Part 6

QUESTION 501
On the topic of OSPF routing; which of the following are the traits of an OSPF area? (Select three)

A. Each OSPF area requires a loopback interface to be configured.
B. Areas may be assigned any number from 0 to 65535.
C. Area 0 is called the backbone area.
D. OSPF networks do not require multiple areas.
E. Multiple OSPF areas must connect to area 0.
F. Single area OSPF networks must be configured in area 1.

Answer: C, D, E

Explanation:
OPSF uses areas in a hierarchical fashion, and the backbone area is always area 0. All other areas have at least one connection to area 0. If, for some reason, any area does not have a direct connection to the backbone area 0, then an OSPF virtual link must be configured. OSPF networks do not require multiple areas, as all routers can be contained within a single area. If an OSPF network is configured as a single area, then area 0 does not need to be used.
Incorrect Answers:

A. Loopback interfaces are often used in OSPF networks, so that the router ID can be configured. However, this is not a requirement.
B. The area-id can be an integer between 0 and 4294967295.
F. Single area OSPF networks do not have to be configured with the backbone area 0. Although area 1 can indeed be used, it is not required that area 1 is used. Single area OSPF networks can be any integer from 0-4294967295.

QUESTION 502
If the bandwidth of an OSPF interface is 64, what would be the calculated cost of the link?

A. 1
B. 10
C. 1562
D. 64000
E. 128000
F. None of the above

Answer: C
The question states that OSPF interface has been configured with the bandwidth 64 command. Cisco IOS always interprets the values for the bandwidth command as being in kbps, so the bandwidth is configured as 64 kbps. The metric for any OSPF

defaults to 100,000,000/bandwidth. So, in this example:
100,000,000 / 64000 = 1562.5
Reference: Sybex CCNA Study Guide edition 4, page 284.

QUESTION 503
What are some of the characteristics of the OSPF routing protocol? (Select all valid answer choices)

A. It confines network instability to a single area of network.
B. It increases the routing overhead of the network
C. It supports VLSM
D. It routes between Autonomous Systems.
E. It allows extensive control of routing updates
F. None of the above

Answer: A, C, E

Explanation:
The following describes some of the features and functionality of the OSPF protocol:
Open Shortest Path First
• Each router discovers its neighbors on each interface. The list of neighbors is kept in a neighbor table.
• Each router uses a reliable protocol to exchange topology information with its neighbors.
• Each router places the learned topology information into its topology database.
• Each router runs the SPF algorithm against its own topology database.
• Each router runs the SPF algorithm against its own topology database to calculate the best routes to each subnet in the database.
• Each router places the best roué to each subnet into the IP routing table.
The following list points out some of the key features of OSPF:
• Converges very quickly - from the point of recognizing a failure, it often can converge in less than 10 seconds.
• Supports VLSM.
• Uses short Hello messages on a short regular interval, with the absence of hello messages indicating that a neighbor is no longer reachable.
• Sends partial updates when link status changes and floods full updates every 30 minutes. The flooding, however, does not happened all at once, so the overhead s minimal.
• Uses cost for the metric.
Incorrect Answers:
B. This is incorrect because the hierarchical design characteristics of OSPF actually reduce the overhead on larger networks.
D. This is not true as OSPF doesn't route between Autonomous Systems. OSPF is an IGP. Routing between autonomous systems is reserved for EGP protocols such as BGP.

QUESTION 504
Which of the following are characteristics of OSPF areas?

A. Hierarchical OSPF networks need to be in one area
B. Multiple OSPF areas must connect to area 0
C. Single area OSPF networks must be configured in area 1
D. Areas can be assigned any number from 0 to 63535
E. Area 0 is called the backbone area
F. Each OSPF area need to be configured with a loopback interface

Answer: B, E

Explanation:
OPSF uses areas in a hierarchical fashion, and the backbone area is always area 0. All other areas have at least one connection to area 0. If, for some reason, any area does not have a direct connection to the backbone area 0, then an OSPF virtual link must be configured. OSPF networks do not require multiple areas, as all routers can be contained within a single area. If an OSPF network is configured as a single area, then area 0 does not need to be used.
Incorrect Answers:

A. For a hierarchy of areas to be configured, multiple areas can be configured. When multiple areas are set up in a network, the backbone area must be area 0.
C. Single area OSPF networks do not have to be configured with the backbone area 0. Although area 1 can indeed be used, it is not required that area 1 is used. Single area OSPF networks can be any integer from 0-4294967295.
D. The area-id can be an integer between 0 and 4294967295.
F. Loopback interfaces are often used in OSPF networks, so that the router ID can be configured. However, this is not a requirement.

QUESTION 505
On what kinds of networks does OSPF elect a backup designated router?

A. Point-to-point and point-to-multipoint networks
B. Nonbroadcast and broadcast multipoint multicasting
C. Point-to-point and multi-access broadcasting
D. Point-to-multipoint and multi-access broadcasting
E. Nonbroadcast and broadcast multiaccess

Answer: E

Explanation:
DR and BDR are elected on broadcast and nonbroadcast multi-access networks.
Reference: Sybex CCNA Study Guide 4th Edition (Page 283)

QUESTION 506
By default, how often does a router running IGRP send its complete routing table to its neighbors?

A. every 5 minutes
B. every 90 seconds
C. every 60 seconds
D. every 30 seconds

Answer: B

Explanation:
IGRP enabled routers send their complete routing table to all their neighbors every 90 seconds.
Incorrect Answers:
D. This is the duration for the entire RIP table to be sent to neighbors in networks using RIP, not IGRP.

QUESTION 507
Which two of the following are valid characteristics of EIGRP? (Select two answer choices)

A. Has a maximum hop count of 25
B. Can differentiate between internal and external routes
C. Uses a 32-bit metric
D. Can maintain only one routing table
E. Need all networks to use the same subnet mask
F. Supports only one routed protocol

Answer: B, C

Explanation:
By default, the EIGRP composite metric is a 32-bit quantity that is a sum of the segment delays and the lowest segment bandwidth.
Enhanced IGRP supports internal and external routes. Internal routes originate within an Enhanced IGRP AS. Therefore, a directly attached network that is configured to run Enhanced IGRP is considered an internal route and is propagated with this information throughout the Enhanced IGRP AS. External routes are learned by another routing protocol or reside in the routing table as static routes. These routes are tagged individually with the identity of their origin.
Incorrect Answers:

A. This choice is wrong since it does not use hop count but a metrics that includes: bandwidth*, delay*, load, reliability, and MTU size. (* used by default).
D. This choice is wrong since we know that it keeps a three tables (neighbor table, topology table, and route table) and if you want to be a nit pick and say it still only

supports one route table, then if you configure IP and IPX on the router, you will have two route tables one for each protocol.
E. This choice is wrong since we know that EIGRP supports VLSM.
F. This choice is wrong since we know it supports IP, IPX and Appletalk.

QUESTION 508
In EIGRP; what is a feasible successor (FS) and where is it stored?

A. A FS is a primary route, stored in the routing table
B. A FS is a backup route, stored in the routing table
C. A FS is a backup route, stored in the topology table
D. A FS is a primary route, stored in the topology table
E. None of the above

Answer: C

Explanation:
The following are some terms relating to EIGRP:
1. Feasible Distance: The lowest calculated metric to each destination
2. Feasibility Condition: A condition that is met if a neighbor's advertised distance to a destination is lower that the router's Feasible Distance to that same destination.
3. Successor: The neighbor that has been selected as the next hop for a given destination based on the Feasibility Condition.
Reference: Jeff Doyle, Routing TCP/IP, Volume I, Chapter 8: Enhanced Interior Gateway Routing Protocol (EIGRP), p.336-337, Cisco Press, (ISBN 1-57870-041-8)
Additional info:
The Feasible Condition is met when the receiving router has a Feasible Distance (FD) to a particular network and it receives an update from a neighbor with a lower advertised or Reported Distance (RD) to that network. The neighbor then becomes a Feasible Successor (FS) for that route because it is one hop closer to the destination network. There may be a number of Feasible Successors in a meshed network environment.
The RD for a neighbor to reach a particular network must always be less than the FD for the local router to reach that same network. In this way EIGRP avoids routing loops. This is why routes that have RD larger than the FD are not entered into the Topology table.
Reference: Ravi Malhotra, IP Routing, Chapter 4: Enhanced Interior Gateway Routing Protocol (EIGRP), O'Reilly Press, January 2002 (ISBN 0-596-00275-0)

QUESTION 509
What is OSPF's default administrative distance (AD)?

A. 90
B. 100
C. 110
D. 120
E. 170

Answer: C

Explanation:
The administrative distance values are configured on a single router and are not exchanged with other routers. Table lists the various sources of routing information, along with the default administrative distance.
Default Administrative Distances

Route Type	Administrative Distance
Connected	0
Static	1
EIGRP summary route	5
EBGP	20
EIGRP (internal	90
IGRP	100
OSPF	110
IS-IS	115
RIP	120
EIGRP (external)	170
iBGP (external)	200

QUESTION 510
What are two characteristics of the OSPF process identifier? (Select two answer choices)

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

Answer: A, C

Explanation:
The OSPF process ID is locally significant, and is only used by the local router to discriminate between multiple OSPF processes. In any given OSPF network, the process ID's do not need to match between neighboring routers. This is in contrast to other routing protocols, such as EIGRP.
Additional info:
router ospf process-id
no router ospf process-id
process-id

Internally used identification parameter for an OSPF routing process. It is locally assigned and can be any positive integer. A unique value is assigned for each OSPF routing process.
Reference:
http://www.cisco.com/en/US/products/sw/iosswrel/ps1826/products_command_summary
_chapter09186a00800d9c58.html

QUESTION 511
Which one of the following answer choices below is true regarding the OSPF topology database?

A. All entries in the topology database will be included on each router.
B. All routers in the same OSPF area will have one topology database.
C. The Dijkstra algorithm is used in the creation of the topology database.
D. LSA packets are used to update and maintain the topology database.

Answer: D

Explanation:
The LSA (link state advertisement) is used to describe a subnet, network mask, metric, etc. pertaining to the routing entries. It is what keeps the OSPF topology database updated and maintained.
Incorrect Answers:

A. This is incorrect because every entry in the topology database won't necessarily be included on each router.
B. This is incorrect because each router has its own topology database.
C. This is incorrect because although the Dijkstra algorithm is associated with OSPF, it works by processing the information that's already in the database, not for creating the database.
Reference: CCNA Self-Study CCNA ICND Exam Certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 192.

QUESTION 512
The Certkiller router is running both RIP and IGRP, and the same route is learned by this router from both of these methods. However, when you issue the command "show ip route" you see only the IGRP route, and not the RIP route. Why is this?

A. IGRP has a faster update timer.
B. IGRP has a lower administrative distance.
C. RIP has a higher metric value for that route.
D. The IGRP route has fewer hops.
E. The RIP path has a routing loop.

Answer: B

Explanation:
To decide which route to use, IOS uses a concept called the administrative distance. The administrative distance is a number that denotes how to believable an entire routing protocol is on a single router. The lower the number, the better, or more believable, the routing protocol. For instance, RIP has a default administrative distance of 120, and IGRP defaults to 100, making IGRP more believable than RIP. So, when both routing protocols learn routes to the same subnet, the router adds only the IGRP route to the routing table.
Reference: CCNA ICND Exam Certification Guide by Wendell Odem, Page 177

QUESTION 513
In a point-to point network, which address are OSPF hello packets sent to?

A. 127.0.0.1
B. 192.168.0.5
C. 223.0.0.1
D. 172.16.0.1
E. 224.0.0.5
F. 254.255.255.255.255

Answer: E

Explanation:
The multicast IP address 224.0.0.5 is known as 'AllSPFRouters.' All routers running OSPF should be prepared to receive packets sent to this address since hello packets are always sent to this destination. Also, certain OSPF protocol packets are sent to this address during the flooding procedure.
Incorrect Answers:

A. This is the IP address reserved for the internal loopback on PC hosts. All windows based PC's will use this internal IP address, assuming that the TCP/IP stack is correctly installed.
B, D. These addresses are part of the range of addresses reserved for internal use, as defined in RFC 1918.

