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Total number of questions: 555

PART I: PLANNING & DESIGN (72 questions)

Design a simple LAN using Cisco Technology (7 questions)

QUESTION NO: 1

**Which of the following devices can an administrator use to segment their LAN?
(Choose all that apply)**

- A. Hubs
- B. Repeaters
- C. Switches
- D. Bridges
- E. Routers
- F. Media Converters
- G. All of the above

Answer: C, D, E

Explanation:

Routers, switches, and bridges don't transmit broadcasts. They segment a large cumbersome network, into multiple efficient networks.

Incorrect Answers:

- A. Hubs is incorrect because a hub doesn't segment a network, it only allows more hosts on one. Hubs operate at layer one, and is used primarily to physically add more stations to the LAN.
- B. This also incorrect because the job of a repeater is to repeat a signal so it can exceed distance limitations. It also operates at layer one and provides no means for logical LAN segmentation.
- F. This is incorrect because media converters work by converting data from a different media type to work with the media of a LAN. It also operates at layer one and provides no means for logical LAN segmentation.

QUESTION NO: 2

Routers perform which of the following functions? (Select three)

- 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:

A. Routers work in Layer 3 of the OSI Model. A major function of the router is to route packets between networks.

C. Through the use of access lists, routers can permit and deny traffic using layer 3 and layer 4 packet information.

F. The primary purpose of a router is to route traffic between different networks, allowing for internetworking.

Incorrect Answers:

B. While routers can be used to segment LANs, which will reduce the amount of collisions; it can not prevent all collisions from occurring. As long as there are 2 or more devices on a LAN segment, the possibility of a collision exists, whether a router is used or not.

D. The broadcast domain of a LAN is often segmented through the use of a router. This results in reducing the size of the broadcast domain.

E. Routers do not forward broadcast traffic.

QUESTION NO: 3

The Sales and Production networks are separated by a router as shown in the diagram below:



Which of the following statements most accurately describes the characteristics of the above networks broadcast and collision domains? (Select the two best answer choices)

- A. There are two broadcast domains in the network.
- B. There are four broadcast domains in the network.
- C. There are six broadcast domains in the network.
- D. There are four collision domains in the network.
- E. There are five collision domains in the network.
- F. There are seven collision domains in the network.

Answer: A, F

Explanation:

In this network we have a hub being used in the Sales department, and a switch being used in the Production department. Based on this, we have two broadcast domains: one for each network being separated by a router. For the collision domains, we have 5 computers and one port for E1 so we have 6 collision domains total because we use a switch in the Production Department so 5 are created there, plus one collision domain for the entire Sales department because a hub is being used.

QUESTION NO: 4

The Testking corporate LAN consists of one large flat network. You decide to segment this LAN into two separate networks with a router. What will be the affect of this change?

- A. The number of broadcast domains will be decreased.
- B. It will make the broadcasting of traffic between domains more efficient between segments.
- C. It will increase the number of collisions.
- D. It will prevent segment 1's broadcasts from getting to segment 2.
- E. It will connect segment 1's broadcasts to segment 2.

Answer: D

Explanation

A router does not forward broadcast traffic. It therefore breaks up a broadcast domain, reducing unnecessary network traffic. Broadcasts from one segment will not be seen on the other segment.

Incorrect Answers:

- A. This will actually increase the number of broadcast domains from one to two.
- B. All link level traffic from segment one to segment two will now need to be routed between the two interfaces of the router. Although this will reduce the traffic on the LAN links, it does also provide a less efficient transport between the segments.

- C. Since the network size is effectively cut into half, the number of collisions should decrease dramatically.
- E. Broadcasts from one segment will be completely hidden from the other segment.

QUESTION NO: 5

Which of the following are benefits of segmenting a network with a router? (Select all that apply)

- A. Broadcasts are not forwarded across the router.
- B. All broadcasts are completely eliminated.
- C. Adding a router to the network decreases latency.
- D. Filtering can occur based on Layer 3 information.
- E. Routers are more efficient than switches and will process the data more quickly.
- F. None of the above.

Answer: A, D

Explanation

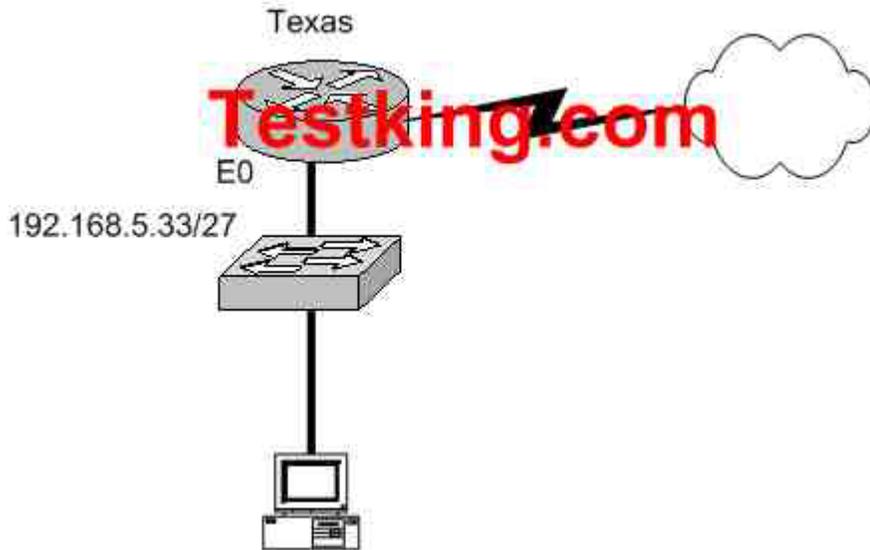
Routers do not forward broadcast messages and therefore breaks up a broadcast domain. In addition, routers can be used to filter network information with the use of access lists.

Incorrect Answers:

- B. Broadcasts will still be present on the LAN segments. They will be reduced, because routers will block broadcasts from one network to the other.
- C. Adding routers, or hops, to any network will actually increase the latency.
- E. The switching process is faster than the routing process. Since routers must do a layer 3 destination based lookup in order to reach destinations, they will process data more slowly than switches.

QUESTION NO: 6

The Testking Texas branch network is displayed in the following diagram:



Of the following choices, which IP address should be assigned to the PC host?

- A. 192.168.5.5
- B. 192.168.5.32
- C. 192.168.5.40
- D. 192.168.5.63
- E. 192.168.5.75

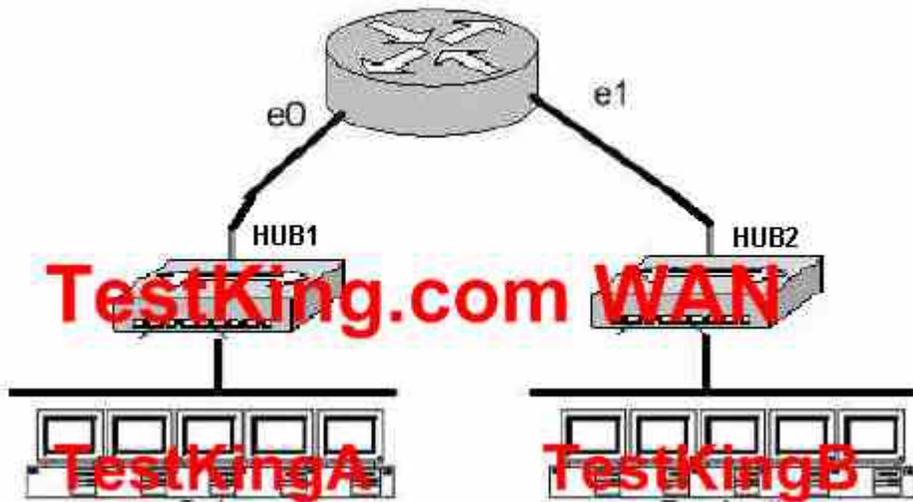
Answer: C.

Explanation:

The subnet mask used on this Ethernet segment is /27, which translates to 255.255.255.224. Valid hosts on the 192.168.5.33/27 subnet are 192.168.5.33-192.168.5.62, with 192.168.5.32 used as the network IP address and 192.168.5.63 used as the broadcast IP address. Therefore, only choice C falls within the usable IP range.

QUESTION NO: 7

The Testking.com network is displayed in the diagram below:



Based on the diagram above, how many collision domains are present in the TestKing.com network??

