In this case the simplest way to have a connected route announced by BGP would be to include a network statement in BGP for the network.

Notes:

33. *C. Border Gateway Protocol (BGP)

Explanation: Border Gateway Protocol (BGP) is an exterior gateway routing protocol. RIP and IGRP are both interior gateway routing protocols. TCP is not a routing protocol.

Notes:

34. *D. aggregate-address

Explanation: The command "aggregate-address" is used to specify a summary address for one or more specific network addresses. Remember that this creates an summary record and if the "Summary Only" option is not specified, both the summary and detail records will be advertised. The Summary record will be active as long as at least one of the detail routes are active.

Notes:

Chapter 7: Implementing BGP in scalable networks

The objective of this chapter is to provide the reader with an understanding of the following:

- Describe the scalability problems associated with internal BGP
- Explain and configure BGP route reflectors
- Describe and configure policy control in BGP using prefix lists
- Describe methods to connect to multiple ISPs using BGP
- Explain the use of redistribution between BGP and Interior Gateway Protocols (IGPs)
- Configure a multihomed BGP environment and verify proper operation

1. Which command can be used to view the addresses in the Border Gateway Protocol (BGP) forwarding table?

    A. Show bgp route
    B. show ip bgp
    C. show bgp table
    D. show bgp

2. The command Neighbor 10.1.1.1 route-reflector-client on R1 causes

    A. R1 to receive updates from 10.1.1.1
    B. R1 to become a route reflector

      C. the cluster ID to become 10.1.1.1

      D. R1 to become a route reflector and pass the updates to 10.1.1.1

3. R1 and R2 are route reflectors for the same cluster and R3, R4, and R5 are route reflector clients. Neighbor statements are required between

      A. R1 and all other routers

      B. R2 and all other routers

      C. R4 and R1and R2

      D. All Answers are Correct

4. Distribute lists in BGP are applied

      A. globally

      B. to individual neighbors or peer groups

      C. to control routable traffic

      D. never

5. The prefix list statement deny 192.168.24.0/22 ge23 will

      A. deny 192.168.24.0/20

      B. deny 192.168.24.0/21

      C. deny 192.168.24.64/23

      D. deny 192.168.24.0/22

6. The prefix list permit any statement is

      A. 0.0.0.0/0

      B. 0.0.0.0/8 le32

      C. 0.0.0.0/32 ge 0

      D. 0.0.0.0/0 le32

7. BGP Multihoming provides multiple ways for connecting to more than one ISP. Which method is the least cpu and memory intensive

      A. default routes from all providers

      B. Customer routes

      C. Specific routes

      D. BGP table

8. BGP Multihoming provides multiple ways for connecting to more than one ISP. Which method provides the greatest control

      A. default routes from all providers

      B. Customer routes

      C. Specific routes

      D. BGP table

9. The command ip route 192.168.32.0 255.255.224.0 null0

   A. causes all traffic destined to 192.168.21.0 to go to the null interface
   B. allows bgp to accept a summarized network statement for the CIDR block
   C. is not a valid command because the mask is less than the class C network
   D. requires that the IOS version be greater than 12.0 to work

10. Redistributing from an IGP into BGP is

    A. not recommended
    B. done only for non IGP routes
    C. recommended only for boundary routers
    D. recommended only if care is exercised not to redistribute them back into
       the IGP

11. Which of the following statements are true regarding redistribution from BGP into
    the IGP

    A. It might be required if all routers in a transit area are running BGP and
       synchronization has been turned off
    B. It can usually be avoided by using a default route
    C. It is recommended
    D. No Answer is Correct

12. In the "neighbor 15.1.2.2 remote-as 100" autonomous-system command, what does
    the function of the neighbor remote-as tell you?

    A. it identifies the AS where the router is located
    B. It finds the peer router.
    C. It finds the autonomous system.
    D. It finds the client network and exchanges the remote data with it

13. Which of the following protocols are supported by Border Gateway Protocol
    (BGP)?

    A. AppleTalk
    B. IP
    C. IPX/SPX
    D. X.25

14. What is the purpose of BGP synchronization?

    A. It insures that the IP routing table and the BGP routing table are the same
    B. It establishes flow control between EBGP traffic and IBGP traffic
    C. It restricts a BGP router from using or advertising a BGP learned route
       unless it is present in the Interior routing protocol's routing table.
    D. It synchronizes the timing of all BGP updates

15. Which of the following are True with regards BGP?

    A. EBGP is a session that occurs between two autonomous Systems
    B. IBGP is a session that occurs between routers in the same autonomous system
    C. EBGP is a session that occurs between routers in the same autonomous system
    D. IBGP is a session that occurs between two autonomous Systems
    E. None of these.

16. What is the consequence of over summarization of BGP routes?

    A. Router loops are generated
    B. Routes become unreachable
    C. Table size is increased
    D. Network convergence occurs end to end.
    E. There are no consequences

17. Review the attached diagram. You have enabled BGP for AS 400. Which of the following commands will enable you to define a remote neighbor?

    A. Neighbor 172.16.1.1 remote-as 401
    B. Remote-as 401 172.16.1.2
    C. Neighbor 172.16.1.2
    D. Neighbor 172.16.1.2 remote-as 401
    E. Neighbor 192.168.10.1 remote-as 401

18. Assuming that you made changes to the BGP session, which command should you use to reset all BGP Entries?

    A. Clear IP bgp *
    B. Clear IP BGP
    C. Use Show IP BGP the Clear each BGP path listed.
    D. Use Show IP BGP Paths the Clear each BGP path listed.
    E. Remove BGP, reboot the router, and then re-add BGP again.

19. All routers in your AS are running BGP and are fully meshed. They need to know and use the BGP routing table. How may this be accomplished without redistributing the BGP routes into the IGP?

    A. BGP-learned routes in a autonomous system are advertised by IGP
    B. Turn off synchronization
    C. BGP routes are known and are able to be used by IBGP routers to make

routing decisions
D. use an IGP default route to control traffic

20. Which of the following routing methods should be used when connecting an enterprise network to an ISP ?

   A. Default routes
   B. Static routes
   C. IGP
   D. BGP

21. The network command permits BGP to do which of the following?

   A. Enables BGP protocol
   B. Permits BGP to advertise an IGP route if it's in the IGP table
   C. Permits BGP to advertise all routes
   D. Notices the IP network BGP wishes to advertise
   E. Includes all networks to be advertised

22. What is the purpose of the BGP Weight attribute.

   A. It is used to identify the best exit router for the AS
   B. If there are multiple exit paths on this router, the lowest weight is the preferred route
   C. If there are multiple exit paths on this router, the highest weight is the preferred route
   D. It is Cisco specific, and therefore is not included in the path selection process.

23. The BGP Local Preference Attribute controls

   Which of the following best defines the purpose of the BGP Local Preference Attribute?

   A. It identifies the preferred path on this router to exit the AS.
   B. It identifies the preferred path to enter the AS.
   C. It identifies the preferred router to exit the AS.
   D. It identifies the best path on this router to exit the AS.

24. Which of the following are Border Gateway Protocol BGP message types are specified in RFC 1771?

   A. open message
   B. update message
   C. notification message
   D. keep-alive message.

25. Which of the following AS numbers are "Private" ASs as defined by IANA

A. 65500 through 65535
B. 65512 through 65535
C. 65150 through 65555
D. 65505 through 65555

26. Why would you use an IBGP router's loopback address as the neighbor address when defining a neighbor relationship

A. Faster multi-hop switching
B. Dynamic neighbor updates
C. reliability
D. Load balancing

Answers

1. *B. show ip bgp

Explanation: Use the "show ip bgp" command to view the list of addresses in the BGP table. This command might not be appropriate if you are looking at the full internet backbone table. (Great for a lab environment, but do not use in the real world.)

Notes:

2. *D. R1 to become a route reflector and pass the updates to 10.1.1.1

Explanation: This command establishes 10.1.1.1 as a route reflector client for this router and additionally, causes R1 to become a route reflector.