QUESTION 514
What kind of information does a router running a link-state routing protocol need to create and maintain its topological database? (Select two answer choices.)

A. LSAs from other routers
B. Beacons received on point-to-point links
C. hello packets
D. Routing tables received from neighbors
E. SAP packets sent by other routers
F. TTL packets from exclusive routers

Answer: A, C

Explanation:
LSA stands for (Link State Advertisement). It is an update sent out by an OSPF router to advertise the subnet number, subnet mask, cost (metric), etc. so that other routers can update their topology databases. Hello packets are sent out by routers as a way of keeping in touch with neighboring routers to tell that they are still up and their routes are still usable.
Reference: CCNA Self-Study CCNA ICND Exam Certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 192 -193
Incorrect Answers:
B. Beacons are used in token ring networks as a sign of an error or fault.
D. This would be more accurate of a distance vector protocol, not a link state routing protocol.
E. SAP entries are used in IPX networks, not for IP routing protocols.

QUESTION 515
What kind of packets does OSPF send to keep up connectivity with its neighboring routers?

A. SPF packets
B. hello packets
C. keepalive packets
D. dead interval packets
E. LSU packets

Answer: B

Explanation:
Hello packets simply identify the subnet, the router sending the packets and a few other details. As long as a router continues to receive Hellos form existing neighbors, the attached link must still be usable, and the neighbor that sent the Hello must still be up and working.
Reference: CCNA Self-Study CCNA ICND Exam Certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 192 -193
Incorrect Answers:
A, E. SPF (shortest path first) and LSU (link state update) packets are not used to maintain connectivity between neighbors.
C. Keepalive packets do not exist. Hello packets perform the functions of a keepalive packet.

QUESTION 516
Which one of the following statements best explains the split horizon rule used in distance vector routing protocols?

A. Only routers can split boundaries (horizons) between concentric networks.

B. Each AS must keep routing tables converged to prevent dead routes from being advertised across boundaries.
C. Networks can only remain fully converged if all information is sent out all active interfaces.
D. Information about a route should not be sent back in the direction from which the original update came.
E. Distance vector protocols need fall back routers that are responsible for momentary loops.

Answer: D

Explanation:
Simply said, the rule of split horizons says that routing information should not be sent out the same interface that it was learned on. This is used to prevent routing loops in the network, but it can also cause problems on NBMA networks, such as a hub and spoke frame relay network. Split horizons include two related concepts that affect what routes are included in a routing update:
An update does not include the subnet of the interface out which the update is sent
All routes with outgoing interface of interface x are not included in updates sent out that same interface x.
Incorrect Answers
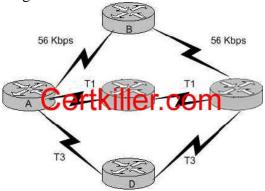
A. There is no such requirement
C. This is not a feature of split horizon
B. This is not a related feature for split horizon
E. Distance vector protocols updates routing table at regular intervals instead of Topology changes
Reference: Wendell Odom. CISCO CCNA Certification Guide (2000 Cisco Press) Page 369.

QUESTION 517
The Certkiller network consists of 5 routers connected together as shown in the diagram below:

Router A is going to route data over to router E. Which of the statements below regarding the decisions router A will make could be true? (Select three answer choices)

A. Router A will determine that all paths have an equal cost if RIP is the routing protocol.
B. Router A will install only the ADE path in its routing table if RIP is the routing protocol.
C. Router A will determine that path ACE has the lowest cost if IGRP is the routing protocol.
D. Router A will determine that path ADE has the lowest cost if IGRP is the routing protocol.
E. Router A will use the route information learned by IGRP if both RIP and IGRP are configured on router A.
F. Router A will use the route information learned by RIP if both RIP and IGRP are configured on router A.

Answer: A, D, E

Explanation:
Choice A is correct because as far as router A is concerned, the path to router E is one hop away regardless of which path is chosen. Since RIP uses the hop count as the metric, they will all appear to be equal. Choice E is correct because IGRP's default administrative distance is 100, while RIP's default administrative distance is 120.
The protocol with the lowest administrative distance is always preferred.
IGRP can load-balance up to six unequal links. RIP networks must have the same hop count to load-balance, whereas IGRP uses bandwidth to determine how to load-balance.
To load-balance over unequal-cost links, you must use the variance command, which controls the load balancing between the best metric and the worst acceptable metric.
Speed of T3 line is 45Mbps and IGRP uses BW as a metric for the shortest path selection so it will use the route via Routers ADE so, choice D is correct.
Incorrect Answers:
B. RIP uses hop counts as the only metric, so they will all appear to be equal even though the diagram shows that the path through ADE contains much more bandwidth than the other alternatives.
C. IGRP uses bandwidth as part of the calculation, so it will choose the router with the T3 circuits over the 56k and T1 links.
F. Since IGRP has a lower AD than RIP, the IGRP route will be preferred over the RIP route.

QUESTION 518
Which of the following statements are correct in regard to classless routing protocols? (Select two)

A. Discontiguous subnets are not allowed.
B. Variable length subnet masks are allowed.
C. RIP v1 is a classless routing protocol.
D. IGRP supports classless routing within the same autonomous system.
E. RIP v2 supports classless routing.

Answer: B, E

Explanation:
Classless and Classful Routing Protocols
Some routing protocols must consider the Class A, B, or C network number that a subnet resides in when performing some of its tasks. Other routing protocols can ignore Class A, B, and C rules altogether. Routing protocols that must consider class rules are called classful routing protocols; those that do not need to consider class rules are called classless routing protocols.
You can easily remember which routing protocols fall into each category because of one fact:
Classful routing protocols do not transmit the mask information along with the subnet number, whereas classless routing protocols do transmit mask information.
You might recall that routing protocols that support VLSM do so because they send mask information along with the routing information. Table 7-3 lists the routing protocols and whether they transmit mast information, support VLSM, and are classless or classful.
Table 7-3 Interior IP Routing Protocol: Classless or Classful?
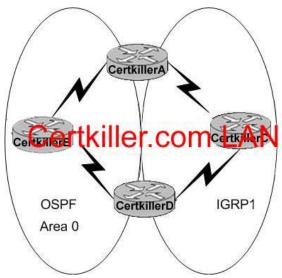
Routing Protocol	Classless	Sends Mask/Prefix in Routing Updates	VLSM Support	Route Summarization Support
RIP-1	No	Yes	No	No
IGRP	No	No	No	No
RIP-2	Yes	Yes	Yes	Yes
EIRGP	Yes	Yes	Yes	Yes
OSPF	Yes	Yes	Yes	Yes

Reference: CCNA ICND Exam Certification Guide by Wendell Odem, Pg.233

QUESTION 519
The Certkiller network consists of 4 routers using both OSPF and IGRP as shown in the diagram below:

In the Certkiller network the following are true:
• All of the parameters are set to default
• All the connected networks are properly advertised
• There is NO route redistribution
Which path will router Certkiller A take to get to router Certkiller D?

A. It will take the route via Certkiller B.
B. It will take the route via Certkiller C.
C. It will use the route with the highest metric.
D. It will load balance over both paths.
E. It will take the shortest route
F. None of the above

Answer: B

Explanation:
Based on the diagram, router A will learn how to reach the destination located at router D
via 2 separate methods: IGRP and OSPF. By default IGRP has a lower administrative
distance (OSPF's administrative distance is 110, IGRP's is only 100) so with all else
being equal, IGRP will be selected over the OSPF route, so it will choose the route via
router C.

QUESTION 520
The following exhibit shows the router topology for the Certkiller network.

On the assumption that every router is running RIP; which of the statements below
correctly describe the way the routers exchange their routing tables? (Select al valid

answer choices)

A. Certkiller 4 exchanges directly with Certkiller 3.
B. Certkiller 4 exchanges directly with Certkiller 2.
C. Certkiller 4 exchanges directly with Certkiller 1.
D. Certkiller 1 exchanges directly with Certkiller 3.
E. Certkiller 1 exchanges directly with Certkiller 2.
F. Certkiller 1 exchanges directly with Certkiller 4.

Answer: A, D

Explanation:
RIP exchanges routing tables with their adjacent neighbors. Therefore, Certkiller 3 will
exchange routes with Certkiller 1, Certkiller 2 and Certkiller 4. Similarly, Certkiller 1 will
exchange routes with Certkiller 3; Certkiller 2 will exchange routes with Certkiller 3; and
Certkiller 4 will exchange routes with Certkiller 3. RIP, unlike OSPF, only exchange
information with their directly connected neighbors. With link state protocols such as
OSPF and IS-IS, information is flooded to all routers within the network system.

QUESTION 521
The Certkiller network is utilizing RIP as the IP routing protocol. Router CK1
learns how to reach the same destination via 6 different paths. All paths have the
same metric and administrative distance. With all routers using the default
operation, which of the paths will be chosen to reach the destination?

A. Only the first two paths that are learned.
B. Four of the paths.
C. All six routes in a routed robin fashion.
D. The oldest two paths in the routing table.
E. The first path learned to the destination network.

Answer: E

Explanation:
By default, RIP only maintains one entry for each destination, and does not load balance
over equal cost paths.
To set the maximum number of routes that RIP can insert into the routing table, use the
rip equal-cost command. Enter a number from 1 to 15. The default is 1. For example:
(config)# rip equal-cost 4
To reset the number of routes to the default value of 1, enter:
(config)# no rip equal-cost
Again, the default is one, so only the first path to the destination will be kept in the
routing table of CK1 .

QUESTION 522
A RIP router has an entry in the routing table for a specific network destination. It

then gets updated with another entry for that same destination, but with a higher path cost (hop count) than the one already in the routing table. What will the router do in this situation?

A. It will ignore the update and take no further action.
B. It will add the update information to its routing table.
C. It will replace the existing routing table entry with the update information.
D. It will delete the existing routing table and will send out hello packets to rebuild the routing table.

Answer: A

Explanation:
If a router learns multiple routes to the same subnet, it chooses the best route based on the metric. This is assuming that the router learned the route from the same routing protocol. If learned from a different routing protocol, then the route with the lowest AD will be installed into the routing table.
Reference: CCNA Self-Study CCNA ICND Exam Certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 150.
Incorrect Answers:
B, C. Only one route to a given destination is placed into the routing table, and the route with the lowest metric is always chosen.
D. This would prove to be a very inefficient method. If this were true, then the entire routing table would be rebuilt for each router nearly every time an update was received.

QUESTION 523
The Certkiller network has been configured with OSPF as the routing protocol.
What is the default administrative distance of the OSPF routing protocol?

A. 90
B. 100
C. 110
D. 120
E. 130
F. 170

Answer: C

Explanation:
The default administrative distance of OSPF is 110. In Cisco networks, the default AD is shown in the following table:
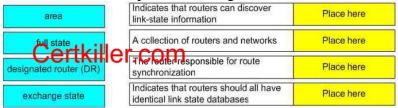
Route Source	Default Distance Values
Connected interface	0
Static route*	1
Enhanced Interior Gateway Routing Protocol (EIGRP) summary route	5
External Border Gateway Protocol (BGP)	20
Internal EIGRP	90
IGRP	100
OSPF	110
Intermediate System-to-Intermediate System (IS-IS)	115
Routing Information Protocol (RIP)	120
Exterior Gateway Protocol (EGP)	140
On Demand Routing (ODR)	160
External EIGRP	170
Internal BGP	200
Unknown**	255

Reference:http://www.cisco.com/en/US/tech/ CK3 65/technologies_tech_note09186a00800 94195.shtml

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QUESTION 524

OSPF is being configured on the entire Certkiller network. Match the OSPF term in the left with is description on the right.