- A. One
- B. Two
- C. Three
- D. Four
- E. Five
- F. Six
- G. Fourteen

Answer: B

Explanation:

Since hubs are being used for both Ethernet segments, there are a total of two collision domains. Routers do not forward broadcast and are used to segment LANs, so TestKingA consists of one collision domain while TestKingB consists of the second collision domain.

**Design an IP addressing scheme to meet design requirements
(44 questions)****QUESTION NO: 1**

You have the binary number 10011101. Convert it to its decimal and hexadecimal equivalents. (Select two answer choices)

- A. 158
- B. 0x9D
- C. 156
- D. 157
- E. 0x19
- F. 0x9F

Answer: B, D

Explanation:

$10011101 = 128+0+0+16+8+4+0+1 = 157$

For hexadecimal, we break up the binary number 10011101 into the 2 parts:

1001 = 9 and 1101 = 13, this is D in hexadecimal, so the number is 0x9D. We can further verify by taking the hex number 9D and converting it to decimal by taking 16 times 9, and then adding 13 for D ($0x9D = (16 \times 9) + 13 = 157$).

QUESTION NO: 2

The subnet mask on the serial interface of a router is expressed in binary as 11111000 for the last octet. How do you express the binary number 11111000 in decimal?

- A. 210
- B. 224
- C. 240
- D. 248
- E. 252

Answer: D

Explanation:

$128 + 64 + 32 + 16 + 8 = 248$. Since this is the last octet of the interface, the subnet mask would be expressed as a /29.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 559

Incorrect Answers:

- A. The number 210 would be 11010010 in binary.
- B. The number 224 would be 11100000 in binary.
- C. The number 240 would be 11110000 in binary
- E. The number 252 would be 11111100 in binary. This is known as a /30 and is used often in point-point links, since there are only 2 available addresses for use in this subnet.

QUESTION NO: 3

Which one of the binary number ranges shown below corresponds to the value of the first octet in Class B address range?

- A. 10000000-11101111
- B. 11000000-11101111
- C. 10000000-10111111
- D. 10000000-11111111
- E. 11000000-10111111

Answer: C

Explanation:

Class B addresses are in the range 128.0.0.0 through 191.255.255.255.

In binary, the first octet (128 through 191) equates to 10000000-10111111

Incorrect Answers:

- A. Binary 10000000 does equate to 128 but binary 11101111 equates to 239
- B. Binary 11000000 equates to 192 and binary 11101111 equates to 239
- D. Binary 10000000 does equate to 128 but binary 11011111 equates to 223
- E. Binary 11000000 equates to 192 but binary 10111111 does equate to 191

QUESTION NO: 4

How would the number 231 be expressed as a binary number?

- A. 11011011
- B. 11110011
- C. 11100111
- D. 11111001
- E. 11010011

Answer: C

Explanation

Decimal number 231 equates to 11100111 in binary (128+64+32+0+0+4+2+1)

Incorrect Answers:

A: Binary 11011011 equates to 219 (128+64+0+16+8+0+2+1)

B: Binary 11110011 equates to 243 (128+64+32+16+0+0+2+1)

D: Binary 11101011 equates to 249 (128+64+32+16+8+0+0+1)

E: Binary 11010011 equates to 211 (128+64+0+16+0+0+2+1)

QUESTION NO: 5

How would the number 172 be expressed in binary form?

- A. 10010010
- B. 10011001
- C. 10101100
- D. 10101110

Answer: C

Explanation:

10101100 = 128 + 0 + 32 + 0 + 8 + 4 + 0 + 0 = 172

Incorrect Answers:

A. Binary 10010010 = 128+0+0+16+0+0+2+0=146

B. Binary 10011001 = 128+0+0+16+8+0+0+1=153

D. Binary 10101110 = 128+0+32+0+8+4+2+0= 174

QUESTION NO: 6

The MAC address for your PC NIC is: C9-3F-32-B4-DC-19. What is the address of the OUI portion of this NIC card, expressed as a binary number?

- A. 11001100-00111111-00011000
- B. 11000110-11000000-00011111
- C. 11001110-00011111-01100000
- D. 11001001-00111111-00110010
- E. 11001100-01111000-00011000
- F. 11111000-01100111-00011001

Answer: D

Explanation:

The first half of the address identifies the manufacturer of the card. This code, which is assigned to each manufacturer by the IEEE, is called the organizationally unique identifier (OUI). In this example, the OUI is **C9-3F-32**. If we take this number and convert it to decimal form we have:

$$C9 = (12 \times 16) + 9 = 201$$

$$3F = (3 \times 16) + 15 = 63$$

$$32 = (3 \times 16) + 2 = 50$$

So, in decimal we have 201.63.50. If we then convert this to binary, we have:

$$201 = 11001001$$

$$63 = 00111111$$

$$50 = 00110010$$

So the correct answer is D: 11001001-00111111-00110010

QUESTION NO: 7

How do you express the binary number 10110011 in decimal form?

- A. 91
- B. 155
- C. 179
- D. 180
- E. 201
- F. 227

Answer: C

Explanation:

If you arrange the binary number 10110011, against the place value and multiply the values, and add them up, you get the correct answer.

1	0	1	1	0	0	1	1
128	64	32	16	8	4	2	1

$$128 + 0 + 32 + 16 + 0 + 0 + 2 + 1 = 179$$

QUESTION NO: 8

Convert the hex and decimal numbers on the left into binary, and match them to their corresponding slot on the right. (Not all of the hexadecimal and decimal numbers will be used)

F1	10101010
1F	11000000
192 (decimal)	11110001
96 (decimal)	10011111
9F	
F9	
85 (decimal)	
170 (decimal)	

Answer:

10101010	170 (decimal)
11000000	192 (decimal)
11110001	F1
10011111	9F

Explanation:

170 (Decimal) = 10101010
 192 (Decimal) = 11000000
 F1 (241 = Decimal) = 11110001
 9F (159 = Decimal) = 10011111

The following chart displays all of the possible IP address numbers, expressed in decimal, hexadecimal, and binary:

DEC	HEX	BIN	DEC	HEX	BIN	DEC	HEX	BIN
0	00	00000000	43	2B	00101011	86	56	01010110
1	01	00000001	44	2C	00101100	87	57	01010111
2	02	00000010	45	2D	00101101	88	58	01011000
3	03	00000011	46	2E	00101110	89	59	01011001
4	04	00000100	47	2F	00101111	90	5A	01011010
5	05	00000101	48	30	00110000	91	5B	01011011
6	06	00000110	49	31	00110001	92	5C	01011100
7	07	00000111	50	32	00110010	93	5D	01011101
8	08	00001000	51	33	00110011	94	5E	01011110
9	09	00001001	52	34	00110100	95	5F	01011111
10	0A	00001010	53	35	00110101	96	60	01100000
11	0B	00001011	54	36	00110110	97	61	01100001
12	0C	00001100	55	37	00110111	98	62	01100010
13	0D	00001101	56	38	00111000	99	63	01100011
14	0E	00001110	57	39	00111001	100	64	01100100
15	0F	00001111	58	3A	00111010	101	65	01100101
16	10	00010000	59	3B	00111011	102	66	01100110
17	11	00010001	60	3C	00111100	103	67	01100111
18	12	00010010	61	3D	00111101	104	68	01101000
19	13	00010011	62	3E	00111110	105	69	01101001
20	14	00010100	63	3F	00111111	106	6A	01101010
21	15	00010101	64	40	01000000	107	6B	01101011
22	16	00010110	65	41	01000001	108	6C	01101100
23	17	00010111	66	42	01000010	109	6D	01101101
24	18	00011000	67	43	01000011	110	6E	01101110
25	19	00011001	68	44	01000100	111	6F	01101111
26	1A	00011010	69	45	01000101	112	70	01110000
27	1B	00011011	70	46	01000110	113	71	01110001
28	1C	00011100	71	47	01000111	114	72	01110010
29	1D	00011101	72	48	01001000	115	73	01110011
30	1E	00011110	73	49	01001001	116	74	01110100
31	1F	00011111	74	4A	01001010	117	75	01110101
32	20	00100000	75	4B	01001011	118	76	01110110
33	21	00100001	76	4C	01001100	119	77	01110111
34	22	00100010	77	4D	01001101	120	78	01111000
35	23	00100011	78	4E	01001110	121	79	01111001
36	24	00100100	79	4F	01001111	122	7A	01111010
37	25	00100101	80	50	01010000	123	7B	01111011
38	26	00100110	81	51	01010001	124	7C	01111100
39	27	00100111	82	52	01010010	125	7D	01111101
40	28	00101000	83	53	01010011	126	7E	01111110
41	29	00101001	84	54	01010100	127	7F	01111111
42	2A	00101010	85	55	01010101			