Notes:

3. *D. All Answers are Correct

Explanation: When using route reflectors, neighbor statements are required between the route reflectors and all peers and between the clients and the route reflectors. To complete this scenario, neighbor statements are also required between R3 and R1 and R2, and between R5 and R1 and R2.

Notes:

4. *B. to individual neighbors or peer groups

Explanation: Distribute lists in BGP are applied to specific neighbors or peer groups. This differs from IGPs where they applies either globally or to a specific interface,

Notes:

5. *C. deny 192.168.24.64/23

Explanation: This statement tests the first 22 bits of the routing update against the argument address of 192.168.24.0. If the first 22 bits match, then the network mask is checked to see if it is greater than, or equal to 23 bits. If it is, then the route will be

denied.

Notes:

6. *D. 0.0.0.0/0 le32

Explanation: The statement 0.0.0.0/0 requires an exact match of all 32 bits being zero, which would only match network 0.0.0.0. 0.0.0.0/8 le32 requires that the first 8 bits of the address are zero - no address would match this. 0.0.0.0/32 ge0 requires that all 32 bits of the address be zero. The correct answer is 0.0.0.0/0 le32 this statement tests no bits and allows any mask that is less than or equal to 32 bits.

Notes:

7. *A. default routes from all providers

Explanation: Using default routes is the least cpu and memory intensive.

Notes:

8. *D. BGP table

Explanation: Receiving the full BGP table allows the greatest control of inter AS routing, but this is also the most cpu, memory and bandwidth intensive.

Notes:

9. *B. allows bgp to accept a summarized network statement for the CIDR block

Explanation: There are various ways of advertising summary routes within BGP. One is to use the aggregate address command. To do this the detail routes are inserted into BGP with a network statement and then they are summarized using the summary only option. Another method would be to use a network statement for the summarized routes such as 192.168.32.0/19. But in order for BGP to announce this route, it must be in the IGP the IGP routing table. This static route places the summary route in the IGP table. This has no effect on routing, as the more specific route (mask greater than 19 bits) will be the longest match.

Notes:

10. *A. not recommended

Explanation: Redistribution from the IGP into BGP is not recommended. The recommended method for entering routes into BGP is via a network statement.

Notes:

11. *B. It can usually be avoided by using a default route

Explanation: Redistribution from BGP into the IGP is not recommended. Usually it can be avoided by using a default route within the AS pointing to the preferred exit router that is running BGP.

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Notes:

12. *A. it identifies the AS where the router is located

Explanation: In the "neighbor ip address remote-as" autonomous-system command the remote-as tells you the peer router that the local router will enable a session with. The ip address tells you the peer router. the autonomous-system tells you the autonomous system of the peer router. Remember, if it is in the same AS it will be internal BGP, if it is a different AS it will be external BGP.

Notes:

13. *B. IP

Explanation: BGP is an exterior gateway protocol (EGP) that performs interdomain routing for IP based traffic.

Notes:

14. *C. It restricts a BGP router from using or advertising a BGP learned route unless it is present in the Interior routing protocol's routing table.

Explanation: BGP synchronization requires that before a router may use, or advertise, a BGP learned route, that route must be in the IGP forwarding table. The purpose of this is to ensure that the BGP route is reachable via the IGP.

Notes:

15. *A. EBGP is a session that occurs between two autonomous Systems

*B. IBGP is a session that occurs between routers in the same autonomous system

Explanation: The E and I in EBGP and IBGP are internal and external. The internal BGP refers to a configuration which resides with in a single AS. External BGP (EBGP) is used between different Autonomous Systems. The difference between the two modes of BGP are associated with the manner in which the updates are handled.

Notes:

16. *E. There are no consequences

Explanation: This is a tricky question, but if you remember that the routing process selects the best path based upon the longest match (more specific route), it makes sense. If AS 1 advertises network 192.168.0.0/16, this identifies a CIDR block of 256 networks 192.168.0.0 through 192.168.255.0. If AS5 advertises network 192.168.16.0/22, networks 192.168.16.0 through 192.168.19.0 are identified with a mask of /22. Even though these routes are contained within the summary of AS1, the longest match would direct these routes to AS5. Actually the IETF encourages an AS that owns over 50% of an address space to summarize the complete space to reduce the number of detail routes in the BGP table.

Notes:

17.

*D. Neighbor 172.16.1.2 remote-as 401

Explanation: The Neighbor 172.16.1.2 remote-as 401 correctly reflects the neighbor command used to define a remote neighbor as of 401. 401 is the remote neighbor, not the local.

Notes:

18. *A. Clear IP bgp *

Explanation: Clear IP bgp * - This command will clear all BGP entries and inform the peers. This method resets every neighbor relationship and clears the BGP routing table. This also causes a route flap for all routes and could cause BGP dampening to become effective. Alternative methods would be to reset a neighbor or peer relationship that was effected by the change or use the soft option to the clear command.

Notes:

19. *B. Turn off synchronization

Explanation: Turning off Synchronization allows a router to use and advertise a route even though it is not present in the IGP routing table.

Notes:

20. *A. Default routes

Explanation: If you are connecting to a single ISP, you should use a default route.

Notes:

21. *B. Permits BGP to advertise IGP route if it's in the IGP table

Explanation: The network command permits BGP to advertise an IGP route if that route is also in the IP table.

Notes:

22. *C. If there are multiple exit paths on this router, the highest weight is the preferred route

Explanation: This attribute is Cisco specific and is not passed to any other router. If there are multiple exit paths on this router, the path with the highest weight is the preferred route.

Notes:

23. *C. It identifies the preferred router to exit the AS.

Explanation: The local preference attribute is used to identify the preferred exit point

from your AS. An example of this would be to visualize that R1 connects to an ISP with a 56Kb link and R3 connects to an ISP with a T1 link. Based on connection speed alone, you might prefer all traffic to exit the AS via the fastest link. This would be accomplished via the Local Preference Attribute. This attribute is exchanged between IBGP routers and the path with the lowest Local Preference is the preferred path.

Notes:

24. *A. open message

*B. update message

*C. notification message

*D. keep-alive message.

Explanation: RFC 1771 specifies four BGP message types; open message, update message, notification message, and keep-alive message.

open message - opens a BGP communications session between peersupdate message - used to provide routing updates to other BGP systemsnotification message - sent when an error condition is detectedkeep-alive message - notifies BGP peers that a device is active

Notes:

25. *B. 65512 through 65535

Explanation: The range of AS numbers from 65512 through 65535 are reserved by the IANA to be used as private use, much like the private IP addresses.

Notes:

26. *C. reliability

Explanation: The primary purpose of using a loopback address rather than a physical interface address when forming an IBGP neighbor relationship is reliability. When using a physical address for the neighbor relationship, the relationship is dependant on that interface being active. If the interface should become inactive, and the router is still operative, the relationship would be cancelled. This would not occur if the Loopback address were used. As long as a single interface were active on the router, the relationship would be maintained

Notes:

Chapter 8: Optimizing Routing Update Operation

The objective of this chapter is to provide the reader with an understanding of the following:

- Select and configure the different ways to control routing update traffic

- Configure route redistribution in a network that does not have redundant paths between dissimilar routing processes
- Configure route redistribution in a network that has redundant paths between dissimilar routing processes
- Resolve path selection problems that result in a redistributed network
- Verify route redistribution
- Configure policy-based routing using route maps
- Configure redistribution between different routing domains and verify proper operation
- Configure policy-based routing and verify proper operation

1. The commands:

   Ip route 0.0.0.0 0.0.0.0 s0 15
   Ip route 0.0.0.0 0.0.0.0 s1 10

   A. causes s1 to be the default gateway back-up for s0
   B. assigns s0 as the back-up default gateway
   C. assigns s0 as the default interface
   D. will be rejected due to the overlapping addresses in both statements

2. The greatest problem with route redistribution is

   A. Large routing tables
   B. Loss of native metrics
   C. Possible routing loops
   D. Invalid route summarizations

3. A simple rule to help avoid routing loops during redistribution is

   A. set the default metric to a value less than the smallest native metric
   B. set the default metric to a value less than the largest native metric
   C. set the default metric to a value greater than the largest native metric
   D. set the default metric to a value greater than the lowest native metric

4. Route 10.1.1.0/24 is learned via multiple routing sources. By default, which entry will appear in the router forwarding table

   A. RIP
   B. OSPF
   C. IGRP
   D. EIGRP

5. Routes are automatically redistributed between

   A. IP RIP and OSPF
   B. IP RIP and EIGRP
   C. IPX RIP and OSPF

D. IPX RIP and EIGRP

6. Redistribution between EIGRP and IGRP is

    A. automatic
    B. not supported
    C. supported, but requires a redistribute list
    D. automatic within the same Autonomous Systems

7. When redistributing from OSPF into RIP, care should be taken to avoid redistributing

    A. unneeded routes
    B. Rip Routes into Rip
    C. OSPF routes into RIP
    D. default routes

8. A method of allowing only specific routes to be redistributed is a

    A. passive interface
    B. distribute list
    C. null interface
    D. Every answer is correct.

9. The CLI command ip route 172.16.3.0 255.255.255.0 172.16.32.2 has and administrative distance of _____ and is _____ redistributed.