Answer:

QUESTION 525
The routers named Certkiller 1 and Certkiller 2 are both configured with RIP only.
What will happen in the event of Certkiller 1 receiving a routing update that contains
a higher cost path to a network already in its routing table?

A. The update information will be added to the existing routing table.
B. The update information will replace the existing routing table entry.
C. The update will be ignored and thus no further action will occur.
D. The existing routing table entry will be purged from the routing table and all
routers will attempt convergence.

Answer: C

Explanation:
In both RIP version 1 and RIP version 2, when routing updates are received where the
metric is higher than the metric that is currently installed in the routing table for that
route, it is discarded. Only routes with a better metric (lower hop count) in accepted and
installed in the routing table.

QUESTION 526
A new network has been configured using OSPF as the routing protocol. With
which network type will OSPF establish router adjacencies but not perform the
DR/BDR election process?

A. point-to-point
B. backbone area 0
C. broadcast multicast
D. non-broadcast multi-access
E. The DR/BDR process is done for all interface types

Answer: A

Explanation:
OSPF will always form an adjacency with the neighbor on the other side of a point-topoint
interface such as point-to-point serial lines. There is no concept of DR or BDR. The
state of the serial interfaces is point to point. Since there are only 2 routers in any point
to point connection, the DR/BDR election process is not required.
Reference: http://www.cisco.com/warp/public/104/2.html#10.1

QUESTION 527
In what location are EIGRP successor routes stored?

A. In the routing table only.
B. In the neighbor table only.
C. In the topology table only.
D. In the routing table and neighbor table.

E. In the routing table and topology table.
F. In the topology table and neighbor table.

Answer: E

Explanation:
A destination entry is moved from the topology table to the routing table when there is a feasible successor. All minimum cost paths to the destination form a set. From this set, the neighbors that have an advertised metric less than the current routing table metric are considered feasible successors.
Feasible successors are viewed by a router as neighbors that are downstream with respect to the destination. These neighbors and the associated metrics are placed in the forwarding table. Successor information is needed by the routing table and by the topology table, so the are stored in both.

QUESTION 528
Which of the following statements regarding EIGRP successor routes is valid?
(Choose two options.)

A. A successor route is used by EIGRP to forward traffic to destination.
B. Successor routes are saved in the topology table to be used if the primary route fails.
C. Successor routes are flagged as "active" in the routing table.
D. A successor route may be backed up by a feasible successor route.
E. Successor routes are stored in the neighbor table following the discovery process.

Answer: A, D

Explanation:
The DUAL finite state machine embodies the decision process for all route computations. It tracks all routes advertised by all neighbors. The distance information, known as a metric, is used by DUAL to select efficient loop free paths. DUAL selects routes to be inserted into a routing table based on feasible successors. A successor is a neighboring router used for packet forwarding that has a least cost path to a destination that is guaranteed not to be part of a routing loop. When there are no feasible successors but there are neighbors advertising the destination, a recomputation must occur. This is the process where a new successor is determined. The amount of time it takes to recompute the route affects the convergence time. Even though the recomputation is not processor-intensive, it is advantageous to avoid recomputation if it is not necessary. When a topology change occurs, DUAL will test for feasible successors. If there are feasible successors, it will use any it finds in order to avoid any unnecessary recomputation. Feasible successors are defined in more detail later in this document.
Feasible Successors
A destination entry is moved from the topology table to the routing table when there is a feasible successor. All minimum cost paths to the destination form a set. From this

set, the neighbors that have an advertised metric less than the current routing table metric are considered feasible successors.

Feasible successors are viewed by a router as neighbors that are downstream with respect to the destination. These neighbors and the associated metrics are placed in the forwarding table.

When a neighbor changes the metric it has been advertising or a topology change occurs in the network, the set of feasible successors may have to be re-evaluated. However, this is not categorized as a route recomputation.

Reference:

http://www.cisco.com/en/US/tech/ CK3 65/ CK2 07/technologies_tech_note09186a0080093f0 7.shtml#feasible

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QUESTION 529

Which statements are true regarding classless routing protocols? Select two.

A. The use of discontiguous subnets is not allowed
B. The use of variable length subnet masks is permitted
C. RIP v1 is a classless routing protocol
D. IGRP supports classless routing within the same autonomous system
E. RIP v2 supports classless routing

Answer: B, E

Explanation:

Classless routing protocols transmit the subnet mask alogn with each route in the routing updates sent by that protocol. Classful routing protocols do not transmit mask information. So, only classful routing protocol supports VLSM. To say that a routing protocol is classless is to say that it supports VLSM, and vice versa. RIP v2 is a classless protocol.

QUESTION 530

Which table of EIGRP route information are held in RAM and maintained through the use of hello and update packets? Select two.

A. Neighbor table
B. SPF table
C. RTP table
D. Topology table
E. Query table
F. DUAL table

Answer: A, D
They are stored in neighbor table and topology table

QUESTION 531
Network topology exhibit

Certkiller.com WAN

Assume that the routing Protocol referenced in each choice below is configuration with its default settings and the given routing protocol is running on all the routers. Which two conditional statements accurately state the path that will be chosen between network 10.1.0.0 and 10.3.2.0 for the routing protocol mentioned? (Choose Two)

A. If RIPv2 is the routing protocol, the path will be from Certkiller 1 to Certkiller 3 to Certkiller 4 to Certkiller 5.
B. If RIPv2 is the routing protocol, the path will be from Certkiller 1 to Certkiller 5.
C. If EIGRP is the routing protocol, the path will be from Certkiller 1 to Certkiller 3 to Certkiller 4 to Certkiller 5.
D. If EIGRP is the routing protocol, the path will be from Certkiller 1 to Certkiller 2 to Certkiller 5.
E. If OSPF is the routing protocol, the path will be from Certkiller 1 to Certkiller 5.

Answer: B, C

Explanation:
It is because the RIP uses hop count as a metric. When using RIP the route with the shortest hop number is choosed. EIGRP uses delay and load as a metric. The route through the Certkiller 3 has the best metric according to EIGRP.

QUESTION 532
A router has EIGRP configured as the only routing protocol. How does EIGRP respond if there is no feasible successor route to a destination network and the successor route fails?

A. It immediately sends its entire routing table to its neighbors.
B. EIGRP sends a Hello packet to the DR to inform it of the route failure.
C. It automatically forwards traffic to a fallback default route until a successor route is found.
D. It sends queries out to neighbors until a new successor route is found.
E. It places the route in holddown until LSA updates inform it of a new route to the network.

Answer: C

Explanation:
DUAL defines a method for each router not only to calculate the best current route to each subnet, but also to calculate alternative routes that could be used if the current route

fails. An alternative route, using what DUAL calls a feasible successor route, is guaranteed to be loop-free. So, if the current best route fails, the router immediately can start using the feasible successor route instead so that convergence can happen very quickly.
Reference: Cisco CCNA intro p.419

QUESTION 533
Which of the protocols below use TCP at the transport layer? (Select four)

A. TFTP
B. SMTP
C. SNMP
D. FTP
E. HTTP
F. HTTPS

Answer: B, D, E, F

Explanation:
SMTP (Simple Mail Transfer Profile for email), FTP (File Transfer Protocol), and HTTP/HTTPS (Hyper Text Transfer Protocol for internet) all use TCP because of the reliable delivery mechanism. SMTP uses TCP port 25, FTP uses TCP ports 20 and 21, HTTP uses TCP port 80, and HTTPS uses TCP port 443.
Incorrect Answers:
A, C. SNMP and TFTP use UDP as the transport mechanism. Generally speaking, protocols that use the keywords "trivial" or "simple" uses UDP, since connectionless, best effort delivery mechanism usually suffice.
Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 163.

QUESTION 534
Which of the following protocols utilize UDP as the layer 4 transport mechanism? (Choose all that apply)

A. TACACS
B. Telnet
C. SMTP
D. SNMP
E. HTTP
F. TFTP

Answer: D, F

Explanation:
SNMP and TFTP use UDP as the transport mechanism. Generally speaking, protocols that use the keywords "trivial" or "simple" uses UDP, since connectionless, best effort

delivery mechanism usually suffice. SNMP uses UDP port 161, while TFTP uses UDP port 69.
Incorrect Answers:

A. TACACS uses TCP port 49
B. Telnet uses TCP port 23
C. SMTP uses TCP port 25
E. HTTP uses TCP port 80

QUESTION 535
Which one of the following protocols uses both UDP and TCP ports for the transport layer operation?
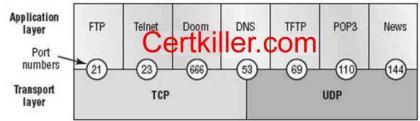
A. FTP
B. TFTP
C. SMTP
D. Telnet
E. DNS

Answer: E

Explanation:
TCP and UDP must use port numbers to communicate with the upper layers. Port numbers keep track of different conversations crossing the network simultaneously. Originating-source port numbers are dynamically assigned by the source host, which will be some number starting at 1024. 1023 and below are defined in RFC 1700, which discusses what is called well-known port numbers.
Virtual circuits that do not use an application with a well-known port number are assigned port numbers randomly chosen from within a specific range instead. These port numbers identify the source and destination host in the TCP segment.

As shown above, only DNS uses both UDP and TCP port 53.

QUESTION 536
Which of the following protocols utilize TCP? (Choose all that apply)

A. NTP
B. NNTP
C. SMTP
D. SNMP
E. HTTPS

F. TFTP

Answer: B, C, E
B. NNTP uses TCP port 119
C. SMTP uses TCP port 25
E. HTTPS uses TCP port 443
Incorrect Answers:

A. NTP uses UDP port 123
D. SNMP uses UDP port 161
F. TFTP uses UDP port 69

QUESTION 537
Although TCP segments differ from UDP segments, they both contain some
common fields. What two segments do they share in common? (Select two answer
choices)

A. source address
B. options
C. sequence number
D. sources
E. destination port
F. checksum

Answer: E, F
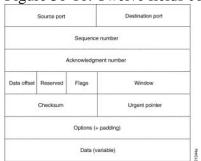
Explanation:
The TCP and UDP packet formats are described below:
TCP Packet Format
Figure 30-10 illustrates the fields and overall format of a TCP packet.
Figure 30-10: Twelve fields comprise a TCP packet.

TCP Packet Field Descriptions
The following descriptions summarize the TCP packet fields illustrated in Figure 30-10:
• Source Port and Destination Port-Identifies points at which upper-layer source
and destination processes receive TCP services.
• Sequence Number-Usually specifies the number assigned to the first byte of
data in the current message. In the connection-establishment phase, this field also
can be used to identify an initial sequence number to be used in an upcoming

transmission.
• Acknowledgment Number-Contains the sequence number of the next byte of data the sender of the packet expects to receive.
• Data Offset-Indicates the number of 32-bit words in the TCP header.
• Reserved-Remains reserved for future use.
• Flags-Carries a variety of control information, including the SYN and ACK bits used for connection establishment, and the FIN bit used for connection termination.
• Window-Specifies the size of the sender's receive window (that is, the buffer space available for incoming data).
• Checksum-Indicates whether the header was damaged in transit.
• Urgent Pointer-Points to the first urgent data byte in the packet.
• Options-Specifies various TCP options.
• Data-Contains upper-layer information.
User Datagram Protocol (UDP)
The User Datagram Protocol (UDP) is a connectionless transport-layer protocol (Layer 4) that belongs to the Internet protocol family. UDP is basically an interface between IP and upper-layer processes. UDP protocol ports distinguish multiple applications running on a single device from one another.
Unlike the TCP, UDP adds no reliability, flow-control, or error-recovery functions to IP. Because of UDP's simplicity, UDP headers contain fewer bytes and consume less network overhead than TCP.
UDP is useful in situations where the reliability mechanisms of TCP are not necessary, such as in cases where a higher-layer protocol might provide error and flow control. UDP is the transport protocol for several well-known application-layer protocols, including Network File System (NFS), Simple Network Management Protocol (SNMP), Domain Name System (DNS), and Trivial File Transfer Protocol (TFTP).
The UDP packet format contains four fields, as shown in Figure 30-11. These include source and destination ports, length, and checksum fields.
Figure 30-11: A UDP packet consists of four fields.