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DEC	HEX	BIN	DEC	HEX	BIN	DEC	HEX	BIN
128	80	10000000	171	AB	10101011	214	D6	11010110
129	81	10000001	172	AC	10101100	215	D7	11010111
130	82	10000010	173	AD	10101101	216	D8	11011000
131	83	10000011	174	AE	10101110	217	D9	11011001
132	84	10000100	175	AF	10101111	218	DA	11011010
133	85	10000101	176	B0	10110000	219	DB	11011011
134	86	10000110	177	B1	10110001	220	DC	11011100
135	87	10000111	178	B2	10110010	221	DD	11011101
136	88	10001000	179	B3	10110011	222	DE	11011110
137	89	10001001	180	B4	10110100	223	DF	11011111
138	8A	10001010	181	B5	10110101	224	E0	11100000
139	8B	10001011	182	B6	10110110	225	E1	11100001
140	8C	10001100	183	B7	10110111	226	E2	11100010
141	8D	10001101	184	B8	10111000	227	E3	11100011
142	8E	10001110	185	B9	10111001	228	E4	11100100
143	8F	10001111	186	BA	10111010	229	E5	11100101
144	90	10010000	187	BB	10111011	230	E6	11100110
145	91	10010001	188	BC	10111100	231	E7	11100111
146	92	10010010	189	BD	10111101	232	E8	11101000
147	93	10010011	190	BE	10111110	233	E9	11101001
148	94	10010100	191	BF	10111111	234	EA	11101010
149	95	10010101	192	C0	11000000	235	EB	11101011
150	96	10010110	193	C1	11000001	236	EC	11101100
151	97	10010111	194	C2	11000010	237	ED	11101101
152	98	10011000	195	C3	11000011	238	EE	11101110
153	99	10011001	196	C4	11000100	239	EF	11101111
154	9A	10011010	197	C5	11000101	240	F0	11110000
155	9B	10011011	198	C6	11000110	241	F1	11110001
156	9C	10011100	199	C7	11000111	242	F2	11110010
157	9D	10011101	200	C8	11001000	243	F3	11110011
158	9E	10011110	201	C9	11001001	244	F4	11110100
159	9F	10011111	202	CA	11001010	245	F5	11110101
160	A0	10100000	203	CB	11001011	246	F6	11110110
161	A1	10100001	204	CC	11001100	247	F7	11110111
162	A2	10100010	205	CD	11001101	248	F8	11111000
163	A3	10100011	206	CE	11001110	249	F9	11111001
164	A4	10100100	207	CF	11001111	250	FA	11111010
165	A5	10100101	208	D0	11010000	251	FB	11111011
166	A6	10100110	209	D1	11010001	252	FC	11111100
167	A7	10100111	210	D2	11010010	253	FD	11111101
168	A8	10101000	211	D3	11010011	254	FE	11111110
169	A9	10101001	212	D4	11010100	255	FF	11111111
170	AA	10101010	213	D5	11010101			

QUESTION NO: 9

Which two of the addresses below are available for host addresses on the subnet 192.168.15.19/28? (Select two answer choices)

- A. 192.168.15.17
- B. 192.168.15.14
- C. 192.168.15.29
- D. 192.168.15.16
- E. 192.168.15.31

F. None of the above

Answer: A, C

Explanation:

The network uses a 28bit subnet (255.255.255.240). This means that 4 bits are used for the networks and 4 bits for the hosts. This allows for 14 networks and 14 hosts (2^n-2). The last bit used to make 240 is the 4th bit (16) therefore the first network will be 192.168.15.16. The network will have 16 addresses (but remember that the first address is the network address and the last address is the broadcast address). In other words, the networks will be in increments of 16 beginning at 192.168.15.16/28. The IP address we are given is 192.168.15.19. Therefore the other host addresses must also be on this network. Valid IP addresses for hosts on this network are: 192.168.15.17-192.168.15.30.

Incorrect Answers:

B. This is not a valid address for this particular 28 bit subnet mask. The first network address should be 192.168.15.16.

D. This is the network address.

E. This is the broadcast address for this particular subnet.

QUESTION NO: 10

You have a Class C network, and you need ten subnets. You wish to have as many addresses available for hosts as possible. Which one of the following subnet masks should you use?

- A. 255.255.255.192
- B. 255.255.255.224
- C. 255.255.255.240
- D. 255.255.255.248
- E. None of the above

Answer: C

Explanation:

Using the 2^n-2 formula, we will need to use 4 bits for subnetting, as this will provide for $2^4-2 = 14$ subnets. The subnet mask for 4 bits is then 255.255.255.240.

Incorrect Answers:

A. This will give us only 2 bits for the network mask, which will provide only 2 networks.

B. This will give us 3 bits for the network mask, which will provide for only 6 networks.

D. This will use 5 bits for the network mask, providing 30 networks. However, it will provide for only for 6 host addresses in each network, so C is a better choice.

QUESTION NO: 11

Which of the following is an example of a valid unicast host IP address?

- A. 172.31.128.255/18
- B. 255.255.255.255
- C. 192.168.24.59/30
- D. FFFF.FFFF.FFFF
- E. 224.1.5.2
- F. All of the above

Answer: A

Explanation

The address 172.32.128.255 /18 is 10101100.00100000.10|000000.11111111 in binary, so this is indeed a valid host address.

Incorrect Answers:

- B. This is the all 1's broadcast address.
- C. Although at first glance this answer would appear to be a valid IP address, the /30 means the network mask is 255.255.255.252, and the 192.168.24.59 address is the broadcast address for the 192.168.24.56/30 network.
- D. This is the all 1's broadcast MAC address
- E. This is a multicast IP address.

QUESTION NO: 12

How many subnetworks and hosts are available per subnet if you apply a /28 mask to the 210.10.2.0 class C network?

- A. 30 networks and 6 hosts.
- B. 6 networks and 30 hosts.
- C. 8 networks and 32 hosts.
- D. 32 networks and 18 hosts.
- E. 14 networks and 14 hosts.
- F. None of the above

Answer: E

Explanation:

A 28 bit subnet mask (11111111.11111111.11111111.11110000) applied to a class C network uses a 4 bits for networks, and leaves 4 bits for hosts. Using the 2^n-2 formula, we have 2^4-2 (or $2 \times 2 \times 2 \times 2 - 2$) which gives us 14 for both the number of networks, and the number of hosts.

Incorrect Answers:

- A. This would be the result of a /29 (255.255.255.248) network.
- B. This would be the result of a /27 (255.255.255.224) network.

- C. This is not possible, as we must subtract two from the subnets and hosts for the network and broadcast addresses.
- D. This is not a possible combination of networks and hosts.

QUESTION NO: 13

The TestKing network was assigned the Class C network 199.166.131.0 from the ISP. If the administrator at TestKing were to subnet this class C network using the 255.255.255.224 subnet mask, how many hosts will they be able to support on each subnet?

- A. 14
- B. 16
- C. 30
- D. 32
- E. 62
- F. 64

Answer: C

Explanation:

The subnet mask 255.255.255.224 is a 27 bit mask (11111111.11111111.11111111.11100000). It uses 3 bits from the last octet for the network ID, leaving 5 bits for host addresses. We can calculate the number of hosts supported by this subnet by using the $2^n - 2$ formula where n represents the number of host bits. In this case it will be 5. $2^5 - 2$ gives us 30.

Incorrect Answers:

- A. Subnet mask 255.255.255.240 will give us 14 host addresses.
- B. Subnet mask 255.255.255.240 will give us a total of 16 addresses. However, we must still subtract two addresses (the network address and the broadcast address) to determine the maximum number of hosts the subnet will support.
- D. Subnet mask 255.255.255.224 will give us a total of 32 addresses. However, we must still subtract two addresses (the network address and the broadcast address) to determine the maximum number of hosts the subnet will support.
- E. Subnet mask 255.255.255.192 will give us 62 host addresses.
- F. Subnet mask 255.255.255.192 will give us a total of 64 addresses. However, we must still subtract two addresses (the network address and the broadcast address) to determine the maximum number of hosts the subnet will support.