    A. 0 - automatically
    B. 0, manually
    C. 1, automatically
    D. 1, manually

10. The CLI command ip route 172.16.3.0 255.255.255.0 S0/2 has and administrative distance of _____ and is _____ redistributed.

    A. 0 - automatically
    B. 0, manually
    C. 1, automatically
    D. 1, manually

11. What is the valid range of settable values for the Administrative Distance?

    A. 0 to 255
    B. 1 to 255
    C. 50 to 200
    D. 0 to 128

12. A route map is a complex access list which allows multiple elements to tested and

various conditions to be set, based upon the test.

    A. True
    B. False

13. Policy-based routing is applied to _____ packets

    A. tcp
    B. udp
    C. inbound
    D. outbound

14. If a packet does not meet the policy route map match criteria, the packet is

    A. dropped
    B. queued
    C. forwarded normally
    D. priority forwarded

15. For a Route Map to check if an address is in either ACL 1 or 2 or 3 and in 5 the correct match statements are?

    A. match 1 or match 2 or match 3 and match 5
    B. match 1 2 3 and 5
    C. match 1 2 3
       match 5
    D. not possible

16. Which command would apply a routing policy named test to a router

    A. config(router)# ip policy route-map test
    B. config(router)# ip policy route map test
    C. config(if)# ip policy route-map test
    D. config(if)# ip policy route map test

17. Select the commands that can be used to verify route redistribution.

    A. Show
    B. Trace
    C. Debug
    D. List
    E. View

18. You have a RIP based network that connects to your OSPF network. You do not want RIP information to be sent over serial port 0 on your router. Input the command below to perform this function. Do not use abbreviated commands.

19. How will networks running Interior Gateway Routing Protocol (IGRP) react if a router is configured using Enhanced IGRP (EIGRP) with the same AS number?

A. You will create two separate network routing protocol segments
B. The routes will be automatically redistributed between both protocols.
C. Any routes connected to the Enhanced IGRP (EIGRP) router will not show in the tables of the IGRP router
D. The network will become unstable and routes will intermittently drop off

20. Why is it not possible to support discontiguous networks with IGRP or RIP v1?

   A. They only support connected networks.
   B. They do not support periodic updates.
   C. They do not include the subnet mask with the update.
   D. They do not support complex subnetting.

21. The routing table entries for network 172.168.0.0 are 172.168.0.0/16,172.168.5.0/24, and 172.168.5.64/26. Which will the router choose for destination 172.168.5.99.

   A. 172.168.5.0/24
   B. 172.168.5.0/16
   C. 172.168.5.68/26
   D. The router will load balance between the 2 routes

22. As a network engineer, you are concerned that you are losing bandwidth for essential application traffic due to very large routing tables being exchanged between routers. What features of the Cisco IOS will allow you to address this problem? (Select two.)

   A. Route summarization
   B. Incremental updates
   C. Switched access technologies
   D. Dial backup
   E. Access lists

23. What is the consequence of OSPF area 2 advertising network 10.1.17.0/24 when area 1 is summarizing 10.1.0.0/16?

   A. Router loops are generated
   B. Routes become unreachable.
   C. No problems, the routes are handled correctly.
   D. Network convergence occurs end to end.
   E. The router hangs

24. Input the command that will enable you to see all routes including redistributed routes.

25. What is the command used to set the administrative distance for routing protocols receiving routes through redistribution?

   A. distance weight [address mask [access-list-number | name]]
   B. redistribution distance weight [address mask [access-list-number | name]]

C. distance route weight [address mask [access-list-number | name]]

D. list distance weight [address mask [access-list-number | name]]

26. Which of the following are valid for verifying routing redistribution between an EIGRP and an OSPF configuration?

    A. Show IP ospf database
    B. Show IP Route
    C. Show ip eigrp neighbors
    D. Show IP interfaces
    E. Show ip protocol

27. Review the attached diagram. Which set of commands will configure a virtual link for area 20.
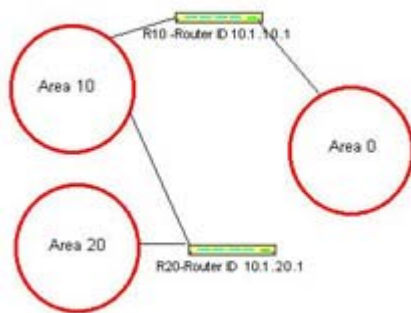
    A. R10: Area 10 virtual-link 10.1.10.1
       R20: Area 10 virtual-link 10.1.20.1
    B. R10: Area 10 virtual-link 10.1.10.1
       R20: Area 20 virtual-link 10.1.20.1
    C. R10: Area 10 virtual-link 10.1.20.1
       R20: Area 10 virtual-link 10.1.10.1
    D. R10: Area 20 virtual-link 10.1.10.1
       R20: Area 20 virtual-link 10.1.20.1
    E. R10: Area 0 virtual-link 10.1.10.1
       R20: Area 0 virtual-link 10.1.20.1

28. Which are true regarding OSPF E2 Routes?

    A. Theses are not imported
    B. Redistribution can only be preformed at an ASBR.
    C. The Metric will be based on its newly calculated OSPF value..
    D. The passive-interface command should be used.
    E. OSPF E2 metrics are not incremented within the OSPF domain

29. Which command would you use to determine how often the shortest path first (SPF) algorithm has been executed?

    A. show ip ospf

B. show ip ospf spf
C. debug ospf
D. show ip ospf database

30. You would like to apply routing filters to a given interface. Which of the following is true?

   A. Routing filters are applied with the distribute-list command
   B. Standard access lists can be applied.
   C. Extended access lists can be applied.
   D. Routing filters are applied with the distribute-group command
   E. Static maps can not be used in re-distribution.

31. You are an administrator for a medium-sized company that has no need to connect to the Internet. You want to standardize IP as your network protocol. Which addresses could you use?

   A. 10.0.0.0 to 10.255.255.255
   B. 172.16.0.0 to 172.31.255.255
   C. 192.168.0.0 to 192.168.255.255
   D. 172.168.0.0 to 172.168.255.255
   E. 20.0.0.0 to 20.155.255.255

32. You have a discontinuous network. Network A at 172.16.5.0 255.255.255.0 is separated from Network C at 172.16.6.0 by Network B at 192.168.14.16 255.255.255.240. Because of route summarization, what routing protocols could you use to route from Network A to Network C.

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

33. You have four subnets available as addresses: 172.108.168.0, 172.108.169.0, 172.108.170.0, and 172.108.171.0. How would you summarize these routes?

   A. 172.108.168.0 255.255.240.0
   B. 172.108.168.0 255.255.254.0
   C. 172.108.168.0 255.255.252.0
   D. 172.108.168.0 255.255.248.0

34. You would like to use a command similar to default gateway, however, for company reasons, you are prohibited from doing this. Input the alternate command to perform this action for network 172.16.0.0. Do not use abbreviated commands.

35. You are attempting to debug some problems that you are having with route redistribution, which of the following commands could assist you with your issues?