32 Bits	
Source Port	Destination Port
Length	Checksum

Source and destination ports contain the 16-bit UDP protocol port numbers used to demultiplex datagrams for receiving application-layer processes. A length field specifies the length of the UDP header and data. Checksum provides an (optional) integrity check on the UDP header and data.
Reference: http://www.cisco.com/univercd/cc/td/doc/cisintwk/ito_doc/ip.htm#xtocid21

QUESTION 538
The corporate head office of Certkiller has a teleconferencing system that uses VOIP (voice over IP) technology. This system uses UDP as the transport for the data transmissions. If these UDP datagrams arrive at their destination out of sequence, what will happen?

A. UDP will send an ICMP Information Request to the source host.
B. UDP will pass the information in the datagrams up to the next OSI layer in the order that they arrive.
C. UDP will drop the datagrams.
D. UDP will use the sequence numbers in the datagram headers to reassemble the data in the correct order.
E. UDP will not acknowledge the datagrams and wait for a retransmission of the datagrams.

Answer: C

Explanation:
VOIP systems utilize UDP because it is faster and uses less overhead. In addition, the reliable transport mechanism used in TCP is useless to VOIP because if a packet gets dropped and needs to be resent, it will be already too late.
UDP provides a service for applications to exchange messages. Unlike TCP, UDP is connectionless and provides no reliability, no windowing, and no reordering of the received data. However, UDP provides some functions of TCP , such as data transfer, segmentation, and multiplexing using port numbers, and it does so with fewer bytes of overhead and with less processing required. UDP data transfer differs from TCP data transfer in that no reordering or recovery is accomplished. Applications that use UDP are tolerant of lost data, or they have some application mechanism to recover data loss.
Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Ciscopress, ISBN 1-58720-094-5) Page 161.

QUESTION 539
A legacy network that is prone to errors may have issues with services that use UDP. Which of the following services could have problems in this case, due to the fact that UDP is used? (Select three answer choices.)

A. DNS
B. Telnet
C. SMTP
D. SNMP
E. HTTP
F. TFTP

Answer: A, D, F

Explanation:

A. DNS uses both UDP and TCP (port 53)
D. SNMP uses UDP port 161
F. TFTP uses UDP port 69
Incorrect Answers:
B. Telnet uses TCP port 23

C. SMTP uses TCP port 25
E. HTTP uses TCP port 80

QUESTION 540
Regarding DHCP (dynamic host configuration protocol), which two of the following choices below are true? (Select two answer choices)

A. The DHCP Discover message uses FF-FF-FF-FF-FF as the Layer 2 destination address.
B. The DHCP Discover message uses UDP as the transport layer protocol.
C. The DHCP Discover message uses a special Layer 2 multicast address as the destination address.
D. The DHCP Discover message uses TCP as the transport layer protocol.
E. The DHCP Discover message does not use a Layer 2 destination address.
F. The DHCP Discover message does not require a transport layer protocol.

Answer: A, B

Explanation:
DHCP uses UDP as its transport protocol. DHCP messages from a client to a server are sent to the DHCP server port (UDP port 67), and DHCP messages from a server to a client are sent to the DHCP client port (UDP port 68).
The client broadcasts a DHCPDISCOVER message on its local physical subnet. The DHCPDISCOVER message may include options that suggest values for the network address and lease duration. BOOTP relay agents may pass the message on to DHCP servers not on the same physical subnet.
Each server may respond with a DHCPOFFER message that includes an available network address in the "ipaddr" field (and other configuration parameters in DHCP options). Servers need not reserve the offered network address, although the protocol will work more efficiently if the server avoids allocating the offered network address to another client. The server unicasts the DHCPOFFER message to the client (using the DHCP/BOOTP relay agent if necessary) if possible, or may broadcast the message to a broadcast address (preferably 255.255.255.255) on the client's subnet.
Incorrect Answers:
C. DHCP messages are broadcast to the "all hosts" address. IP multicast addresses are not used.
D. UDP is used, not TCP.
E. Since DHCP is used so that a client can obtain an IP address, a layer two destination address must be used, as the layer 3 IP address does not yet exist on the client for the return traffic.
F. DHCP, along with nearly every other type of traffic, requires the use of a transport layer protocol.
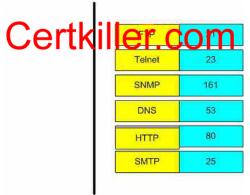
QUESTION 541
Drag the Layer 4 network services on the left with its corresponding TCP port number on the right. Note that all choices should be used when completed.

Answer:

QUESTION 542
Which protocol below uses TCP port 443?

A. HTML
B. HTTPS
C. TFTP
D. Telnet
E. SMTP

Answer: B

Explanation:
HTTPS is the secured version of the HTTP application, which normally uses 128 bit SSL
encryption to secure the information sent and received on a web page. An example is a
banking web site, or a trustworthy shopping web site that takes credit card information.
It is an application layer protocol which uses TCP port 443.
Incorrect Answers:

A. HTML is not a protocol.
C. TFTP uses UDP port 69.
D. Telnet uses TCP port 23.
E. SMTP uses TCP port 25.

QUESTION 543
Which protocol automates all of the following functions for hosts on a network: IP configuration, IP addresses, subnet masks, default gateways, and DNS server information?

A. CDP
B. SNMP
C. DHCP
D. ARP
E. DNS
F. None of the above

Answer: C

Explanation:
DHCP uses the concept of the client making a request and the server supplying the IP address to the client, plus other information such as the default gateway, subnet mask, DNS IP address, and other information.
Incorrect Answers:

A. CDP is the Cisco Discovery Protocol. It is used by Cisco devices at the data link layer to obtain information about their directly connected neighbors.
B. SNMP is the Simple Network Management Protocol. This is used for the maintenance, management, and monitoring of network devices.
D. ARP is the Address Resolution Protocol, which is used to resolve layer 2 MAC addresses to layer 3 IP addresses.
E. DNS is the Domain Name Service. It is used to resolve domain names (for example, www. Certkiller .com) to IP addresses. The IP address location of primary and secondary DNS resolver servers can be obtained for hosts using DHCP.

QUESTION 544
What does the term computer language refer to?

A. Binary
B. Decimal
C. Hexadecimal
D. Octal

Answer: A

Explanation:
Computers speak in binary code; meaning that every piece of data is fundamentally either a 1 or a 0, and all data aspects within a computer is a series of 1s and 0s.

QUESTION 545
Which three address ranges are used for internal private address blocks as defined
by RFC 1918? (Choose all that apply)

A. 0.0.0.0 to 255.255.255
B. 10.0.0.0 to 10.255.255.255
C. 172.16.0.0 to 172.16.255.255
D. 172.16.0.0 to 172.31.255.255
E. 127.0.0.0. to 127.255.255.255
F. 192.168.0.0 to 192.168.255.255
G. 224.0.0.0 to 239.255.255.255

Answer: B, D, F

Explanation:
RFC 1918 defines three different IP address ranges as private, meaning that they can be
used by any private network for internal use, and these ranges are not to be used in the
Internet. The class A private range is 10.0.0.0 to 10.255.255.255. The class B address
range is 172.16.0.0 to 172.31.255.255. The class C private IP address range is
192.168.0.0 to 192.168.255.255.
Incorrect Answers:

A. The 0.0.0.0 network address is invalid and can not be used.
C. The correct address range is 172.16.X.X through 172.31.X.X
E. The 127.0.0.1 address is reserved for the internal loopback IP address, but the entire
127.X.X.X range is not defined in RFC 1918 as a private address range for networks.
G. This address range describes the class D multicast address range.

QUESTION 546
What statements are true regarding ICMP packets? Choose two

A. They acknowledge receipt of TCP segments.
B. They guarantee datagram delivery.
C. They can provide hosts with information about network problems.
D. They are encapsulated within IP datagrams.
E. They are encapsulated within UDP datagrams.

Answer: C, D

Explanation:
ping may be used to find out whether the local machines are connected to the network or whether a remote
site is reachable. This tool is a common network tool for determining the network connectivity which uses
ICMP protocol instead of TCP/IP and UDP/IP. This protocol is usually associated with the network
management tools which provide network information to network administrators, such as ping and traceroute
(the later also uses the UDP/IP protocol).
ICMP is quite different from the TCP/IP and UDP/IP protocols. No source and destination ports are included

in its packets. Therefore, usual packet-filtering rules for TCP/IP and UDP/IP are not applicable. Fortunately, a special "signature" known as the packet's Message type is included for denoting the purposes of the ICMP packet. Most commonly used message types are namely, 0, 3, 4, 5, 8, 11, and 12 which represent echo reply, destination unreachable, source quench, redirect, echo request, time exceeded, and parameter problem respectively.

In the ping service, after receiving the ICMP "echo request" packet from the source location, the destination

Incorrect Answers

ICMP is an IP protocol so A and E are incorrect.

ICMP doesn't guarantee datagram delivery so B is wrong as well.

QUESTION 547

Exhibit

Source Port	Destination Port	Sequence Number	Acknowledgemant Number	...	Window Size	..
21	12409	583974	292735	-	6000	-

The exhibit displays the partial contents of an encapsulation header.

Which of the following are true of the network traffic represented in this diagram?

Select three.

A. This is a UDP header
B. This is an OSI layer 4 header.
C. This is traffic from an FTP server.
D. This is traffic from an Telnet client.
E. The last PDU received in this session had a sequence number of 292735.

Answer: B, C, E

Explanation:

As the header contains the sequence number and ACK number fields, it represents a TCP header. Choice B is correct as TCP works on Layer 4 i.e. Transport Layer.

Source Port mentioned in the header is 21 which indicate it is FTP Traffic because FTP uses port 20 and 21 for data and control. So choice C is correct.
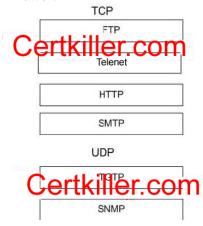
QUESTION 548

Drag and drop.

Your Certkiller.com boss asks you to match the networks services with the corresponding Layer 4 protocols.

Network service		TCP
FTP		Place here
SNMP		Place here
SMTP		Place here
TFTP		Place here
Telnet		UDP
		Place here
HTTP		
		Place here

Answer:

Explanation:
FTP uses TCP Port Numbers 20 and 21. Port 20 is used for Data. Port 21 is used for
Control.
Telnet used TCP Port Number 23.
HTTP uses TCP Port Number 80.
SMTP uses TCP Port Number 25.
SNMP uses UDP Port Number 161.
TFTP uses UDP Port Number 69.

QUESTION 549
Which of the following protocols use both TCP and UDP ports?

A. FTP
B. SMTP
C. Telnet
D. DNS

Answer: D
FTP : TCP Port 20 or 21
SMTP : TCP Port 110
Telnet : TCP Port 23
DNS : both TCP and UDP Port 25

QUESTION 550
How many simultaneous Telnet sessions does a Cisco router support by default?

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

Answer: E

Several concurrent Telnet connections to a router are allowed. The **line vty *0 4* command** signifies that this configuration applies to vtys (virtual teletypes—terminals) 0 through 4. Only these five vtys are allowed by the IOS unless it is an IOS for a dial access server, such as a Cisco AS5300. All five vtys typically have the same password, which is handy because users connecting to the router via a Telnet cannot choose which vty they get.

QUESTION 551
Which fields are included in the TCP header? (Choose three).