QUESTION NO: 14

What is the subnet for the host IP address 172.16.210.0/22?

- A. 172.16.42.0

- B. 172.16.107.0
- C. 172.16.208.0
- D. 172.16.252.0
- E. 172.16.254.0
- F. None of the above

Answer: C

Explanation:

This question is much easier than it appears when you convert it to binary and do the Boolean operation as shown below:

IP address 172.16.210.0 =	10101100.00010000.11010010.00000000
/22 mask =	11111111.11111111.11111100.00000000
AND result =	11111111.11111111.11010000.00000000
AND in decimal=	172 . 16 . 208 . 0

QUESTION NO: 15

What is the subnet for the host IP address 201.100.5.68/28?

- A. 201.100.5.0
- B. 201.100.5.32
- C. 201.100.5.64
- D. 201.100.5.65
- E. 201.100.5.31
- F. 201.100.5.1

Answer: C

Explanation:

This question is much easier than it appears when you convert it to binary and do the Boolean operation as shown below:

IP address 201.100.5.68 =	11001001.01100100.00000101.01000100
/28 mask =	11111111.11111111.11111111.11000000
AND result =	11001001.01100100.00000101.01000000
AND in decimal=	200 . 100 . 5 . 64

QUESTION NO: 16

3 addresses are shown in binary form below:

- A. 01100100.00001010.11101011.00100111

- B. 10101100.00010010.10011110.00001111
- C. 11000000.10100111.10110010.01000101

Regarding these three binary addresses in the above exhibit; which statements below are correct? (Select three)

- A. Address C is a public Class C address.
- B. Address C is a private Class C address.
- C. Address B is a public Class B address.
- D. Address A is a public Class A address.
- E. Address B is a private Class B address.
- F. Address A is a private Class A address.

Answer: A, D, E

Explanation:

- A. Address C converts to 192.167.178.69 in decimal, which is a public class C address.
- D. Address A converts to 100.10.235.39, which is a public class A IP address.
- E. Address B converts to 172.18.158.15, which is a private (RFC 1918) IP address.

QUESTION NO: 17

What is the IP address range for the first octet in a class B address, in binary form?

- A. 00000111-10001111
- B. 00000011-10011111
- C. 10000000-10111111
- D. 11000000-11011111
- E. 11100000-11101111
- F. None of the above

Answer: C

Explanation:

The class B address range is 128.0.0.0-191.255.255.255. When looking at the first octet alone, the range is 128-191. The binary number for 128 is 10000000 and the binary number for 191 is 10111111, so the value range is 10000000-10111111.

QUESTION NO: 18

Which one of the binary bit patterns below denotes a Class B address?

- A. 0xxxxxxx
- B. 10xxxxxx

- C. 110xxxxx
- D. 1110xxxx
- E. 11110xxx

Answer: B

Explanation:

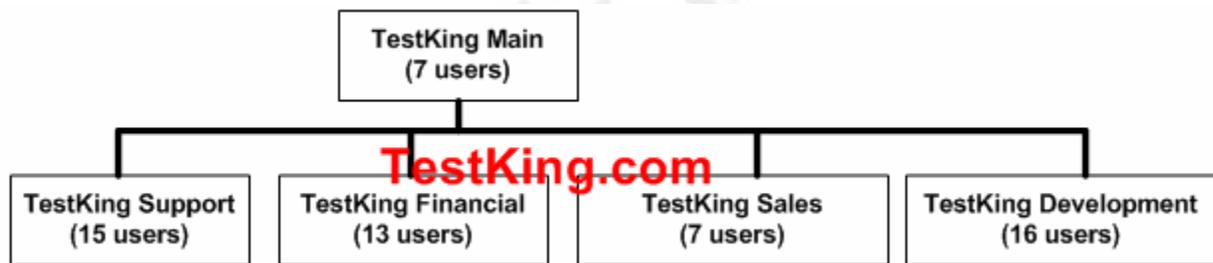
Class B addresses start with a binary of 10. The valid class B range is 128.0.0.0-191.255.255.255.

Incorrect Answers:

- A. Class A addresses start with 0, as they are addresses that are less than 128.
- C. Class C addresses start with 110, for a value of 192.0.0.0-223.255.255.255
- D. Class D addresses start with 1110. They are reserved for multicast use
- E. Class E addresses start with 11110. They are currently reserved for experimental use.

QUESTION NO: 19

The Testking network consists of 5 different departments as shown below:



You are a systems administrator at TestKing and you've just acquired a new Class C IP network. Which of one of the subnet masks below is capable of providing one useful subnet for each of the above departments (support, financial, sales & development) while still allowing enough usable host addresses to meet the needs of each department?

- A. 255.255.255.128
- B. 255.255.255.192
- C. 255.255.255.224
- D. 255.255.255.240
- E. 255.255.255.248
- F. 255.255.255.252

Answer: C

Explanation:

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The network currently consists of 5 subnets. We need to subnet the Class C network into at least 5 subnets. This requires that we use 3 bits for the network address. Using the formula $2^n - 2$ we get 6. This also leaves us with 5 bits for hosts, which gives us 30 hosts.

Incorrect Answers:

- A. Only 1 bit is required to give us 128 but 1 bit gives us 0 subnets.
- 2 bits are required to give us 192 but 2 bits gives us only 2 subnets. This is too few.
- D. 4 bits are required to give us 240. This gives us 14 subnets. However we are left with 4 bits for hosts leaving us with 14 host addresses. Two of the networks require more than 14 hosts so this will not do.
- E. 5 bits are required to give us 248. This gives us 30 subnets. However we are left with 3 bits for hosts leaving us with 6 host addresses. All the networks require more than 6 hosts so this will not do.
- F. 6 bits are required to give us 252. This gives us 62 subnets. However we are left with 2 bits for hosts leaving us with 2 host addresses. This is too few.

QUESTION NO: 20

Your network uses the 172.12.0.0 class B address. You need to support 459 hosts per subnet, while accommodating the maximum number of subnets. Which mask would you use?

- A. 255.255.0.0.
- B. 255.255.128.0.
- C. 255.255.224.0.
- D. 255.255.254.0.

Answer: D

Explanation:

To obtain 459 hosts the number of host bits will be 9. This can support a maximum of 510 hosts. To keep 9 bits for hosts means the last bit in the 3rd octet will be 0. This gives 255.255.254.0 as the subnet mask.

QUESTION NO: 21

Using a subnet mask of 255.255.255.224, which of the IP addresses below can you assign to the hosts on this subnet? (Select all that apply)

- A. 16.23.118.63
- B. 87.45.16.159
- C. 92.11.178.93
- D. 134.178.18.56
- E. 192.168.16.87
- F. 217.168.166.192

Answer: C, D, E

Explanation:

Since the subnet mask is 255.255.255.224, the number of network hosts that is available is 30. Every network boundary will be a multiple of 32. This means that every subnet will be a multiple (0, 32, 64, 96, 128, 160, 192, 224) and the broadcast address for each of these subnets will be one less this number (31, 63, 95, 127, 159, 191, 223). Therefore, any IP address that does not end in one of these numbers will be a valid host IP address.

C. Valid Host in subnetwork 2 (92.11.178.64 to 92.11.178.95)

D. Valid Host in subnetwork 1 (134.178.18.32 to 134.178.18.63)

E. Valid Host in subnetwork 2 (192.168.16.64 to 192.168.16.95)

Incorrect Answers:

A. This will be the broadcast address for the 16.23.118.32/27 network.

B. This will be the broadcast address for the 87.45.16.128/27 network

F. This will be the network address for the 217.168.166.192/27 network.

QUESTION NO: 22

Your ISP has assigned you the following IP address and subnet mask:

IP address: 199.141.27.0

Subnet mask: 255.255.255.240

**Which of the following addresses can be allocated to hosts on the resulting subnet?
(Select all that apply)**

A. 199.141.27.2

B. 199.141.27.175

C. 199.141.27.13

D. 199.141.27.11

E. 199.141.27.208

F. 199.141.27.112

Answer: A, C, D

Explanation:

IP address = 11001000.10001101.00011011.00000000 = 199.141.27.0

Subnet mask = 11111111.11111111.11111111.11110000 = 255.255.255.240

Subnet # = 11001000.10001101.00011011.00000000 = **199.141.27.0**

Broadcast = 11001000.10001101.00011011.00001111 = 199.141.27.15

The valid IP address range = 199.141.27.1 - 199.141.27.14

QUESTION NO: 23

The IP network 210.106.14.0 is subnetted using a /24 mask. How many usable networks and host addresses can be obtained from this?