A. Trace
B. Show ip protocol
C. Debug
D. Show ip route
E. Show IP interfaces brief

36. What is accomplished on a Cisco router by the following command?

Router(config-router)#passive-interface E0

A. No routing updates are sent out on interface E0 for any routing process.
B. If there is no route in the table, send packets to the default route.
C. This would passively enter an administrative route in the routing table.
D. Routing updates are suppressed on interface E0 for only this routing process.

37. Which of the following only send updates in the event that a route changes?

A. Interior Gateway Routing Protocol (IGRP)
B. Routing Information Protocol 1 (RIP1)
C. Enhanced IGRP (EIGRP)
D. Routing Information Protocol 2 (RIP2)

38. Select the methods that can be used on a router to control routing update traffic.

A. Passive interface
B. Default routes
C. Static routes
D. Route update filtering
E. All of the above

39. How should the following addresses be summarized?

172.16.64.0/24
172.16.65.0/24
172.16.95.0/24

A. Area 9 range 172.16.64.0 255.255.255.224.0
B. Area 9 range 172.16.64.0 255.255.255.240.0
C. Area 9 range 172.16.64.0 0.0.31.255
D. Area 9 range 172.16.64.0 0.0.15.255
E. No answer is correct.

40. In an EIGRP environment, what is true about static routes?

A. Default static routes are automatically advertised.
B. All static mappings are automatically re-distributed.
C. Floating Static mapping may be over written by a dynamically learned path.

D. Permanent routes will remain in the routing table if the router goes down
E. All of the answers.

41. Review the following configuration

R1#(config) Interface s0
R1#(config-if) ip address 192.168.1.5 255.255.255.252
R1#(config-if)distribute-list 5
R1#(config) access-list 5 deny 192.168.21.0

What is the result of applying this distribute list?

A. Network 192.168.21.0 will be filtered
B. Network 172.168.2.0 will be filtered
C. Network 192.168.21.0 will be permitted
D. Only the default route will be permitted

Answers

1. *B. assigns s0 as the back-up default gateway

Explanation: These two default routes create a floating static route. The default route using s1 has an administrative distance of 10 and is the lower number. This will be the primary default route. If s1 should go down, s0 will then become the back-up default interface.

Notes:
2. *C. Possible routing loops

Explanation: The greatest potential problem with route redistribution is the possibility of introducing routing loops.

Notes:
3. *C. set the default metric to a value greater than the largest native metric

Explanation: If the default metric is set to an amount greater than the largest native metric. The native route will still take precedence even if the routes were redistributed back into the original routing process.

Notes:
4. *D. EIGRP

Explanation: The route learned by the process with the lowest administrative distance is the route that will be places in the routing table. EIGRP has the lowest default administrative distance (90), IGRP (100), OSPF (110), and RIP (120).

Notes:

5. *D. IPX RIP and EIGRP

Explanation: IPX RIP and AppleTalk RTMP routes are automatically redistributed into EIGRP. The only IP routes automatically redistributed with EIGRP are routes from IGRP with the same AS number. All other routing processes must be manually redistributed.

Notes:

6. *D. automatic within the same Autonomous Systems

Explanation: IGRP routes are automatically redistributed with EIGRP, providing they have the same AS number.

Notes:

7. *B. Rip Routes into Rip

Explanation: When redistributing from any protocol, care must be taken to avoid redistributing routes learned from one process, back into the same process. In this instance RIP routes are redistributed into OSPF and OSPF is redistributed into RIP. Care must be taken to insure that the native RIP routes are the routes in the routing table.

Notes:

8. *B. distribute list

Explanation: A distribute list permits or denies specific routes from being advertised. A passive interface will not allow all updates to be sent over a specific interface.

Notes:

9. *D. 1, manually

Explanation: This command creates a static route pointing to a next hop address. This route has an administrative distance of 1 and must be manually redistributed.

Notes:

10. *A. 0 - automatically

Explanation: This command creates a static route pointing to an interface. This route has an administrative distance of 0 and is automatically redistributed.

Notes:

11. *B. 1 to 255

Explanation: The range of valid administrative distances is 1 through 255. Although zero is a valid administrative distance, it is only generated by a static route using an interface.

Notes:

12. *A. True

Explanation: The major benefit of route maps is the ability to test multiple test criteria and then set various conditions based upon the test. The only action that an access list can

control is to either permit the function or deny it.

Notes:

13. *C. inbound

Explanation: When using Policy based routing, the policy is applied to the packets as they arrive at the inbound interface.

Notes:

14. *C. forwarded normally

Explanation: Policy based routing is not a method of filtering traffic, but allows certain packets to be handled in a different manner. If a packed does not match the route map criteria, that packet is forwarded normally.

Notes:

15. *C. match 1 2 3
match 5

Explanation: When using route maps, if you should list more than one access list on a match statement, this will be interpreted as an or statement. Each match statement is a test that must be satisfied in order to apply the set statements. In this scenario, there must be two match statements. One to test for access list 1 or 2 or 3, and an additional one to test access list 5.

Notes:

16. *C. config(if)# ip policy route-map test

Explanation: Route maps are applied at the interface level and route map command is hyphenated.

Notes:

17. *A. Show

*B. Trace

Explanation:

- Know your network topology
- Use "show" to view the routing tables on the routers
- Use "trace" to verify
- Use trace and debug to observe the routing update traffic on ASBRs and internal routers.

Notes:

18. passive-interface serial 0

Explanation: Setting a passive interface for a routing protocol will prevent routing

messages for that protocol from being sent over that interface.

Notes:

19. *B. The routes will be automatically redistributed between both protocols.

Explanation: As long as IGRP and EIGRP are assigned the same AS number, the routes will be automatically redistributed between them. If the ASs are different, then the routes must be manually redistributed.

Notes:

20. *C. They do not include the subnet mask with the update.

Explanation: The reason that you can not support discontiguous networks with RIP v1 and IGRP is because the network mask is not included with the routing update. Complex subnetting can be supported with these protocols, but this only allows for subnetting that is not on an octet boundary.

Notes:

21. *C. 172.168.5.68/26

Explanation: The router chooses the path with the longest matching bits in the subnet mask since that indicates a more specific route. In this instance, the network 172.168.5.64/26 has a broadcast address of 172.168.5.127 and hosts are 172.168.5.65 through 172.168.5.126.

Notes:

22. *A. Route summarization

*B. Incremental updates

Explanation: The problem of the exchange of very large routing tables is addressed through route summarization and incremental updates. Route summarization allows route aggregation to occur at major network boundaries. Incremental updates are used with EIGRP and OSPF to only send topology changes instead of the whole routing table.

Notes:

23. *C. No problems, the routes are handled correctly.

Explanation: All routes within the 10.1.x.x address space would be included within this summary, unless there were a more specific route (longer network mask match). In this instance, route 10.1.17.0/24 would be routed to area 2 rather than area 1 because the network mask for this network is a /24.

Notes:

24. show ip route

Explanation: The show IP route command will display the routing table and how each route was learned.

Notes:

25. *A. distance weight [address mask [access-list-number | name]]

Explanation: Using the distance command to set the administrative distance higher than the native protocol's administrative distance can prevent redundant paths from being incorrectly advertised.

Notes:

26. *A. Show IP ospf database

*B. Show IP Route

Explanation: The show IP ospf database will display information regarding the entire network. This will include Type 5 LSAs which are routes redistributed from other routing protocols. Also, the show ip route command will display all routes and by which protocol they were learned. If the EIGRP routes were redistributed into OSPF, they would appear as External OSPF routes in the routing table.

Notes:

27.
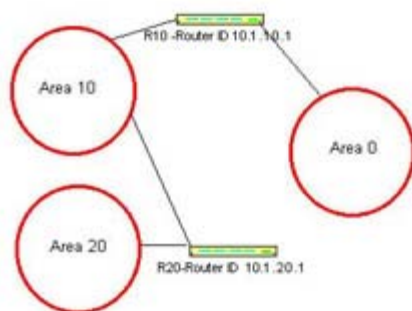
*C. R10: Area 10 virtual-link 10.1.20.1
R20: Area 10 virtual-link 10.1.10.1

Explanation: The object is defining a virtual link across a transit area. In this case that area is 10. On each side of the transit area, you must configure a link such that each router shares the transit area (10) and list the partner's id

Notes:

28. *E. OSPF E2 metrics are not incremented within the OSPF domain

Explanation: As stated, OSPF E2 will maintain their original redistributed metric regardless of where they are within the OSPF environment. Routes may only be redistributed into, or out of, OSPF via an ASBR.