A. Source Port
B. Acknowledgement Number
C. Request Number
D. Destination Address
E. Window
F. Data

Answer: A, B, E

Explanation:
TCP header:

Source Port. 16 bits.
Destination Port. 16 bits.
Sequence Number. 32 bits.
The sequence number of the first data byte in this segment. If the SYN bit is set, the sequence number is the initial sequence number and the first data byte is initial sequence number + 1.
Acknowledgment Number. 32 bits.
If the ACK bit is set, this field contains the value of the next sequence number the sender of the segment is expecting to receive. Once a connection is established this is always sent.
Data Offset. 4 bits.
The number of 32-bit words in the TCP header. This indicates where the data begins. The length of the TCP header is always a multiple of 32 bits.
reserved. 3 bits.
Must be cleared to zero.
ECN, Explicit Congestion Notification. 3 bits.
Added in RFC 3168.
Control Bits. 6 bits.
Window. 16 bits, unsigned.
The number of data bytes beginning with the one indicated in the acknowledgment field which the sender of this segment is willing to accept.
Checksum. 16 bits.

This is computed as the 16-bit one's complement of the one's complement sum of a pseudo header of information from the IP header, the TCP header, and the data, padded as needed with zero bytes at the end to make a multiple of two bytes.
Urgent Pointer. 16 bits, unsigned.
If the URG bit is set, this field points to the sequence number of the last byte in a sequence of urgent data.
Options. 0 to 44 bytes.
Options occupy space at the end of the TCP header. All options are included in the checksum. An option may begin on any byte boundary. The TCP header must be padded with zeros to make the header length a multiple of 32 bits.
Data. Variable length.

QUESTION 552
Catalyst switches utilize a special technology to identify and prevent topology loops and ensure that data flows properly through a single network path. What is the name of this technology?

A. VTP
B. ISL
C. 802.1Q
D. STP

Answer: D

Explanation:
Catalyst switches use the STP (spanning tree protocol) to prevent loops and to ensure data flows through a single network path. A separate instance of the STP mechanism is applied to every individual VLAN that is configured on the Catalyst switch.
Incorrect Answers:

A. VTP is the VLAN Trunking Protocol, which is used by Catalyst switches to pass VLAN information between switches. By itself, it does not provide any mechanism for detecting and preventing loops.
B, C. Inter-Switch Link (ISL) and 802.1Q are encapsulation types used for the creation of trunks. ISL is Cisco proprietary and 802.1Q is the industry standard method, but neither of these two options provide for any way to prevent a layer 2 loop in the network.

QUESTION 553
What are two characteristics of "store and forward" switching? (Select two answer choices)

A. Latency fluctuates regardless of frame size.
B. The switch receives the complete frame before beginning to forward it.
C. Latency through the switch varies with frame length.
D. The switch checks the destination address upon receipt of headers.

Answer: B, C

Explanation:
With store-and-forward, the entire frame is received by the switch before the first bit of
the frame is forwarded.
As soon as the incoming switch port receives enough of the frame to see the destination
MAC address, the forwarding decision is made and the frame is transmitted out the
appropriate outgoing port to the destination device. So, each frame might experience
slightly less latency. Store and forward switching may add latency when compared to
other switching methods such as cut through, but it can reduce the amount of errors that
become forwarded through a network.
Reference:
CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-
094-5) Page 243
Incorrect Answers:

A. The amount of latency that is introduced with this method of switching is dependent
on the size of the frame, as the switch must wait to receive the entire frame before
sending it.
D. The switch must wait for the entire frame before forwarding it on, and not just the
headers.

QUESTION 554
You want your Catalyst switch to implement a switching method that holds a packet
in its memory until the data portion of the respected packet reaches the switch.
Which method should you employ on your Catalyst switch?

A. Fast Forward
B. Store and forward
C. Frag-free
D. None of the above

Answer: C

Explanation:
Fragment Free switching filters out the majority of packet errors before forwarding
begins. In a properly functioning network, most packet "errors" are due to collisions
which are resolved within the first 64 bytes of the packet. These collisions cause packet
fragments. After a packet has successfully passed this fragment threshold, it will continue
to be received without error with near-certainty. (The next biggest cause of failure arises
from "late" collisions which can occur when the network is physically interrupted.) This
is how the Fragment Free option works.
Fragment Free switching waits until the received packet passes the 64-byte fragment
threshold and then forwards the packet.
Incorrect Answers:

A. Fast Forward switching is optimized for performance. It offers the lowest level of latency by immediately forwarding a packet upon receipt of only the destination address (after the first 6 bytes are received).

Because Fast Forward does not wait until the entire packet is received before forwarding, this form of switching may sometimes relay a packet that has an error. Although this will be an infrequent occurrence and the destination network adapter will discard the faulty packet upon receipt, this superfluous traffic may be deemed unacceptable in certain environments. Such cut-through overhead can be reduced by using the Fragment Free option.

B. Another switching mode supported by Catalyst switches is the traditional Store-and-Forward bridging mode. Complete packets are stored and checked for errors prior to transmission. Latency varies by packet size since the entire packet needs to be received prior to transmission.

Store-and-Forward is the most error-free form of switching; however, the forwarding latency is higher than either of the two cut-through switching modes.

Reference:
http://www.cisco.com/en/US/partner/products/hw/switches/ps570/products_user_guide_chapter09186a008007d4a3.html

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QUESTION 555
What are some characteristics of the typical VLAN arrangement? (Select all that apply)

A. VLANs logically divide a switch into multiple, independent switches at Layer 2.
B. Trunk links can carry traffic for multiple VLANs.
C. VLAN implementation significantly increases traffic due to added trunking information.
D. A VLAN can span multiple switches.
E. VLANs extend the collision domain to include multiple switches.
F. VLANs typically decrease the number of multiple switches.

Answer: A, B, D

Explanation:
VLANs give you the power of making virtual LAN networks to subdivide collision domains into smaller units of functionality. Without being limited by physical location.
A is correct because that is the exact function of a VLAN. B is correct because trunk links are used to carry traffic for multiple VLANs. D is correct because a VLAN can and often does span across multiple switches, through the use of VTP
Incorrect Answers:
C. This choice is incorrect because although trunking information uses bandwidth, the amount isn't at all significant.
E. This is incorrect because VLANs do the exact opposite, and are used to segment collision domains.
F. This is incorrect because VLANs themselves have no power in decreasing the numbers of multiple switches.

QUESTION 556
Which of the following answers are correct characteristics of microsegmentation, in the context of a Local Area Network (LAN)? (Select two answer choices)

A. Dedicated paths between sending and receiving hosts are established.
B. Multiple subnetwork broadcast addresses are created.
C. Multiple ARP tables are needed.
D. The decrease in the number of collision domains.
E. Broadcast domains are enhanced.
F. Additional bandwidth is used to connect hosts.

Answer: A, F

Explanation:
Microsegmentation works exactly the same way as it is defined. The network is segmented into smaller pieces to reduce the collision domains. This is done through the use of VLANs. A is correct because dedicated paths are established, and F is correct because all these new paths do take up some overhead. Every host within a VLAN will have the overhead of a VLAN ID tag added to each frame. Although this additional overhead is minimal, it is overhead nonetheless.
Incorrect Answers:
B. This would only be true if the switch was layer 3 capable, or a trunk was created to a router with multiple subinterfaces for each VLAN. If traffic from one VLAN needs to be sent to hosts on another VLAN, then inter-VLAN routing is required, and this will indeed add additional subnet broadcast addresses. However, the process of segmentation itself does not require inter-VLAN routing, so choice B is not necessarily true.
C. Only one ARP table is needed per switch.
D, E. Segmenting the network through the use of VLANs will actually increase the total number of collision domains.

QUESTION 557
You are an administrator of a switched network and your goal is to reduce some of the administrative overhead on your network. You plan on achieving this by configuring a new VLAN for each department in your network. However, you need to share the VLAN information across numerous switches throughout your network. Which of the following would allow you accomplish this?

A. STP
B. GVRP
C. SNMP
D. VTP
E. DHCP

Answer: D

Explanation:
The VTP (VLAN TRUNKING PROTOCOL) is a Cisco Layer 2 messaging protocol that manages the addition, deletion, and renaming of VLANs on a network-wide basis. It allows for VLAN information to span multiple switches withing the switch domain.
Incorrect Answers:

A. STP is a switching protocol but it is used for preventing network loops.
B. GVARP is an actual protocol used in switch administration, but it beyond the scope of what a CCNA is expected to know.
C. SNMP is a protocol used for managing and monitoring networks
E. DHCP is the Dynamic Host Configuration Protocol, which allows for PC's to obtain their IP address dynamically upon booting up, along with their DNS and default gateway information.

QUESTION 558
Which one of the following characteristics is true regarding the use of hubs and switches?

A. Hubs can have their ports be configured with VLANs
B. Using hubs is costly with regard to bandwidth availability.
C. Switches can not forward broadcasts.
D. Switches are more efficient than hubs in processing frames.
E. Switches increase the number of collision domains in the network.

Answer: E

Explanation: Switches increases the number of collisions domains in the network. Switches that are configured with VLANs will reduce the size of the collision domains by increasing the number of collision domains in a network, but making them smaller than that of one big, flat network.
Incorrect Answers:

A. Switches are capable of VLAN configurations, but hubs are not.
B. Hubs are generally the least costly method possible to connect multiple devices together in a network.
C. Switches forward broadcasts and multicasts, by default, to all ports within the same VLAN. Only routers block all broadcast traffic by default.
D. Switches and hubs can be equally efficient in processing frames, in theory. In practice, switches are generally more efficient as they usually have more CPU and memory allocated to them, and are generally much more expensive than a simple hub.

QUESTION 559
You wish to segment your LAN into multiple broadcast domains. Which technology method should you implement in order to do this?

A. Transparent bridging
B. Cut-through switching

C. Fragment-free switches
D. Virtual LANs
E. Store-and-forward switching

Answer: D

Explanation:
The creation of VLANs in a switch will provide separate Broadcast domains. By default, all ports in a Catalyst switch belong to VLAN 1. By creating additional VLANs, the LAN will be logically segmented into separate broadcast domains.
Incorrect Answers

A. Transparent bridging is called Transparent because the endpoints devices do not need to know that the bridges exists. It will not play any role for creating separate broadcast domain
B, E. Both of these are switching methods.
C. This has nothing to do with the creation of multiple broadcast domains.

QUESTION 560
When comparing and contrasting the similarities and differences between bridges and switches, which of the following are valid statements? Choose all the valid answer choices)

A. Bridges are faster than switches because they have fewer ports.
B. A switch is a multiport bridge,
C. Bridges and switches learn MAC addresses by examining the source MAC address of each frame received.
D. A bridge will forward a broadcast but a switch will not.
E. Bridges and switches increase the size of a collision domain.
F. None of the above statements are true.

Answer: B, C

Explanation:
Both bridges and switches build the bridge table by listening to incoming frames and examining the source MAC address in the frame.
Switches are multiport bridges that allow you to create multiple broadcast domains. Each broadcast domain is like a distinct virtual bridge within a switch.
Incorrect Answers:

A. Switches are generally faster than bridges. Bridges also do not necessarily have fewer ports than switches.
D. Both bridges and switches will forward broadcast and multicast traffic, assuming that the traffic remains in the same VLAN.
E. The use of VLANs in a switch can decrease the size of the collision domain, by creating additional, smaller collision domains.