- A. 1 network with 254 hosts
- B. 4 networks with 128 hosts
- C. 2 networks with 24 hosts
- D. 6 networks with 64 hosts
- E. 8 networks with 36 hosts

Answer: A

Explanation:

A subnet with 24 bits on would be 255.255.255.0. Since this is a class C network, this subnet can have only 1 network and 254 usable hosts.

QUESTION NO: 24

Given that you have a class B IP address network range, which of the subnet masks below will allow for 100 subnets with 500 usable host addresses per subnet?

- A. 255.255.0.0
- B. 255.255.224.0
- C. 255.255.254.0
- D. 255.255.255.0
- E. 255.255.255.224

Answer: C

Explanation:

Using the $2^n - 2$ formula for host addresses, $2^9 - 2 = 510$ host address, so a 9-bit subnet mask will provide the required number of host addresses. If these 9 bits are used for the hosts in a class B network, then the remaining 7 bits are used for the number of networks.

Again using the $2^n - 2$ formula, we have $2^7 - 2 = 126$ networks that are available.

Incorrect Answers:

- A. This will provide for only 1 network with $2^{16} - 2 = 65534$ hosts
- B. This will provide for 6 networks with 8190 host addresses.
- D. This will provide 254 networks and 254 hosts.
- E. This will provide 2046 different networks, but each network will have only 30 hosts.

QUESTION NO: 24

You have a class C network, and you need to design it for 5 usable subnets with each subnet handling a minimum of 18 hosts each. Which of the following network masks should you use?

- A. 225.225.224.0.
- B. 225.225.240.0.
- C. 225.225.255.0.
- D. 255.255.255.224
- E. 225.225.255.240

Answer: D

Explanation:

The default subnet mask for class C network is 255.255.255.0. If one has to create 5 subnets, then 3 bits are required. With 3 bits we can create 6 subnets. The remaining 5 bits are used for Hosts. One can create 30 hosts using 5 bits in host field. This matches with the requirement.

Incorrect Answers:

- A, B. This is an illegal subnet mask for a class C network, as the third octet can not be divided when using a class C network.
- C. This is the default subnet mask for a class C network. It provides for one network, with 254 usable host IP addresses.
- E. This subnet mask will provide for 14 separate networks with 14 hosts each. This does not meet the requirement of a minimum of 18 hosts.

QUESTION NO: 25

The 213.115.77.0 network was subnetted using a /28 subnet mask. How many usable subnets and host addresses per subnet were created as a result of this?

- A. 2 networks with 62 hosts
- B. 6 networks with 30 hosts
- C. 16 networks and 16 hosts
- D. 62 networks and 2 hosts
- E. 14 networks and 14 hosts
- F. None of the above

Answer: E

Explanation:

A class C subnet with a 28 bit mask requires 4 bits for the network address, leaving 4 bits for host addresses. Using the $2^n - 2$ formula ($2^4 - 2$ in this case) we have 14 host addresses and 14 network addresses.

Incorrect Answers:

- A. This would be the result of a /26 network mask
- B. This would be the result of a /27 network mask
- C. Remember we need to always subtract two for the network and broadcast addresses, so this answer is incorrect.
- D. This would be the result of a /30 network mask.

QUESTION NO: 26

The 201.145.32.0 network is subnetted using a /26 mask. How many networks and IP hosts per network exists using this subnet mask?

- A. 4 networks with 64 hosts
- B. 64 networks and 4 hosts
- C. 2 networks and 62 hosts
- D. 62 networks and 2 hosts
- E. 6 network and 30 hosts

Answer: C

Explanation:

A class C network with a 26 bit mask requires 2 bits for the network address, leaving 6 bits for host addresses. Using the $2^n - 2$ formula ($2^2 - 2$ for the network and $2^6 - 2$ for hosts) we have 2 network addresses and 62 host addresses.

Incorrect Answers:

- A, B. This is not a possible combination. No network mask will provide for 64 usable hosts, because we must always subtract 2 for the network and broadcast address.
- D. This would be the result of a /30 mask.
- E. This would be the result of a /27 network mask.

QUESTION NO: 27

You have a class B network with a 255.255.255.0 mask. Which of the statements below are true of this network? (Select all valid answers)

- A. There are 254 usable subnets.
- B. There are 256 usable hosts per subnet.
- C. There are 50 usable subnets.
- D. There are 254 usable hosts per subnet.
- E. There are 24 usable hosts per subnet.
- F. There is one usable network.

Answer: A, D

Explanation

The default subnet mask for Class B is 255.255.0.0. Thus an extra 8 bits have been used for the network portion, leaving 8 for hosts. The $2^n - 2$ formula ($2^8 - 2$ in this case for both the network and IP hosts) gives us 254 networks and 254 hosts per network.

Incorrect Answers:

B. We must remember to always subtract 2 (one for the network, and one for the broadcast) so the result is 254, not 256.

C, E. No possible network mask would give us this exact number of subnets or hosts.

F. This would be true if this were a class C network, not a class B.

QUESTION NO: 28

How many usable IP addresses can you get from a conventional Class C address?

- A. 128
- B. 192
- C. 254
- D. 256
- E. 510

Answer: C

Explanation:

Class C addresses range from 192.0.0.0 through 223.225.225.225 and default subnet mask of 255.255.255.0. In Class C addresses, the first 24 bits are used as for the network ID while only the last 8 bits is used for the host ID. Using the $2^n - 2$ formula, we can calculate that Class C addresses can support a maximum of 254 ($2^8 - 2$) hosts.

Incorrect Answers:

D. Note that the question asked for the number of usable addresses, and not the total number of all addresses. We must subtract 2 for the network and broadcast addresses to calculate the number of usable addresses in any subnet.

QUESTION NO: 29

Your ISP assigned you a full class B address space. From this, you need at least 300 sub-networks that can support at least 50 hosts each. Which of the subnet masks below are capable of satisfying your needs? (Select two).

- A. 255.255.255.0
- B. 255.255.255.128
- C. 255.255.252.0
- D. 255.255.255.224
- E. 255.255.255.192
- F. 255.255.248.0

Answer: B, E

Explanation:

Requirement in the question is that the company needs 300 subnets and 50 hosts per subnet.

Number of Bits in the Host or Subnet Field	Maximum number of Hosts or Subnets ($2^n - 2$)
1	0
2	2
3	6
4	14
5	30
6	62
7	126
8	254
9	510
10	1022
11	2046
12	4094
13	8190
14	16,382

With 9 bits used for the subnet portion, we get 510 subnets and using the remaining 7 bits for the hosts gives us 126 hosts per subnet. The subnet mask will be 255.255.255.128

With 10 bits used for the subnet portion, we get 1022 subnets and then using the remaining 6 bits for hosts provides 62 hosts per subnet. The subnet mask will be 255.255.255.192 in this case which will also fulfill the requirement.

QUESTION NO: 30

Your work PC has the IP address 172.16.209.10 /22. What is the subnet of this address?

- A. 172.16.42.0
- B. 172.16.107.0
- C. 172.16.208.0
- D. 172.16.252.0
- E. 172.16.254.0

Answer: C

Explanation:

172.16.209.10/22 translates to 10101100.00010000.11010001.00001010 in binary form.