Notes:

29. *A. show ip ospf

Explanation: Show ip ospf shows number of times the SPF algorithm was executed.

Notes:
30. *A. Routing filters are applied with the distribute-list command

Explanation: Routing filters are used when controlling routes between two routers. Using standard access lists, these routes can be filtered.

Notes:
31. *A. 10.0.0.0 to 10.255.255.255

*B. 172.16.0.0 to 172.31.255.255

*C. 192.168.0.0 to 192.168.255.255

Explanation: The InterNIC has reserved 3 blocks of addresses as private:

Class A-10.0.0.0 to 10.255.255.255
Class B-172.16.0.0 to 172.31.255.255
Class C-192.168.0.0 to 192.168.255.255

Many organizations use private addressing inside their firewall and NAT public addresses when needed to transit public address space.

Notes:
32. *A. RIPv2

*B. OSPF

*C. EIGRP

Explanation: You would have to use RIP2, OSPF, or EIGRP because those routing protocols can turn off route summarization. With IGRP and RIP1, the summary address of 172.16.0.0 would cause confusion when crossing 192.168.14.16. Also, remember that EIGRP and RIP v2 are by default classful routing protocols. In order to accomplish this scenario, it is necessary to include the IP Classless and No Auto-Summary commands for both of these protocols. OSPF and IS-IS are the only protocols that could handle this natively.

Notes:
33. *C. 172.108.168.0 255.255.252.0

Explanation: The router would start with the highest-order number of bits that match. In this case it is 10101100.01101100.10101000.00000000 which would be 172.108.168.0.The mask would identify only the four routes and would use the mask of /22 255.255.252.0.

Notes:
34. ip default-network 172.10.0.0

Explanation: The default-network command is useful for providing a route for any path or

address that is not defined.

Notes:

35. *A. Trace

*B. Show ip protocol

*C. Debug

*D. Show ip route

*E. Show IP interfaces brief

Explanation: The trace command is extremely useful for finding were routing fails (or timings) between two points. Show IP protocol is a very helpful command. This identifies which protocols you are routing and who the neighbors are for each protocol. Additional, it identifies when you received your last update from each neighbor.The debug command will show in real time events on the router as they occur. You might wish to review the actual routing update information.The show ip route command is extremely useful for evaluating where data is being sent and how a route was learned.Don't overlook the obvious. Show the status of the interfaces. If the interface is down, the network will be unreachable.

Notes:

36. *D. Routing updates are suppressed on interface E0 for only this routing process.

Explanation: This configures a passive interface where no routing updates for the specified routing process are sent over this interface..

Notes:

37. *C. Enhanced IGRP (EIGRP)

Explanation: EIGRP only sends routing updates in the event that a route changes. This significantly reduces overhead. Also, the only routers that are updated are those affected by the change.

Notes:

38. *E. All of the above

Explanation: Cisco routers can use passive interfaces, default routes, static routes, and route update filtering to control route update traffic.

Notes:

39. *E. No answer is correct.

Explanation: The only networks that could be summarized are 172.16.64 and 172.16.65.0 and the correct statement for this would be Area 9 range 172.16.64.0 255.255.254.0. The network 172.16.95.0 has to be announced as a /24.

Notes:

40. *A. Default static routes are automatically advertised.

*C. Floating Static mapping may be over written by a dynamically learned path.

Explanation: Default static routes are automatically advertised. The key word here is default, not all. Also, Floating Static mapping may be over written by a dynamically learned route if the administrative distance of the static route is greater than the dynamically learned route. This allows updates by a routing protocol to have precedence and be able to use a static route as a back-up.

Notes:

41. *A. Network 192.168.21.0 will be filtered

*B. Network 172.168.2.0 will be filtered

Explanation: Access list 5 does not have a permit statement included. The processing would be to inspect the packet for address 192.168.21.0 and if found, deny it. If it did not find this address it would go to the next line of the access-list whish is the implied deny any. Therefore no routing traffic would be allowed over the interface. Therefore, routes 192.168.21.0 and 172.168.2.0, as well as any other route would be filtered.

Notes:

Chapter 9: Configuring IS-IS Protocol

The objective of this chapter is to provide the reader with an understanding of the following:

- Explain basic OSI terminology and network layer protocols used in OSI
- Identify similarities and differences between Integrated IS-IS and OSPF
- Identify characteristics of an effective addressing plan for IS-IS deployment
- Explain how networks and interfaces are represented in IS-IS
- List the types of IS-IS routers and their role in IS-IS area design
- Describe the hierarchical structure of IS-IS areas
- Describe the concept of establishing adjacencies
- Describe the concepts of routing traffic transport and database synchronization
- Explain the basic principles of area routing
- Explain IS-IS NBMA (non-broadcast multi-access network) modeling solutions in switched WAN networks
- Given an addressing scheme and other laboratory parameters, identify the steps to configure Cisco routers for proper Integrated IS-IS operation
- Identify verification methods which ensure proper operation of Integrated IS-IS on Cisco routers

1. IS-IS and OSPF are similar in the following manner

    A. Link-state representation
    B. Link-state databases

C. SPF Algorithm
D. Every answer is correct.
E. No Answer is Correct

2. There are how many types of IS-IS hello packets on a P2P link, regardless of level type?

A. none
B. 1
C. 2
D. 3

3. IS-IS interface cost is set to _____ by default

A. 1000
B. 256
C. 100
D. 10

4. Integrated IS-IS is used to transport

A. CLNS and ES
B. IP only
C. IP and OSI
D. IP and ES

5. IS-IS has _____ features than OSPF

A. more
B. less
C. same
D. about the same

6. IS-IS allows a _____ flexible approach to extending the backbone

A. more
B. less
C. similar
D. There is no comparison

7. Integrated IS-IS is a(n) _____ version of IS-IS for mixed ISO CLNS and IP environments.

A. abbreviated
B. older
C. expanded
D. newer

8. The selection of the DIS is based on

    A. the highest priority and highest router id
    B. the lowest priority and lowest MAC address
    C. the highest priority and highest MAC address
    D. the highest priority and lowest router id

9. An end station (ES) connects to an _____ router

    A. L0
    B. L1
    C. L0/L1
    D. L2
    E. 8.

10. IS-IS hellos are sent every _____ seconds

    A. 10
    B. 15
    C. 20
    D. 60

11. The boundary between IS-IS areas exists

    A. between interfaces on an ABR
    B. within an ASBR
    C. on a link between routers
    D. nowhere

12. Of the four defined metrics associated with an outgoing interface, which is the only one Cisco supports?

    A. delay
    B. default
    C. expense
    D. error

13. The Network Statement for IS-IS

    A. Identifies which IP networks are to be advertised
    B. Activates routing on matching interfaces
    C. Assigns a network-entity-title to the router
    D. is not needed

14. To activate IS-IS routing for IP on an interface, the following command is required

    A. config(router)# ip routing e0
    B. config(if)# ip routing
    C. config(if)# ip router isis

D. config(if)# isis ip routing

15. To configure a L2 adjacency between two specific routers, the following command is required

   A. config(router)# is-type Level-2-only
   B. config(if)# isis circuit-type Level-2
   C. config(if)# isis metric Level-2
   D. No Answer is Correct

16. What ISIS command is used to view which interfaces are supported and which protocols are being redistributed

   A. Show ip isis neighbor
   B. sh isis neighbors
   C. show clns protocol
   D. show ip protocols

17. Which command is used to show isis neighbor adjacencies

   A. show isis neighbors detail
   B. show clns neighbors
   C. show ip isis neighbors
   D. show cdp neighbors

18. IS-IS Dial-Up operation is recommended for

   A. DDR
   B. Virtual Profiles
   C. Back-up
   D. NBMAs

19. In a Dial-up IS-IS environment, Legacy DDR is

   A. not supported
   B. is regarded as an NBMA
   C. supported, but only for back-up
   D. No Answer is Correct

20. In an IS-IS environment, Dialer Profiles are

   A. Point-to-Point connections
   B. Point-to-Multipoint connections
   C. NBMAs
   D. not supported

21. Which of the following are used by OSPF and IS-IS that are not used in other IP routing protocols?

A. Link State Advertisements
B. Route Summarization
C. Hop counts
D. Variable Length Subnet Masking (VLSM)

22. What are the three types of Hello packets used in IS-IS?

A. ESH
B. EEH
C. ISH
D. SIH
E. IIH

23. How does the Link-State Data Base in IS-IS maintains it synchronization ?

A. Each router queries a central router (DIS) on a periodic basis to validate their data base
B. Sequence number PDUs (SNP) ensure that the LSPs are sent reliably.
C. Whenever a new router is activated, all routers exchange their database.
D. Full updates are sent every thirty minutes.