QUESTION 561
Network topology exhibit:

Which destination addresses will the computer Certkiller A use to send data to the computer Certkiller C? (Select two answer choices)

A. The IP address of Switch Certkiller 2
B. The MAC address of Switch Certkiller 2
C. The IP address of Certkiller C
D. The MAC address of Certkiller C
E. The IP address of the route Certkiller 1's E0 interface.
F. The Mac address of the router Certkiller 1's E0 interface.
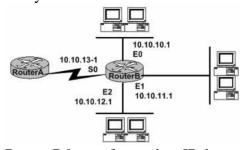
Answer: C, F
The correct answer should be destination IP address of the server. The source and destination IP address should not change throughout the duration of the data transmission. The destination MAC addresses belong to the nearest router for traffic that is destined to a host that is on a different network.
Incorrect Answers:
A, B. The IP address and MAC address should never be used as the destination address, unless the traffic is actually meant to be sent to the switch itself.
D. The MAC address used as the destination will address will come from the Ethernet port of the router, because the host resides on a different network.
E. Destination MAC addresses belong to the nearest router, but not the nearest IP address.

QUESTION 562
Study the network below:

Router B has to forward an IP datagram to 10.10.10.10; which of the interfaces will be used by router B when forwarding this datagram?

A. S0
B. E0
C. E1
D. E2
E. E0, E1, E2
F. None of the above

Answer: B

Explanation:
IP address 10.10.10.10 is on the 10.10.10.0 network. This network is attached to the E0 interface on Router B. This would then be used as the path to an address on the 10.10.10.0 network.
Incorrect Answers:
A, C, D. The router is used to segment traffic, so that local traffic on one segment does not get broadcasted or forwarded out the other interfaces unless it needs to.
E. This answer would imply that all LAN traffic gets broadcasted to all LAN ports. This would only be true if the device used was a switch or hub, or perhaps in the case where bridging was being utilized with the router. However, in this case it is clear that each LAN segment lies in its own IP subnet, so the traffic will only be forwarded out the single interface that is needed.

QUESTION 563
Which of the following correctly describe the various functions and virtues of a router? (Select all valid answer choices)

A. Packet switching
B. Collision prevention on a LAN segment.
C. Packet filtering
D. Broadcast domain enlargement
E. Broadcast forwarding
F. Internetwork communication

Answer: A, C, F

Explanation:
The main function of a router is to connect different, separated networks together. In doing so, switching packets from one network to another is a primary function, along with providing for communication between networks. As an additional feature, routers are capable of providing filtering on a network address and application port level, so choice C is also correct.
Incorrect Answers:
B. Routers can indeed be used to segment a network separate a collision domain, since routers do not forward LAN broadcasts and multicasts to other interfaces. However, routers alone can not prevent all collisions from occurring on any given LAN segment.
D. Routers actually segment LANs into smaller broadcast domains.

E. Routers do not forward broadcast and multicast traffic out the additional interfaces by default. Unless bridging, or IP helpers are configured on the router, LAN broadcasts are blocked at the router level.

QUESTION 564
After replacing the NIC card of a PC on the LAN, your Cisco switch shows a new MAC address is attached to that port. Which of the following answer choices below correctly describe a MAC address? (Select all that apply)

A. It is a globally unique IP address.
B. It is a globally unique 48 bit address
C. It is provided by the manufacturer of the NIC.
D. It is used as part of the IPX/SPX configuration.
E. It is a logical address.

Answer: B, C

Explanation:
The IEEE defines the format and assignment of LAN addresses. The IEEE requires globally unique MAC (Media Access Control) addresses on all network interface cards (NICs). The IEEE calls these addresses MAC addresses because the MAC protocols such as IEEE 802.3 define the addressing details. To ensure a unique MAC address, the Ethernet card manufacturers encode the MAC address onto the card, usually in a ROM chip, using a 48 bit hardware address.
Incorrect Answers:

A. A MAC address is a hardware based layer 2 address, that can be used with any network type. IP addresses are used only in TCP/IP networks, and are used at layer 3 of the OSI model.
D. MAC addresses can be used for any upper level data network, including IP, IPX, and Appletalk networks. It is not specifically designed for IPX/SPX.
E. It is a hardware based, burned in address.

QUESTION 565
On a Cisco network, which of the following modes of flow control are commonly used to mitigate the effects of busy data networks? (Select three answer choices)

A. Source Quench.
B. Learning.
C. Buffering.
D. Windowing.
E. Cut-Through.

Answer: A, C, D

Explanation:

There are three commonly used methods for handling network congestion as desribed below:

Source Quench Messages

Source quench messages are used by receiving devices to help prevent their buffers from overflowing. The receiving device sends a source quench message to request that the source reduce its current rate of data transmission.

Buffering

Buffering is used by network devices to temporarily store bursts of excess data in memory until they can be processed. Occasional data bursts are easily handled by buffering. However, buffers can overflow if data continues at high speeds

Windowing

Windowing is a flow-control method in which the source device requires an acknowledgement from the destination after a certain number of packets have been transmitted.

1. The source device sends a few packets to the destination device.

2. After receiving the packets, the destination device sends an acknowledgment to the source.

3. The source receives the acknowledgment and sends the same amount of packets.

4. If the destination does not receive one or more of the packets for some reason (such as overflowing buffers), it does not send an acknowledgment. The source will then retransmit the packets at a reduced transmission rate.

Incorrect Answers:

B. Learning is a step that a bridge port takes when booting up. It is one of the four states that a bridge port can be in (listening, learning, forwarding, blocking).

E. This is one of switching type used to determine how a switch should process the incoming frames. It is not related to flow control.

QUESTION 566

When selecting a Network Interface Card (NIC), which of the following factors need to be considered? Select three

A. The type of application used on the network
B. The type of system bus used by the computers
C. The type of memory installed in each computer
D. The type of media used in the network topology
E. The type of protocols used in the network
F. The physical layout of the network hosts

Answer: B, D, F

QUESTION 567

If NVRAM lacks boot system commands, where does the router look for the Cisco IOS by default?

A. ROM
B. RAM

C. Flash
D. Bootstrap
E. Startup-.config

Answer: C

Explanation:
Flash memory - Either an EEPROM or a PCMCIA card, Flash memory stores fully functional IOS images and is the default location where the router gets its IOS at boot time. Flash memory also can be used to store any other files, including configuration files.
Reference:
CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) page 187

QUESTION 568
Exhibit

The exhibit shows some common router ports.
Which port can be used for a WAN T1 connection?

A. AUI
B. BRI
C. Console
D. Serial 0

Answer: D

Explanation:
There are only two ways to connect to a T1 line, either with a serial cable to an external T1 DSU/CSU.

QUESTION 569
What Functions do a router perform in a network? (Choose two).

A. Packet Switching
B. Access Layer Security
C. Path Selection.
D. VLAN Membership Assignment.
E. Bridging between LAN segments.
F. Microsegmentation of Broadcast Domains.

Answer: A, C

Explanation: The primary function of an router are: Packet Switching and Path Selection

QUESTION 570
Which of one the following fields is contained within an IEEE Ethernet frame header?

A. source and destination MAC address
B. source MAC address and destination network address only
C. source and destination network address only
D. source network address and destination MAC address
E. source and destination MAC address and source and destination network address

Answer: A

Explanation:
Ethernet versus IEEE 802.3
Two frame formats can be used on Ethernet:
1. The standard issued in 1978 by Xerox Corporation, Intel Corporation and Digital Equipment Corporation, usually called Ethernet (or DIX Ethernet).
2. The international IEEE 802.3 standard, a more recently defined standard.
The difference between the two standards is in the use of one of the header fields, which contains a protocol-type number for Ethernet and the length of the data in the frame for IEEE 802.3.
As shown in the diagram above, the only address that IEEE Ethernet frame headers contain are the source and destination MAC addresses.
Reference: http://www.auggy.mlnet.com/ibm/3376c28.html

QUESTION 571
Which frame field do error detection schemes view to perform their function?

A. ERR
B. Flag
C. FCS
D. MTU
E. MAC
F. PDU

Answer: C

Explanation:
Most data-link protocols include a FCS (frame check sequence) or a CRC (Cyclical redundancy check) field in the data-link trailer. This field contains a value that is the result of a mathematical formula applied to the data in the frame, which is applied check for any errors that may have occurred during the transport.
Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 51.

QUESTION 572
Error detection schemes check errors in the data packets by reading which field frame IDs?

A. MTU
B. PDU
C. FCS
D. Flag
E. MAC
F. BRI

Answer: C

Explanation:
Frame Check Sequence (FCS) field
Ethernet uses a CyclicRedundancyCheck (CRC) algorithm to detect transmission errors. The FrameCheckSequence field is filled (using a CRC) by the sending host. If the receiving host detects a wrong CRC, it will throw away that packet.
Incorrect Answers:

A. MTU is the Maximum Transmission Unit, which is set to 1500 bytes by default for ethernet packets.
B, D. This is not part of the data packet.
E. This is the Media Access Control, which is used most often to describe the layer 2 physical address of a device.
F. BRI is related to an ISDN connection, describing a ciircuit with 2 bearer channels and a single data channel. It has absolutely nothing to do with error correction in a data packet.

QUESTION 573
Regarding PAR (Positive Acknowledgement and Re-transmission), which of the answer choices below are correct? (Select all that apply.)

A. The source device will only retransmit lost packets on the request of the destination device.
B. The source device starts a timer when it sends a segment and retransmits if an acknowledgment is not received before the timer expires.
C. The destination device acknowledges receipt of a segment by sending a packet with a new sequence number and the ACK bit sent.
D. The destination device acknowledges receipt of a segment by sending a packet that indicates the next sequence number it expects.
E. If the destination device does not receive a segment, all segments are retransmitted.
F. The source device keeps a record of all segments sent and expects and acknowledgment of each.

Answer: B, D, F

Explanation:
Answer B
• The sender sets a re-transmission timer, awaiting acknowledgement, just in case the acknowledgement is lost, or in call all the transmitted segments are lost.
Answer D
• The client will reply with an acknowledgement that requests for the next sequence number.
Answer F
• The only way to know that it has sent the certain sequence number by keeping a record of it.
Incorrect Answers:
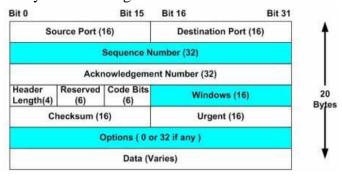
A. This is not true, as this would cause problems if the acknowledgement was lost in transmission. In a PAR transmission, the sender uses a timer system to resend the data if not acknowledged in a timely manner.
C. The receiver sends the next expected sequence number to the sender, not a randomly chosen new sequence number.
E. Only data within the window that is missing the acknowledgement will be resent. All data within the window size will be retransmitted, but not all data in the entire segment.

QUESTION 574
Study the following exhibit:

The exhibit above is representative of which of the following data structures?

A. FDDI frame
B. Ethernet frame
C. UDP datagram
D. Token Ring frame
E. TCP segment
F. None of the above

Answer: E

Explanation:
This diagram represents a TCP segment. TCP is a connection oriented protocol, which

means it sends the data according to the sliding window algorithm, and uses acknowledgements. The diagram above shows the areas where windows and acknowledgement numbers are used. UDP data structures do not use these fields.
Reference:
CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) page 151.

QUESTION 575
What term is used to describe the process where one frame is placed into a different type of frame?

A. Framing
B. De-encapsulation
C. Encapsulation
D. De-framing

Answer: C

Explanation:
Encapsulation is defined as: "The technique used by layered protocols in which a layer adds header information to the protocol data unit (PDU) from the layer above. As an example, in Internet terminology, a packet would contain a header from the physical layer, followed by a header from the network layer (IP), followed by a header from the transport layer (TCP), and followed by the application protocol data."
When a frame is placed inside another frame it is know as encapsulation. To restore the frame to its original state is de-encapsulation.

QUESTION 576
A PC on a network segment sends data to another PC on a different segment.
Which of the following correctly describe the correct order of how this data will be encapsulated?