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The network portion is 22 bits, so after the logical AND comparison the network address translates to 10101100.00010000.110100001.00001010. Converting the network portion to decimal results in the address 172.16.208.0/22

QUESTION NO: 31

You've been assigned the CIDR (classless inter domain routing) block of 115.64.4.0/22 from your ISP. Which of the IP addresses below can you use for a host? (Select all valid answers)

- A. 115.64.8.32
- B. 115.64.7.64
- C. 115.64.6.255
- D. 115.64.3.255
- E. 115.64.5.128
- F. 115.64.12.128

Answer: B, C, E

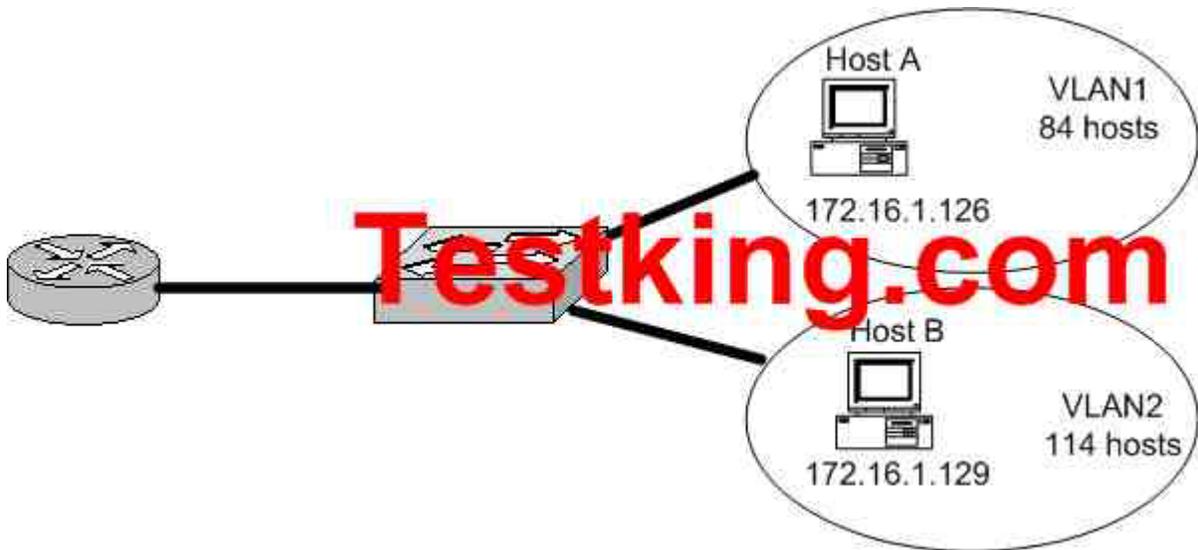
Explanation:

115.64.4.0 = 01110011.01000000.00000100.00000000
 Subnet mask = 11111111.11111111.11111100.00000000 = 255.255.252.0
 Subnet number = 01110011.01000000.00000100.00000000 = 115.64.4.0
 Broadcast = 01110011.01000000.00000111.11111111 = 115.64.7.255

Valid address range = 115.64.4.1 - 115.64.7.254

QUESTION NO: 32

A Testking remote office branch is set up as shown in the diagram below:



All of the hosts in the above exhibit are connected with each other via the single Catalyst switch. Which of the following statements correctly describe the addressing scheme of this network? (Select three)

- A. The subnet mask in use is 255.255.255.192.
- B. The subnet mask in use is 255.255.255.128.
- C. The IP address 172.16.1.25 can be assigned to hosts in VLAN1.
- D. The IP address 172.16.1.205 can be assigned to hosts in VLAN1
- E. The LAN interface of the router is configured with one IP address.
- F. The LAN interface of the router is configured with multiple IP addresses.

Answer: B, C, F

Explanation:

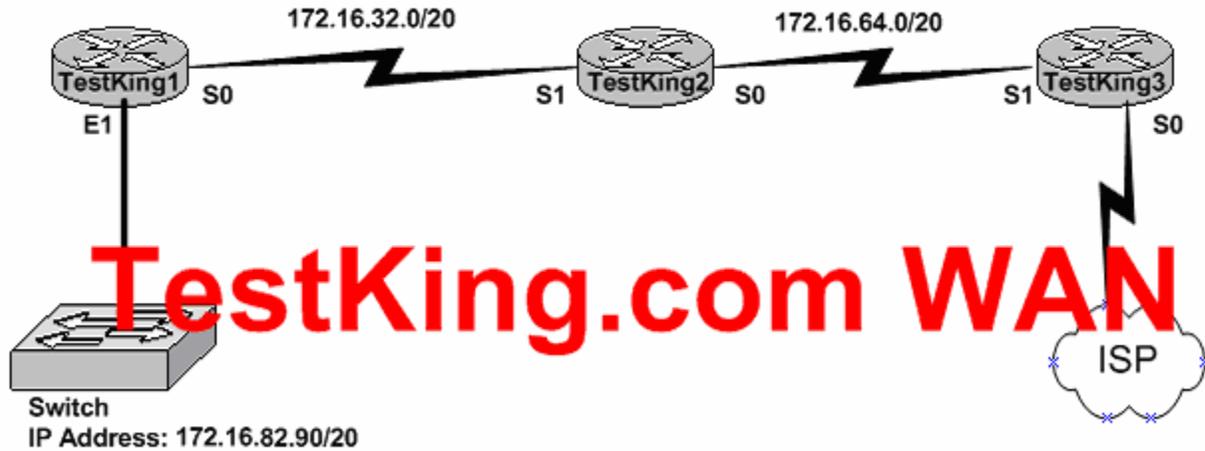
Based on the diagram above, the subnet mask used for each VLAN is 255.255.255.128. This means that hosts in VLAN 1 will be addressed 172.16.1.1-172.16.1.126, with 172.16.1.127 being used as the broadcast address. Hosts in VLAN 2 will be addressed 172.16.1.129-172.16.1.254. Because there is only one LAN interface on the router, sub interfaces will be used, so the router's LAN interface will be configured with 2 IP addresses, one for VLAN 1 and 1 for VLAN 2.

Incorrect Answers:

- A. This subnet mask will only provide 62 host IP addresses, and the diagram shows that as many as 114 host IP addresses are needed.
- D. This IP address can be used in VLAN 2, not VLAN 1.
- E. Since there are 2 subnets in this network, each separate network will require a distinct default gateway IP address, so 2 IP addresses will be required on the LAN interface of the router.

QUESTION NO: 33

The Testking network is shown in the following diagram:



In the above network diagram, what are the broadcast addresses of the subnets?
(Select three)

- A. 172.16.82.255
- B. 172.16.95.255
- C. 172.16.64.255
- D. 172.16.32.255
- E. 172.16.47.255
- F. 172.16.79.255

Answer: B, E, F

Explanation:

The subnets in the network are subnetted Class B addresses. A /20 subnet mask means that the subnet addresses increment by a factor of 16. For example: 172.16.16.0, 172.16.32.0, 172.16.48.0, 172.16.64.0 etc. The broadcast address is the last IP address before the next subnet address.

B. The switch IP address (172.16.82.90) is in the 172.16.80.0 subnet. 172.16.95.255 is the broadcast address for the 172.16.80.0 subnet.

E. This is the broadcast address for the 172.16.32.0 subnet.

F. This is the broadcast address for the 172.16.64.0 subnet.

QUESTION NO: 34

Which one of the following varieties of NAT utilizes different ports to map multiple IP addresses to a single globally registered IP address?

- A. Static NAT

- B. Port loading
- C. NAT Overloading
- D. Dynamic NAT

Answer: C

Explanation:

Port address translation, or NAT overloading, uses transport layer port information to dynamically create NAT entries. This is also known as one to many network address translation.

Incorrect Answers:

- A. Static NAT is known as one to one NAT, and is used to map a single IP address to a single registered IP address. It is often used for servers that need to be accessed via the Internet.
- B, D. This is the incorrect term, and is not used.

QUESTION NO: 35

On the topic of VLSM, which one of the following statements best describes the concept of the route aggregation?

- A. Deleting unusable addresses through the creation of many subnets.
- B. Combining routes to multiple networks into one supernet.
- C. Reclaiming unused space by means of changing the subnet size.
- D. Calculating the available host addresses in the AS.

Answer: B

Explanation:

In the networking world route aggregate means combining routes to multiple networks into one. This is also known as route summarization or supernetting. It is normally used to reduce the number of route entries in the routing table by advertising numerous routes into one larger route.

Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 236.

QUESTION NO: 36

You have a single Class C IP address and a point-to-point serial link that you want to implement VLSM on. Which subnet mask is the most efficient?

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

- D. 255.255.255.252
- E. 255.255.255.254

Answer: D

Explanation:

For a single point to point link, only 2 IP addresses are required, one for the serial interface of the router at each end. Therefore, the 255.255.255.252 subnet mask is often used for these types of links, as no IP addresses are wasted.