24. An IS-IS domain is equivalent to which of the following:

A. An OSPF area
B. A Hub and Spoke Network
C. An IP Autonomous System
D. A redistributed OSPF and Eigrp topology

25. When using IS-IS, Routing between an ES and an IS is which type of routing

A. Level 0
B. Level 1
C. Level 2
D. Level 3
E. Level 4

26. When using IS-IS, routing between ISs in the same area is which level of routing?

A. Level 0
B. Level 1
C. Level 2
D. Level 3
E. Level 4

27. When using IS-IS, Routing between different areas within the same domain is which type of routing

A. Level 0
B. Level 1

  C. Level 2
  D. Level 3
  E. Level 4

28. When using IS-IS, Routing between separate domains is which type of routing

  A. Level 0
  B. Level 1
  C. Level 2
  D. Level 3
  E. Level 4

29. Type the instruction which would display information about both ES and IS neighbors.
30. What is the default Administrative distance for ISIS?

  A. 100
  B. 105
  C. 110
  D. 115
  E. 120

31. What is a pseudonode in IS-IS?

  A. An IS-IS entry node
  B. A L1-L2 router
  C. A DIS
  D. An inter area router

Answers

1. *D. Every answer is correct.

   Explanation: ISIS and OSPF are similar in the manner of link representation, manipulation of a link-state database, and usage of the Dykstra algorithm to select best path.

   Notes:
2. *B. 1

   Explanation: Regardless of link level type, there is only one type of hello packet sent over a Point-to-Point link.

   Notes:
3. *D. 10

   Explanation: All interfaces in ISIS have a default cost of 10. OSPF uses a cost based upon

the bandwidth

Notes:

4. *C. IP and OSI

Explanation: Integrate ISIS transports both OSI an IP traffic. ES is not a type of traffic.

Notes:

5. *B. less

Explanation: ISIS has fewer features than OSPF. (example ISIS does not support the Stub Area concept.)

Notes:

6. *A. more

Explanation: IS-IS is more flexible than OSPF. IS-IS does not use an area 0 concept. There is no stipulation on how segments of the network can be interconnected. The only requirement is that there must be a contiguous path inter-connecting all L2 routers.

Notes:

7. *C. expanded

Explanation: IS-IS was expanded to support IP as well as ISO traffic.

Notes:

8. *C. the highest priority and highest MAC address

Explanation: The DIS (Designated Intermediate System) in ISIS is like the DR in OSPF. The selection is identical. The Router with the highest priority is the DIS. If multiple routers have the same highest priority, then the highest MAC address within the highest priority is elected.

Notes:

9. *B. L1

Explanation: A User (L0) connect to an L1 router to exit the local network.

Notes:

10. *A. 10

Explanation: IS-IS hello packets are sent every 10 seconds.

Notes:

11. *C. on a link between routers

Explanation: IS-IS is different than OSPF when it comes to establishing the local boundaries. OSPF uses an ABR, which has interfaces in both the Backbone area and a

user area. IS-IS boundaries are on the link connecting the routers, not the router itself.

Notes:

12. *B. default

Explanation: Cisco only supports the default metric.

Notes:

13. *C. Assigns a network-entity-title to the router

Explanation: The network statement in IS-IS identifies the IS-IS network-entity-title for the router.

Notes:

14. *C. config(if)# ip router isis

Explanation: IS-IS is activated at the interfaces level by using the ip router isis command.

Notes:

15. *B. config(if)# isis circuit-type Level-2

Explanation: To Configure an L2 adjacency, both routers must identify the link as an L2 circuit.

Notes:

16. *C. show clns protocol

Explanation: Show clns protocol identifies which interfaces are supported under IS-IS and also what protocols are being redistributed.

Notes:

17. *B. show clns neighbors

Explanation: Show clns neighbor lists the IS-IS neighbors

Notes:

18. *C. Back-up

Explanation: IS-IS is not recommended for DDR applications. It is recommended that in a dial environment it be used only as a back up.

Notes:

19. *B. is regarded as an NBMA

Explanation: Legacy DDR assigns all dial characteristics to the interface, including the IP address. In order to dial multiple locations from the single interface, each endpoint must be on the same network, which makes the topology an NBMA.

Notes:

20. *A. Point-to-Point connections

Explanation: Dialer Profiles are treated as a Point-to-Point connection.

Notes:

21. *A. Link State Advertisements

Explanation: LSA are used by all link state routing protocols. Route summarization and VLSM are supported by RIP-V2 and EIGRP, as well as OSPF and IS-IS. Hop count is only used by RIP (V1&V2).

Notes:

22. *A. ESH

*C. ISH

*E. IIH

Explanation: The three types of Hello Packets used by IS-IS are the ESH (between an ES and an IS), ISH (between and IS and an ES), and the IIS (between ISs)

Notes:

23. *B. Sequence number PDUs (SNP) ensure that the LSPs are sent reliably.

Explanation: The sequence number PDUs ensure that the LSPs are sent reliably. SNPs contain descriptors: not the actual, detailed information , but headers describing the LSPs.

Notes:

24. *C. An IP Autonomous System

Explanation: A domain in IS-IS can be visualized as an IP Autonomous System. (A group of routers under a single administrative control.)

Notes:

25. *A. Level 0

Explanation: Level 0 routing is between an End Station and an Intermediate System on the same subnet

Notes:

26. *B. Level 1

Explanation: Level 1 Routing is routing between ISs in the same area

Notes:

27. *C. Level 2

Explanation: Level 2 routing is routing between different areas within the same domain.

Notes:

28. *D. Level 3

Explanation: Level 3 Routing is routing between separate IS-IS domains.

Notes:

29. *A. show clns neighbor

Explanation: The Show CLNS neighbor command displays the neighbor ISs and ES neighbors. Remember that even though the routing protocol is IS-IS, you are forming CLNS neighbor relationships.

Notes:

30. *D. 115

Explanation: The default administrative distance for ISIS is 115.

Notes:

31. *C. A DIS

Explanation: A pseudonode is a virtual router. It is used to build a directed graph for broadcast media only . The DIS generates a LSP to represent this pseudonode.

Notes:

Chapter 10: TotalRecall Cisco Labs for BSCI

Introduction

The following labs are included to prepare for the interactive configuration exercises that will appear on the exam. They are brief exercises, which emphasize a specific characteristic or function. These are not intended as a substitute for experience and familiarization with CLI coding, but as a thought process to identify the types of scenarios that you might encounter on the actual exam.

l Lab EIGRP Configuration 1

R1 Configuration

(Assume router is in the config mode)

- Remove keepalive from e0
- Assign ip address 192.168.14.18/28 to Ethernet 0
- Assign ip address 192.168.14.65/30 to Serial 0
- Activate EIGRP (Autonomous System 5)
- Advertise all networks

R2 Configuration

(Assume router is in the config mode)

- Assign ip address 192.168.14.33/27 to e0
- Activate EIGRP (Autonomous System 5)
- Assign ip address 192.168.14.66/30 to s0
- Advertise all networks

I Lab Answer:

R1(config)# interface e0
R1(config-if)# no keep-alive
R1(config-if)# ip address 192.168.14.18 255.255.255.240
R1(config-if)# interface s0
R1(config-if)# ip address 192.168.14.65 255.255.255.252
R1(config-if)# router eigrp 5
R1(config-router)# network 192.168.14.0

R2(config)# interface s0
R2(config-if)# ip address 192.168.14.66 255.255.255.252
R2(config-if)# interface e0
R2(config-if)# ip address 192.168.14.33 255.255.255.224
R2(config-if)# router eigrp 5
R2(config-router)# network 192.168.14.0

This is an example of EIGRP supporting VLSM for network 192.168.14.0

The address range of 192.168.14.16 through 192.168.14.31 is assigned to R1 e0.