A. Data, Frame, Packet, Segment, Bit
B. Data, Frame, Segment, Packet, Bit
C. Data, Packet, Frame, Segment, Bit
D. Data, Packet, Segment, Frame, Bit
E. Data, Segment, Frame, Packet, Bit
F. Data, Segment, Packet, Frame, Bit

Answer: F

Explanation:
Data Encapsulation
Step 1 Create the application data and headers
• Data
Step 2 Package the data for transport

• Segment
Step 3 Add the destination and source network layer addresses to the data
• Packet
Step 4 Add the destination and source data link layer addresses to the data
• Frame
Step 5 Transmit the bits
• Bit
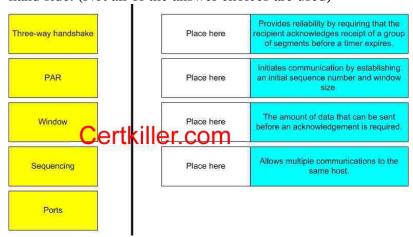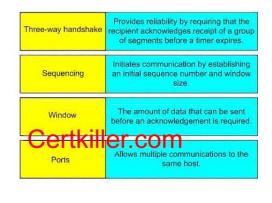
QUESTION 577
Classify terms on the left hand side with their associated descriptions on the right hand side. (Not all of the answer choices are used)

Answer:

QUESTION 578
The command "ip route 192.168.24.64 255.255.255.192 192.168.8.2 100" was configured on a router named CK1 . No routing protocols or other static routes are configured on the Corporate router yet.
Based on this information, which statement is true about this command?

A. This command sets a gateway of last resort for the CK1 router.
B. The number 100 indicates the number of hops to the destination network.

C. The interface with IP address 192.168.8.2 is on the CK1 router.
D. The command creates a static route for all IP traffic with the source address 192.168.24.64.
E. Packets destined for host 192.168.24.124 will be sent to 192.168.8.2.
F. None of the above

Answer: E

Explanation:
This configuration command will establish a static route, where all traffic destined to the 192.168.64/26 network will be sent to the next hop router that has the 192.168.8.2 IP address. The value of 100 at the end of the static route means that the administrative distance of 100 will be assigned to the route. By default, static routes have an AD of 1. In this case, it is much higher but all traffic to this destination will still be used by this route since no other routes exist in CK1 .
Incorrect Answers:

A. The default route is also called the "all 0's" route since it is set with the "ip route 0.0.0.0 0.0.0.0" command.
B. The value of 100 is used to set the administrative distance, not the number of hops.
C. The IP address set in a static route is used for the next hop router, not the local router.
D. Static routes are used to tell the router how and where to forward traffic that is destined for particular networks, not for traffic that is sourced from networks.

QUESTION 579
Network equipment supporting the use of flow control mechanisms has been recently installed. What is the purpose of flow control in a data network?

A. It ensures that data is retransmitted if an acknowledgment is not received.
B. It reassembles segments in the correct order on the destination device.
C. It provides a mechanism for the receiver to control the transmission speed.
D. It regulates the size of each datagram segment.
E. All of the above are functions of flow control

Answer: C

Explanation:
Flow control paces the transmission of data between a sending device and a receiving device. Flow control ensures that the receiving device can absorb the data sent to it before the sending device sends more. When the buffers on the receiving device are full, a message is sent to the sending device to suspend transmission until the data in the buffers has been processed.
Incorrect Answers:

A. Data retransmission mechanisms are not handled by control. They are most often handled by transport layer protocols such as TCP.

B. This describes the reassembly portion of the segmentation and reassembly (SAR) function of network equipment.
D. The maximum transmission unit (MTU) handles the regulation of maximum frame sizes.

QUESTION 580
Three different Certkiller routers are connected as shown below:

Host 1 is trying to communicate with Host 2. The e0 interface on Router C is down. Which of the following are true? (Choose two)

A. Router C will use ICMP to inform Host 1 that Host 2 cannot be reached.
B. Router C will use ICMP to inform Router B that Host 2 cannot be reached.
C. Router C will use ICMP to inform Host 1, Router A, and Router B that Host 2 cannot be reached.
D. Router C will send a Destination Unreachable message type.
E. Router C will send a Router Selection message type.
F. Router C will send a Source Quench message type.

Answer:
A. D

Explanation:
When a packet reaches a router that is destined for a network that is not in the routing table or for a network that is down, the router will send an ICMP destination unreachable message back to the sender. This informs the sending station that the packet could not be forwarded to the destination, and this information will be sent to the sending station, not to the router.

QUESTION 581
Which functions do routers perform when routing a packet? (Choose two)

A. packet switching
B. destination host addressing
C. path selection
D. VLAN membership assignment
E. ARP request forwarding

Answer: A, C

QUESTION 582
A router receives a packet on interface 172.16.45.66/26. The source IP of the packet
is 172.16.45.127/26 and the destination is 172.16.46.191/26.
How will the router handle the packet?

A. The destination is a host on another subnet, so the router will not forward the
packet.
B. The destination is a host on the same subnet, so the router will forward the packet.
C. The destination is a broadcast address, so the router will not forward the packet.
D. The destination is a network address, so the router will forward the packet.

Answer: C

Explanation:
/26 means 2-bits of subnetting. There will be 4 subnets having 64 hosts in each subnet.
Subnets will be
172.16.46.0 -------- 172.16.46.63 (0-63)
172.16.46.64 -------- 172.16.46.127 (64-127)
172.16.46.128 -------- 172.16.46.191 (128-191)
172.16.46.192 -------- 172.16.46.255 (192-255)
The destination address is 172.16.46.191 which indicates a BROADCAST address so,
router will not process this broadcast.

QUESTION 583
Which WAN service utilizes two different encapsulation types (one for data and one
for signaling) on its data link layer?

A. ISDN
B. Frame Relay
C. ATM
D. FDDI

Answer: A

Explanation:
ISDN use "out-of-band" signaling, which means that the clocking is done on the "D"
(data) channel and not the same channels as the actual data. ISDN BRI circuits are also
referred to as 2B+1D circuits, as they use 2 64 kbps channels as the bearer channels, and
one 16 kbps D channel which is used for the signaling.
Incorrect Answers:
B. Frame Relay uses only one type of encapsulation for the data and LMI as the
connection identifier for each circuit.
C. ATM uses a uniform, 53 byte cell format for data transmission.
D. FDDI is a legacy network standard, normally used in LAN environments, not as a
WAN. It also does not utilize multiple encapsulation types.

QUESTION 584
In Frame Relay; what is the purpose of Inverse ARP? (Select only one answer choice)

A. It is used to map a known IP address to a MAC address
B. It is used to map a known DLCI to a MAC address
C. It is used to map a known MAC address to an IP address
D. It is used to map a known DLCI to an IP address
E. It is used to map a known MAC address to DLCI

Answer: D

Explanation:
Just as ARP resolves IP addresses to MAC addresses, Inverse ARP maps a known DLCI to an IP address.
Incorrect Answers:
A, C. ARP and Reverse ARP (RARP) are used for IP address/MAC address mappings.
B, E. DLCI do not have a need to discover the MAC address of a host, so a DLCI is never mapped to a MAC address.

QUESTION 585
What are some common layer 2 encapsulations for a WAN link? (Select all the appropriate answer choices)

A. Ethernet
B. PPP
C. Token Ring
D. HDLC
E. Frame Relay
F. POTS

Answer: B, D, E

Explanation:
WAN data-link protocols used on point-to-point serial links provide the basic function of data delivery across that one link. The two most popular WAN data-link protocols are High-Level Data Link Control (HDLC) and PPP. A very popular WAN is frame relay, which is less expensive that dedicated point to point serial links, and is usually set up in a hub and spoke environment using a series of virtual circuits.
Reference:
CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page
Incorrect Answers:
A, C. Ethernet and Token ring networks are used in Local Area Networks, not in Wide Area Networks (although this is changing as the use of metro and long haul Ethernet links become more popular and cost-effective).

F. POTS stands for the "plain old telephone service." Although the use phone lines and modems have been used to connect computers together over long distances for years, POTS is not a layer 2 encapsulation type. In fact, many phone line data connections use PPP as the layer 2 encapsulation type.

QUESTION 586
Which of the following correctly describe characteristics of PPP? (Select all valid answer choices)

A. Encapsulates several different types of routing protocols.
B. Supports only IP.
C. Can be used over analog circuits.
D. Is proprietary to Cisco
E. Supports error correction.

Answer: A, C, E

Explanation:
• PPP can be used on either type of line (dial or switched lines), because data-link protocols are designed for point-to-point environment.
• PPP uses one LCP per link and one Control Protocol for each Layer 3 protocol defined on the link. If a router is configured for IPX, Apple Talk, and IP on a PPP serial link, the router configured for PPP encapsulation automatically tries to bring up the appropriate control protocols for each layer 3 protocol.
• Error recovery can be performed by the data-link protocol or a higher-layer protocol, or it might not be performed at all. Supported but not enabled by default.
Incorrect Answers:
B. PPP can be used to support any higher layer protocol, including IP, IPX, Appletalk, etc.
D. PPP is an industry standard used in point to point data networks. The Cisco proprietary method that is similar to PPP is HDLC.
Reference:
CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 309

QUESTION 587
Which one of the WAN data-link protocols below is used for out-of-band signaling?

A. HDLC
B. NCP
C. PAP
D. LAPD
E. LAPB

Answer: D

Explanation:
Out-of-band signaling is telecommunication signaling (exchange of information in order to control a telephone call) that is done on a channel that is dedicated for the purpose and separate from the channels used for the telephone call. An example of this is the D channel on an ISDN BRI circuit. LAPD is used by ISDN lines for signaling to set up and bring down circuits. LAPD is formally defined in Q.921.

QUESTION 588
You are preparing to create a point to point WAN by connecting a Cisco router with a Juniper router by way of their serial links. Which one of the following commands would you use?

A. CK1 (config-if)# encapsulation hdlc ansi
B. CK1 (config-if)# encapsulation ppp
C. CK1 (config-if)# encapsulation LAPD
D. CK1 (config-if)# encapsulation frame-relay ietf
E. CK1 (config)#encapsulation ppp

Answer: B

Explanation:
PPP is the best encapsulation type to use, when connecting routers of different manufacturers, because PPP is non proprietary (unlike HDLC). PPP is an industry standard layer 2 encapsulation type that is supported by every router manufacturer.
Incorrect Answers:

A. HDLC is a cisco proprietary method of encapsulation for connecting a point to point connection. Although HDLC has become so popular that many other router vendors also support it, HDLC ANSI is not an option that can be used.
C. LAPD is used as an out of band signaling protocol on connections such as ISDN. It is not a choice that can be made in this case.
D. This would be the correct choice if the connection was a frame relay connection, instead of a leased line connection. The ietf keyword is needed for connecting frame links to routers that are non-cisco.
E. This command needs to be placed in interface configuration mode, not in global configuration mode.

QUESTION 589
Which WAN technology was designed to give homes and small business high speed digital dial-up service over already existing communication infrastructure?

A. X25
B. Frame Relay
C. ATM
D. ISDN
E. ATX

Answer: D

Explanation:
ISDN stands for Integrated Services Digital Network, precisely because it was designed to be integrated with current digital telephone services. It was originally designed to bring relatively high speed voice and data services to home users, as well as corporate users.
Note: This question is obviously a bit dated, as a better choice in today's marketplace would be DSL, which also provides even higher speeds over the existing telephone infrastructure.

QUESTION 590
A new asynchronous connection is being installed in your network. Which pair of WAN encapsulations types is suitable for asynchronous lines?