QUESTION NO: 37

You have a network that supports VLSM and you need to reduce IP address waste in your point to point WAN links. Which of the masks below would you use?

- A. /38
- B. /30
- C. /27
- D. /23
- E. /18

Answer: B

Explanation:

For a single point to point link, only 2 IP addresses are required, one for the serial interface of the router at each end. Therefore, the 255.255.255.252 subnet mask is often used for these types of links because no IP addresses are wasted. The subnet mask 255.255.255.252 is a /30, so answer B is correct.

Incorrect Answers:

- A. The largest mask that can be used is the single IP host mask, which is /32. It is not possible to use a /38 mask, unless of course IPv6 is being used.
- C, D, E. These masks will provide for a larger number of host addresses, and since only 2 IP addresses are needed for a point to point link, these extra addresses are wasted.

QUESTION NO: 38

How would you express the binary number: 10101010 in its decimal and hexadecimal forms?

- A. Decimal=160, hexadecimal=00
- B. Decimal=170, hexadecimal=AA
- C. Decimal=180, hexadecimal=BB
- D. Decimal=190, hexadecimal=CC

Answer: B

Explanation:

For the binary equivalent of 10101010 to Decimal, the answer is $128+32+8+2=170$.

For the hexadecimal number, we need to break up the binary number into two bytes of 1010 and 1010. Each one in binary is then 10 and 10, which is A and A in hexadecimal.

QUESTION NO: 39

Which of the following IP hosts would be valid for PC users, assuming that a /27 network mask was used for all of the networks? (Choose all that apply.)

- A. 15.234.118.63
- B. 83.121.178.93
- C. 134.178.18.56
- D. 192.168.19.37
- E. 201.45.116.159
- F. 217.63.12.192

Answer: B, C, D

Explanation:

With a 255.255.255.224 network mask, the network boundaries will be a multiple of 32, so any network will have a multiple of 32 (32, 64, 96, 128, 160, 192, 224) in the last octet. If we subtract 1 from each of these numbers (so we have 31, 63, 95, etc), we know that any IP address ending in any of these numbers will be a broadcast address.

Valid Address	Current host range
83.121.178.93	83.121.178.65 to 82.121.178.94
134.178.18.56	134.178.18.33 to 134.178.18.62
192.168.19.37	192.168.19.33 to 192.168.19.62

Incorrect Answers:

- A. This is the broadcast address for the 15.234.118.32/27 network.
- E. This is the broadcast address for the 201.45.116.128/27 network.
- F. This is the network address for the 217.63.12.192/27 network.

QUESTION NO: 40

You are the network administrator at TestKing. TestKing has been provided with the network address 165.100.27.0/24. The TestKing CEO wants to know how many subnetworks this address provides, and how many hosts can be supported on each subnet.

What would your reply be? (Choose all that apply)

- A. One network with 254 hosts.
- B. 254 networks with 254 hosts per network.
- C. 65,534 networks with 255 hosts per network.
- D. 30 networks with 64 hosts per network.
- E. 254 networks with 65,534 per network.

Answer: A

When we have address 165.100.27.0/24 the number of networks is 1 with 254 hosts because this address is already subnetted and valid hosts range are 165.100.27.1-165.100.27.254.

The right answer is A.

If the address is 165.100.0.0/24 then right answer is B.

QUESTION NO: 41

In networks that support VLSM, which network mask should be used for point-to-point WAN links in order to reduce the waste of IP addresses?

- A. /24
- B. /30
- C. /27
- D. /26
- E. /32

Answer: B

Explanation:

The /30 mask translates to 255.255.255.252 and is commonly used for point to point WAN connections. This network mask results in only 2 available IP addresses, but in any point to point WAN connection there are only 2 endpoints so only 2 IP addresses are needed.

QUESTION NO: 42

The Testking network has been divided into 5 separate departments as displayed below:



Using a Class C IP network, which subnet mask will provide one usable subnet per department while allowing enough usable host addresses for each department specified in the graphic?

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

Answer: C

Explanation:

Choice C will provide for 8 separate subnets with 30 usable hosts per subnet. Since we only require 5 different subnets with at most 16 users, this will suffice.

Incorrect Answers:

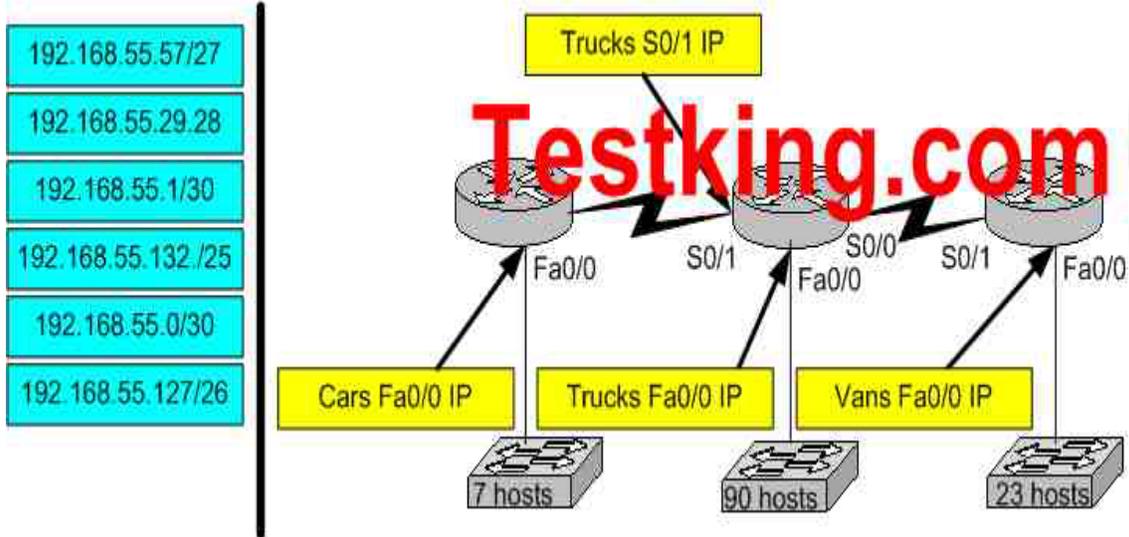
- A. This will only provide 1 network with 254 hosts. This question requires 5 different networks.
- B. This will only provide 4 networks, with 62 hosts per network.
- D. This will provide for 14 networks, but with only 14 hosts per network so there will not be enough hosts for the Production and Engineering LANs.
- E. This will provide for 62 different networks, but each with only 2 usable hosts per network.

QUESTION NO: 43

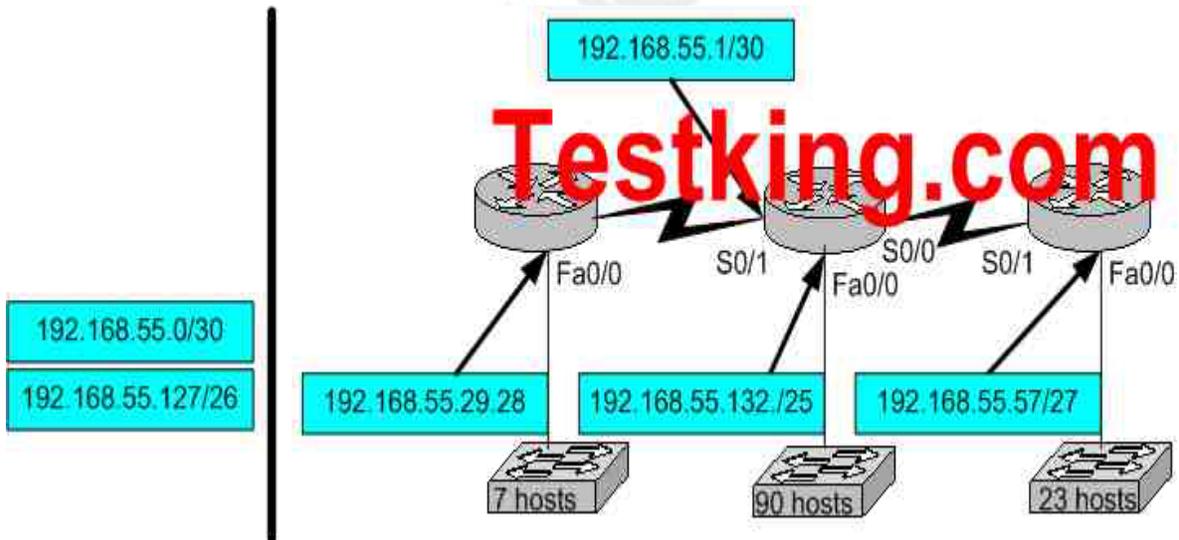
TestKing has three locations and has plans to redesign the network accordingly. The networking team received 192.168.55.0 to use as the addressing for entire network from the administrator. After subnetting the address, the team is ready to assign the address.