The address range of 192.168.14.32 through 192.168.14.63 is assigned to R2 e0

The address range of 192.168.14.64 through 192.168.14.67 is assigned to serial link between r1 and r2

II Lab EIGRP Configuration 2

This lab configures EIGRP in a three router environment. When completed, all routers will include all subnets and loopback addresses within their routing table.

R1 Configuration

(Assume router is in the config mode)

- Remove keepalive from e0
- Assign ip address 192.168.14.18/28 to Ethernet 0
- Assign ip address 192.168.14.65/30 to Serial 0
- Assign ip address 172.16.1.1/32 to Loopback 0
- Activate EIGRP (Autonomous System 5)
- Advertise all networks

R2 Configuration

(Assume router is in the config mode)

- Assign ip address 192.168.120.33/27 to e0
- Assign ip address 172.16.1.2/32 to Loopback 0
- Activate EIGRP (Autonomous System 5)
- Assign ip address 192.168.14.66/30 to s0
- Advertise all networks

R3 Configuration

(Assume router is in the config mode)

- Assign ip address 192.168.120.35/27 to e0
- Assign ip address 172.16.1.3/32 to Loopback 0
- Activate EIGRP (Autonomous System 5)
- Advertise all networks

II Lab Answer

R1(config)# interface e0
R1(config-if)# no keep-alive
R1(config-if)# ip address 192.168.14.18 255.255.255.240
R1(config-if)# interface s0
R1(config-if)# ip address 192.168.14.65 255.255.255.252
R1(config-if)# interface loopback 0
R1(config-if)# ip address 172.16.1.1 255.255.255.255
R1(config-if)# router eigrp 5
R1(config-router)# network 192.168.14.0
R1(config-router)# network 172.16.0.0
R1(config-router)# no auto-summary

R2(config)# interface s0
R2(config-if)# ip address 192.168.14.66 255.255.255.252
R2(config-if)# interface e0
R2(config-if)# ip address 192.168.120.33 255.255.255.224
R2(config-if)# interface Loopback 0
R2(config-if)# ip address 172.16.1.2 255.255.255.255
R2(config-if)# router eigrp 5
R2(config-router)# network 192.168.14.0
R2(config-router)# network 192.168.120.0
R2(config-router)# network 172.16.0.0
R2(config-router)# no auto-summary

R3(config-if)# interface e0
R3(config-if)# ip address 192.168.120.35 255.255.255.224
R3(config-if)# interface Loopback 0
R3(config-if)# ip address 172.16.1.3 255.255.255.255
R3(config-if)# router eigrp 5

R3(config-router)# network 192.168.120.0
R3(config-router)# network 172.16.0.0
R3(config-router)# no auto-summary

III Lab OSPF 1: STUB AREA

ABR Configuration

(Assume router is in the config mode)

- Assign ip address 203.250.14.1/28 to Ethernet 0
- Assign ip address 203.250.15.5/30 to Serial 0
- Activate OSPF (use process ID 21)
- Activate e0 in area 0
- Activate S0 in area 1
- Make area 1 a Stub Area

Interior Router

(Assume router is in the config mode)

- Assign ip address 203.250.15.6/30 to s0
- Activate OSPF 26
- Assign s0 to area 1

III Lab Answer

ABR(config)# interface e0
ABR(config-if)# ip address 203.250.14.1 255.255.255.240
ABR(config-if)# interface serial 0
ABR(config-if)# ip address 203.250.15.5 255.255.255.252
ABR(config-if)# router ospf 21
ABR(config-router)# network 203.250.14.1 0.0.0.0 area 0
ABR(config-router)# network 203.250.15.5 0.0.0.0 area 1
ABR(config-router)# area 1 stub

INTERIOR(config)# interface s0
INTERIOR(config-if)# ip address 203.250.15.6 255.255.255.252
INTERIOR(config-if)# router ospf 26
INTERIOR(config-router)# network 203.250.15.6 0.0.0.0 area 1
INTERIOR(config-router)# area 1 stub

Remember in a STUB area all routers must be identified as stub.

IV Lab OSPF 2: Totally Stubby Area

ABR

(Assume router is in the config mode)

- Assign ip address 203.250.14.1/28 to Ethernet 0
- Assign ip address 203.250.15.5/30 to Serial 0
- Activate OSPF (use process ID 21)
- Activate e0 in area 0
- Activate S0 in area 1
- Make area 1 a Totally Stubby area

Interior Router

(Assume router is in the config mode)

- Assign ip address 203.250.15.6/30 to s0
- Activate OSPF 26
- Assign s0 to area 1

IV Lab Answer:

ABR(config)# interface e0
ABR(config-if)# ip address 203.250.14.1 255.255.255.240
ABR(config-if)# interface serial 0
ABR(config-if)# ip address 203.250.15.5 255.255.255.252
ABR(config-if)# router ospf 21
ABR(config-router)# network 203.250.14.1 0.0.0.0 area 0
ABR(config-router)# network 203.250.15.5 0.0.0.0 area 1
ABR(config-router)# area 1 stub no summary

INTERIOR(config)# interface s0
INTERIOR(config-if)# ip address 203.250.15.6 255.255.255.252
INTERIOR(config-if)# router ospf 26
INTERIOR(config-router)# network 203.250.15.6 0.0.0.0 area 1
INTERIOR(config-router)# area 1 stub

Remember in any type of STUB area all routers must be identified as stub. To change a Stub Area to a Totally Stubby Area, the only change is that the ABR adds the no summary option to the stub statement.

V IS-IS Configuration

This Lab will configure IS-IS between two routers in the same Area

R1 Configuration

- Assign ip address 172.16.1.1/24 to e0
- Assign ip address 10.1.1.1/32 to loopback 0
- Activate IS-IS with an area tag of 50
- Assign NET using an area number of 21 and a system ID of 0000.0000.0001
- Enable IS-IS on e0
- Enable IS-IS on lo0

R2 Configuration

- Assign ip address 172.16.1.2/24 to e0
- Assign ip address 10.1.1.2/32 to loopback 0
- Activate IS-IS with an area tag of 50
- Assign NET using an area number of 21 and a system ID of 0000.0000.0002
- Enable IS-IS on e0
- Enable IS-IS on lo0

R2(config)# interface e0
R2(config-if)# ip address 172.16.1.2 255.255.255.0
R2(config-if)# ip router isis 50
R2(config-if)interface loopback 0
R2(config-if)# ip address 1.0.1.1.2 255.255.255.255
R2(config-if)# ip router isis 50
R2(config-if)# router isis 50
R2(config-router)# Net 21.0000.0000.0000.0002.00

V Lab Answer:

R1(config)# interface e0
R1(config-if)# ip address 172.16.1.1 255.255.255.0
R1(config-if)# ip router isis 50
R1(config-if)# interface loopback 0
R1(config-if)# ip address 10.1.1.1 255.255.255.255
R1(config-if)# ip router isis 50
R1(config-if)# router isis 50
R1(config-router)# Net 21.0000.0000.0000.0001.00

R2(config)# interface e0
R2(config-if)# ip address 172.16.1.2 255.255.255.0
R2(config-if)# ip router isis 50
R2(config-if)# interface loopback 0
R2(config-if)# ip address 10.1.1.2 255.255.255.255
R2(config-if)# ip router isis 50
R2(config-if)# router isis 50
R2(config-router)# Net 21.0000.0000.0000.0002.00

Reminder:

When using IS-IS, the routing process in activated by the ip router isis statement on each
interface that is to be active in the routing process. The Network statement has nothing to do
with which networks are being advertised. The network statement is used only to establish the
area and router identification.