A. PPP and ATM
B. PPP and SDLC
C. ATM and HDLC
D. SDLC and HDLC

Answer: A

Explanation:
By now you should know that PPP is very feature rich, and it supports asynchronous communication. It is the encapsulation type for ISDN and modems, as well as point to point serial connections.
ATM stands for Asynchronous Transfer Mode, so by its name alone you know that it is good for an asynchronous connection. ATM has a lot in common with Frame Relay, but it works with SONNET on the layer 1 level, and uses a uniform sized 53 byte cell for all communications.
Incorrect answers:
C, D. These are both incorrect because they contain HDLC, and HDLC only supports synchronous links.
B. This is incorrect because it contains SDLC, which stands for Synchronous Data Link Control. Obviously, the name alone should tell you that it does not support asynchronous data lines.
References:
CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Pages 308-317
CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 101-103
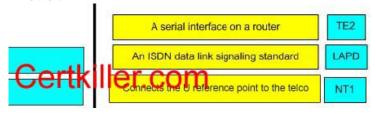
QUESTION 591
Classify the ISDN terms on the right hand side to their corresponding description on the left side. (Not all the options on the left will be used)

LAPD	A serial interface on a router
LAPB	An ISDN data link signaling standard
TE1	Connects the U reference point to the telco
ITU.T.430	
TE2	
NT1	

Certkiller.com

Answer:

	A serial interface on a router	TE2
Certkiller.com	An ISDN data link signaling standard	LAPD
	Connects the U reference point to the telco	NT1

Explanation:
• LAPD - provides the data link protocol that allows delivery of messages across that D-channel to the local switch.
• LAPB - Protocol and is designed primarily to satisfy the signaling requirements of ISDN basic access. It is defined by ITU-T Recommendations Q.920 and Q.921.
• TE1 - ISDN -capable four-wire cable. Understands signaling and 2B=D. Uses an S reference point.
• ITU.T.430 - Defines connectors, encoding, framing, and reference points.
• TE2 - Equipment that does not understand ISDN protocols and specifications (no ISDN awareness). Uses an R reference point, typically an RS-232 or V.35 cable, to connect to a TA.
• NT1 - CPE equipment in North America. Connects with a U reference point (two-wire) to the Telco.
Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page Chapter 10.

QUESTION 592
You have a single ISDN BRI B channel. What is its maximum bandwidth capacity of this one channel?

A. 16kb/s
B. 64kb/s
C. 128kb/s
D. 144kb/s
E. 192kb/s
F. 256kb/s

Answer: B

Explanation:
A single ISDN BRI B channel only has a maximum bandwidth of 64kbps. You need two of them together just to get 128kbps. A complete ISDN circuit is 2B+1D, with 2 64kbps B channels and one 64 kbps D channel.

QUESTION 593
Which of the following are correct regarding ISDN? (Select all that apply)

A. Legacy DDR can use port information to define interesting traffic.
B. Legacy DDR can configure multiple dialer configurations on the same interface.
C. Legacy DDR can use ACLs to define interesting traffic.
D. HDLC or PPP can be used to encapsulate ISDN D channel information.
E. The BRI interfaces on ISDN routers with dialer profiles configured cannot belong to multiple dialer pools.
F. Dialer profiles cannot use extended ACLs to define interesting traffic.

Answer: A, B, C

Explanation:
Dialer profiles separate logical configurations from the physical interfaces that receive or make calls. Because of this separation, interfaces such as ISDN, asynchronous modems, or synchronous serial connections can be shared by multiple dialer profile configurations. Dialer profiles allow logical and physical configurations to be bound together dynamically on a per call basis, allowing physical interfaces to take on different characteristics based on incoming or outgoing call requirements. Dialer profiles can define encapsulation, access control lists, minimum or maximum calls, and toggle features on or off. Dialer profiles are particularly useful where multiple ISDN B channels are to be used to connect to multiple remote destinations simultaneously. In such a case, one dialer profile can be bound to one set of B channels while another dialer profile can be bound to another set of B channels, thus allowing the same physical interface to connect to multiple remote destinations simultaneously.
Interesting traffic can be defined using both standard and extended access lists, meaning that information from layer 3 addresses and layer 4 ports can be utilized.
Incorrect Answers:
D. HDLC is not a valid option for ISDN connections.
E. This statement is incorrect. Dialer profiles can indeed be used with multiple dialer pools.
F. Any type of access list can be used to define the interesting traffic. Interesting traffic can be defined using both standard and extended access lists, meaning that information from layer 3 addresses and layer 4 ports can be configured.

QUESTION 594
Which of the following statements regarding ISDN are correct? (Select all that apply)

A. Each ISDN B channel has transmission speeds of up to 64 kbps.

B. The ISDN B channel can carry video, voice or data.
C. The ISDN B channel transmission rate varies depending on the service used.
D. The ISDN D channel transmits control information.
E. The ISDN B channels can be configured with different subnets and encapsulation
types when dialer profiles are configured.

Answer: A, B, D

Explanation:
Each B channel has a maximum throughput of 64 kbps and can carry encoded pulse code
modulation digital voice, video, or data. They are used mainly for circuit-switched data
communications such as High-Level Data Link Control (HDLC) and Point-to-Point
Protocol (PPP). However, they can also carry packet-switched data communications.
The router uses the D channel to dial destination phone numbers. It has a bandwidth of 16
kbps for BRI or 64 kbps for PRI. Although the D channel is used mainly for signaling, it
too can also carry packet-switched data.
Incorrect Answers:
C. The individual B channels can be set at 56 kbps or 64 kbps, but this value is static and
can not be changed dynamically based on the service that is being used at the time.
E. Although dialer profiles can be used to place individual B channels into separate
logical interfaces with different IP subnets, the encapsulation type can not be changed.

QUESTION 595
In regard to a hub and spoke Frame-Relay data network, what kind of physical
network is it classified as?

A. point-to-point
B. broadcast multi-access
C. nonbroadcast multipoint
D. nonbroadcast multi-access
E. broadcast point-to-multipoint

Answer: D

Explanation:
Frame relay networks are considered to be NBMA networks. Frame Relay is a WAN
protocol that operates at the physical and data link layers of the Open System
Interconnection (OSI) reference model. This protocol is standardized by both the
International Telecommunication Union Telecommunications Standardization Sector
(ITU-T) and American National Standards Institute (ANSI).
Frame Relay uses statistical multiplexing techniques to provide network access in a
packet-switched network. It is strictly a Layer 2 protocol suite. Being a Layer 2 protocol
enables Frame Relay to offer higher performance WAN applications (such as LAN
interconnection) than the older protocols (such as X.25), which incorporated Layer 3
functions. Given these performance benefits, Frame Relay is a popular WAN medium.
However, it has some limitations with regard to IP multicast. To illustrate, Frame Relay

is a Layer 2 nonbroadcast multiaccess (NBMA) network protocol. IP multicast networks are designed to utilize the capabilities of Layer 2 broadcast media such as on a LAN.

QUESTION 596
Which of the following statements correctly describes the characteristics of a Frame Relay point-to-point subinterface? (Select two answer choices)

A. Needs to use Inverse ARP.
B. Maps a single IP subnet per DLCI.
C. Maps a single IP subnet across multiple DLCIs.
D. Resolves NBMA (non broadcast multi access) split horizon issues.
E. Requires use of the frame-relay map command.
F. None of the above

Answer: B, D

Explanation:
B is correct because only one DLCI can be configured per point-to-point subinterface. The command 'frame-relay interface-dlci' associates the selected point-to point subinterface with only one DLCI.
Subinterfaces were originally created to take care of split-horizon issues from distance vector routing protocols over non-broadcast multiple access networks, because split horizon prevents routing updates received on one interface from retransmitting out onto the same interface. This is true even if the routing update is received on one frame relay PVC destined out to another frame relay PVC! By partitioning the frame relay network into numerous point-to point networks using subinterfaces; each new point-to-point subnetwork gets their own network number assigned. Therefore, the routed protocol views each subnetwork as if it was located on a separate interface.
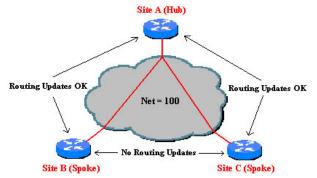

Figure 2: Split-horizon does not allow remote sites to send routing updates to each other.

Reference: http://www.ciscopress.com/articles/article.asp?p=170741&seqNum=6
Incorrect Answers:

A. Since only one DLCI is assigned per subnet in a logical point to point interface, there is no need for Inverse ARP, since both the DLCI and IP addresses are already known.
C. The IP subnet is mapped across a single virtual circuit, so only one DLCI is mapped

per subinterface.
E. This command would be needed when multiple virtual circuits are being configured on one physical interface. When logical subinterfaces are used, the "frame-relay interface-dlci" command is used, not this command.

QUESTION 597
Regarding Frame Relay Multipoint subinterfaces; which statement is true?

A. An IP address is required on the physical interface
B. All routers are required to be fully meshed
C. All routers must be in the same subnet to forward routing updates and broadcasts
D. Multipoint is the default configuration for Frame Relay subinterfaces

Answer: C

Explanation:
Unlike Frame Relay point-to-point connections, multipoint Frame Relay router interfaces must all be in the same subnet.
Incorrect Answers:

A. The IP address is required on the logical subinterface, not the physical interface.
B. It is never an absolute requirement for a frame relay network to be fully meshed. The vast majority of frame relay networks are configured in a hub and spoke fashion, to avoid all of the charges associated with the numerous PVC's needed to be fully meshed.
D. Point to point is the default frame relay subinterface type.

QUESTION 598
The Certkiller Frame Relay network is displayed below:

In regard to router Certkiller 1; what is the function of the Frame Relay DLCI?

A. Defines the signaling standard between Certkiller 1 and Certkiller 2.
B. Classifies the encapsulation used between Certkiller 1 and Certkiller 2.
C. Identifies the circuit between Certkiller 2 and the frame switch.
D. Classifies the circuit between Certkiller 1 and Certkiller 2.
E. Defines the signaling standard between Certkiller 1 and the frame switch.

Answer: C

Explanation:
Certkiller 1 sends frames with DLCI, and they reach the local switch. The local switch sees the DLCI field and forwards the frame through the Frame Relay network until it reaches the switch connected to Certkiller 2. The Certkiller 2's local switch forwards the frame out of the access link to Certkiller 2. DLCI information is considered to be locally

significant, meaning that the DLCI is used between the end router and the carrier's local frame relay switch.

Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 386

Incorrect Answers:

A, E. DLCI is used only as a circuit identifier (DLCI=Data Link Circuit Identifier), and not used for signaling.

B. The encapsulation options are not defined with DLCIs.

D. The DLCI information is considered to be locally significant, meaning that the DLCI is used between the end router and the carrier's local frame relay switch. The DLCI is not used end to end (router to router).

QUESTION 599

Your frame relay network uses DLCI information on each of the PVC's. What is the purpose of them?

A. They determine the encapsulation type employed by the Frame Relay.

B. They identify the logical circuit between a local router and a Frame Relay WAN switch.

C. They represent the physical address of the router.

D. They represent the keepalives in the maintenance of PVC.

Answer: B

Explanation:

Routers use the data-link connection identifier (DLCI) as the Frame Replay address, which identifies the VC over which the frame should travel.

Data Link Connection Identifiers are the "hardware address" on a Frame Relay network. They identify a routers PVC to the Frame Relay switch.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) page 377

Incorrect Answers:

A. DLCI information is not used to determine the encapsulation of the frame relay circuit in any way.

C. A DLCI is used at layer two, but it is a separate identifier that is not related to the hardware MAC address of any device.

D. The function of a keepalive is handled by LMI in a frame network, not the DLCI.

QUESTION 600

Which of the following commands would be applied to a WAN interface, but not on LAN Interface? (Choose all that apply)

A. IP address

B. encapsulation PPP

C. no shutdown
D. PPP authentication CHAP
E. Speed
F. None of the above

Answer: B, D

Explanation:
PPP encapsulation can be used in ISDN interfaces, Asynchronous serial interfaces, and point to point serial WAN connections. PPP is not an option for LAN interfaces. CHAP authentication is a PPP 3 way authentication method. CHAP authentication can only be used on PPP encapsulated interfaces and is not a LAN interface configuration option.
Incorrect Answers:
A, C. This command can be applied to both LAN and WAN interface types.
E. The speed command is used on LAN interfaces, and is not used on WAN interface types.