VI BGP Route Reflector

This lab will configure three iBGP routers as a route reflector and two clients.

R1 (Route Reflector)

- Assign ip address 192.168.7.5/30 to s0
- Configure BGP 7
- Configure R1 as a route reflector for R2 and R3

R2 (Route Reflector Client)

- Assign ip address 192.158.7.6/30 to s0
- Assign ip address 192.168.7.9/30 to s1
- Activate BGP 7
- R2 is a client to Route Reflector R1

R3 (Route Reflector Client)

- Assign ip address 192.158.7.10/30 to s0
- Activate BGP 7
- R3 is a client to Route Reflector R1

VI Lab Answer:

R1 Route Reflector

R1(config)# interface s0
R1(config-if)# ip address 192.168.7.5 255.255.255.252
R1(config-if)# router bgp 7
R1(config-router)# neighbor 192.168.7.6 remote-as 7
R1(config-router)# neighbor 192.168.7.6 route-reflector-client
R1(config-router)# neighbor 192.168.7.10 remote-as 7
R1(config-router)# neighbor 192.168.7.6 route-reflector-client

R2 Route Reflector Client (Directly connected to the reflector)

R2(config)# interface s0
R2(config-if)# ip address 192.168.7.6 255.255.255.252
R2(config)# interface s1
R2(config-if)# ip address 192.168.7.9 255.255.255.252
R2(config-if)# router bgp 7
R2(config-router)# neighbor 192.168.7.5 remote-as 7

R3 Route Reflector Client (Not directly connected to the reflector)

R2(config)# interface s0
R2(config-if)# ip address 192.168.7.10 255.255.255.252
R2(config-if)# router bgp 7
R2(config-router)# neighbor 192.168.7.5 remote-as 7

Reminder: When using route reflectors, the reflector has a neighbor relationship with all clients, but the clients only have a neighbor relationship with the reflector.

VII Configure iBGP and eBGP

This is a three router scenario where R1 and R2 are in AS 120 and R3 is in as 30. R1 and R2 will be configured as iBGP and r2and R3 will be eBGP.

R1 Configuration

- Assign ip address 172.17.1.1/24 to e0
- Assign ip address 10.120.1.1/32 to lo0
- Use eigrp as the IGP
- Config iBGP with R2
- Advertise all networks in both BGP and EIGRP

R2 Configuration

- Assign ip address 172.16.1.2/24 to e0
- Assign ip address 192.168.3.5/30 to s0
- Assign ip address 10.120.1.2/32 to lo0
- Use eigrp as the IGP
- Config iBGP with R1
- Configure eBGP with R3
- Advertise all networks in both BGP and EIGRP (network 192.168.3.4/30 is owned by AS30)

R3 Configuration

- Assign ip address 192.168.3.6/32 to s0
- Assign ip address 192.168.4.1/24 to e0
- Assign ip address 10.30.1.1/32 to lo0
- Use eigrp as the IGP
- Config eBGP with R2
- Advertise all networks in both BGP and EIGRP

VII Lab Answer:

R1(config)# interface e0
R1(config-if)# ip address 172.17.1.1 255.255.255.0
R1(config-if)# interface lo0
R1(config-if)# ip address 10.120.1.1 255.255.255.255
R1(config-if)# router eigrp 120
R1(config-router)# network 10.0.0.0
R1(config-router)# network 172.17.0.0
R1(config-router)# router bgp 120
R1(config-router)# network 10.120.1.1 mask255.255.255.255
R1(config-router)# network 172.17.1.0 mask 255.255.255.0
R1(config-router)# neighbor 172.17.1.2 remote-as 120
R1(config-router)# end

R2(config)# interface e0
R2(config-if)# ip address 172.17.1.2 255.255.255.0

```
R2(config-if)# interface s0
R2(config-if)# ip address 192.168.3.5 255.255.255.252
R2(config-if)# interface lo0
R2(config-if)# ip address 10.120.1.2 255.255.255.255
R2(config-if)# router eigrp 120
R2(config-router)# network 10.0.0.0
R2(config-router)# network 172.17.0.0
R2(config-router)# network 192.168.3.0
R2(config-router)# router bgp 120
R2(config-router)# network 10.120.1.2 mask 255.255.255.255
R2(config-router)# network 172.17.1.0 mask 255.255.255.0
R2(config-router)# neighbor 172.17.1.2 remote-as 120
R2(config-router)# neighbor 192.168.3.6 remote-as 30
R2(config-router)# end

R3(config)# interface e0
R3(config-if)# ip address 192.168.4.1 255.255.255.0
R3(config-if)# interface s0
R3(config-if)# ip address 192.168.3.6 255.255.255.252
R3(config-if)# interface lo0
R3(config-if)# ip address 10.30.1.1 255.255.255.255
R3(config-if)# router eigrp 30
R3(config-router)# network 10.0.0.0
R3(config-router)# network 192.168.3.0
R3(config-router)# network 192.168.4.0
R3(config-router)# router bgp 30
R3(config-router)# network 10.30.1.1 mask 255.255.255.255
R3(config-router)# network 192.168.4.0
R3(config-router)# network 192.168.3.4 mask 255.255.255.252
R3(config-router)# neighbor 192.168.3.5 remote-as 120
R3(config-router)# end
```

BFQ Remote Labs

Overview

BFQ PODs Hosted by:

Internet Security Solutions
201 Davis Drive, Suite DD
Sterling, Virginia 20164

BFQ Cisco Remote Labs provides hands-on training via the Internet using real Cisco equipment. As an essential component to a complete learning solution, web-based lab experiences give network professionals a key advantage in developing and maintaining technical proficiency.

About BFQ Labs POD 1:

All Individuals wising to improve their skills or gain Cisco career certification need hands-on experience with specific Cisco equipment. BFQ Cisco Remote Labs online provides you direct access to equipment in HALF (1/2) hour segments.

Please refer to our calendar www.BFQLabs.com for available access times.
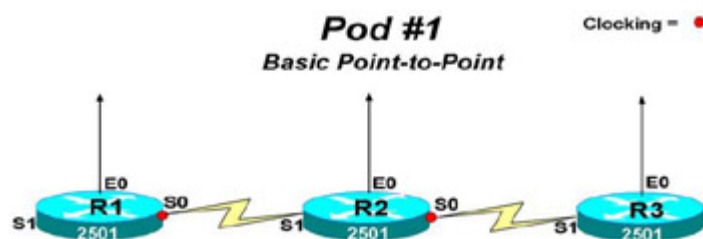
BFQ Labs Equipment List: POD 1

R1 = 2501

R3 = 2501

R4 = 2501

Analog VoIP Test Phones

TelTone ISDN BRI Simulator

Visit www.BFQLabs.com and sign up

About BFP Labs POD2:

All Individuals wising to improve their skills or gain Cisco career certification need hands-on experience with specific Cisco equipment. BFQ Cisco Remote Labs online provides you direct access to equipment in three (3) hour segments. Please refer to our calendar www.BFQLabs.com for available access times.

Access to the open POD will provide you the freedom to perform you personalized labs. You will be able to concentrate on the right labs to complete your learning experience

Our PODs are aligned with key Cisco training courses with bundles of remote labs that, taken together, have all of the exercises and equipment access needed to support the completion of necessary Cisco courses.

BFQ Labs Equipment List: POD 2

RouterA = 2503 Cisco 2511 Term Server

RouterB = Cisco 4500M+ w/Ethernet, Token-Ring and Serial ports

RouterC = Cisco 4700M+ w/Fast Ethernet, Token-Ring and Serial ports

RouterD = Cisco 2621 w/FXS, BRI, Fast Ethernet and Serial ports

Switch = Catalyst 5505 w/Sup III, Fast Ethernet and RSM modules

Router E = Cisco 2514 w/Ethernet and Serial ports