The administrator plans to configure ip subnet-zero and use RIP v2 as the routing protocol. As a member of the networking team, you must address the network and at the same time conserve unused addresses for future growth.

Being mindful of these goals, drag the host addresses on the left to the correct router interface. One of the routers is partially configured. Not all of the host addresses on the left will be used.



Answer:



QUESTION NO: 44

You are the network administrator at TestKing. TestKing has been assigned the class C IP address 189.66.1.0 by its Internet Service Provider. If you divide the network range by using the 255.255.255.224 subnet mask, how many hosts can be supported on each network?

- A. 14
- B. 16
- C. 30
- D. 32
- E. 62
- F. 64

Answer: C

Explanation:

The subnet mask 255.255.255.224 is a 27 bit mask (11111111.11111111.11111111.11100000). It uses 3 bits from the host Id for the network ID, leaving 5 bits for host addresses. We can calculate the number of hosts supported by this subnet by using the $2^n - 2$ formula where n represents the number of host bits. In this case it will be 5. $2^5 - 2$ gives us 30.

Incorrect Answers:

- A. Subnet mask 255.255.255.240 will give us 14 host addresses.
- B. Subnet mask 255.255.255.240 will give us a total of 16 addresses. However, we must still subtract two addresses (the network address and the broadcast address) to determine the maximum number of hosts the subnet will support.
- D. Subnet mask 255.255.255.224 will give us a total of 32 addresses. However, we must still subtract two addresses (the network address and the broadcast address) to determine the maximum number of hosts the subnet will support.
- E. Subnet mask 255.255.255.192 will give us 62 host addresses.
- F. Subnet mask 255.255.255.192 will give us a total of 64 addresses. However, we must still subtract two addresses (the network address and the broadcast address) to determine the maximum number of hosts the subnet will support.

Select an appropriate routing protocol based on user requirements (13 questions)

QUESTION NO: 1

When designing OSPF networks; what is the purpose of using a hierarchical design? (Select all choices that apply)

- A. To reduce the complexity of router configuration
- B. To speed up convergence
- C. To confine network instability to single areas of the network
- D. To reduce routing overhead
- E. To lower costs by replacing routers
- F. To decrease latency

Answer: B, C, D

Explanation:

An OSPF network designed in a hierarchical fashion with different areas is used because a small change in the topology of a single area won't force every router to run the SPF algorithm. Changes in one area are limited to that area only, not to every router within the entire network. Confining the topology changes to one area reduces the overhead and speeds the convergence of the network.

Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 194

Incorrect Answers:

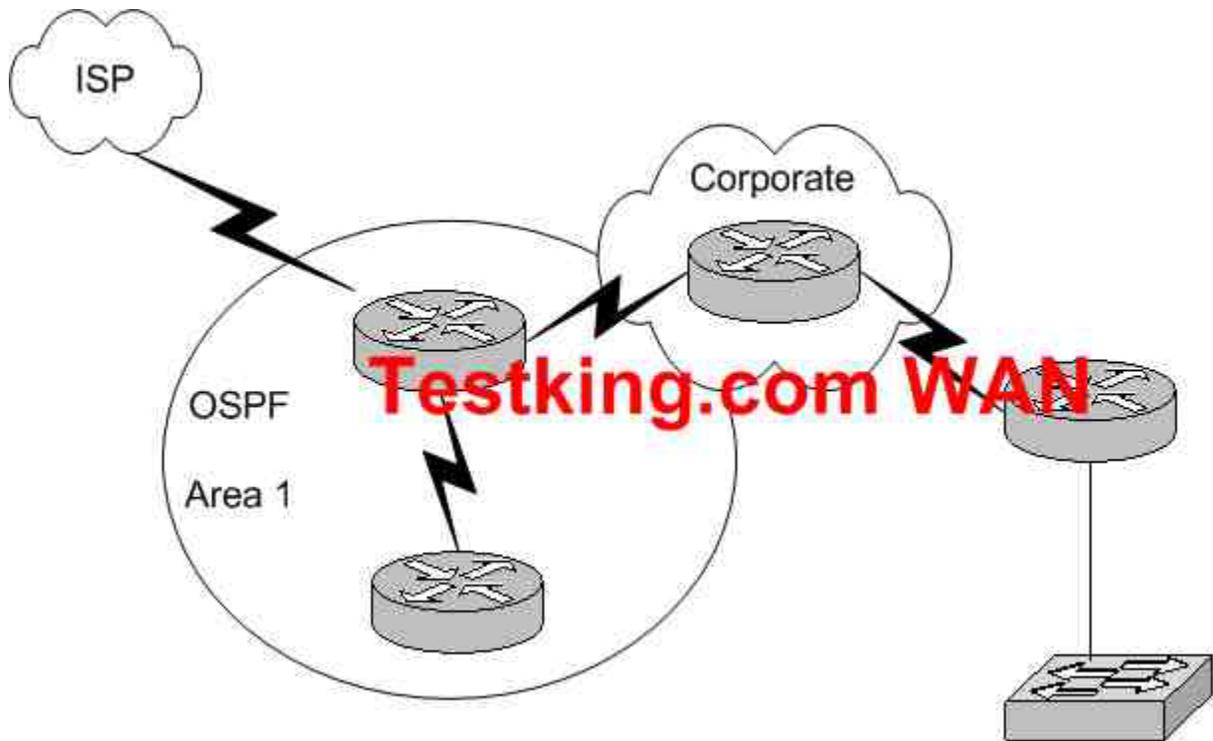
A. This choice is incorrect because a hierarchical design actually adds complexity to the router configuration.

E. This is incorrect because a hierarchical design will not eliminate the need for routers. In fact, segmenting the network into multiple areas may actually require the use of additional routers.

F. The use of a hierarchical design will in no way reduce the latency involved. If additional routers are implemented in order to segment the network into additional areas, then the latency involved may actually increase.

QUESTION NO: 2

The Testking network is shown in the diagram below:



In this diagram, OSPF is used as the routing protocol between the corporate office and the offices on the left side of the diagram. An ISDN link provides connectivity from the central corporate router to the remote sales office on the right side of the diagram. Which type of route should the corporate office use to reach the router on the right side of the diagram if the overhead on the ISDN link is to be kept to a minimum?

- A. A RIP route
- B. An OSPF route
- C. A static route
- D. A default route
- E. A dynamic route
- F. None of the above

Answer: C

Explanation:

A static route uses the least amount of overhead because no routing protocol information will be exchanged over the ISDN link. As long as the ISDN link is up, the static route will always remain in the routing table of the corporate router.

Incorrect Answers:

A. This will not only provide additional overhead on the ISDN link as the RIP information is passed from one side to the other, but it will add additional overhead and complexity to the corporate router because now two routing protocols will need to be

running. With this choice, RIP and OSPF will need to be configured on the corporate router.

B. This will add the overhead of LSP information being passed between the two routers over the ISDN link.

D. Although a default route can be a type of static route, in this case a default route will be a poor choice because then traffic destined to the Internet will go to remote office on the right side, instead of towards the ISP on the left.

E. All dynamic routing protocols will add some level of overhead. Static routes will not increase the traffic level at all over the ISDN link.

QUESTION NO: 3

You are a network administrator and you need to implement a routing protocol on your network that provides:

- Scalability
- VLSM support
- Minimal overhead
- Support for connecting networks using routers of multiple vendors

Which of the following routing protocol would best serve your needs?

- A. VTP
- B. RIP version 1
- C. EIGRP
- D. OSPF
- E. IGRP
- F. CDP

Answer: D

Explanation:

Since one of the requirements is that the routing protocol must support other vendors, our only choices are RIP and OSPF. Since RIP version 1 does not support VLSM, OSPF is the only choice.

Incorrect Answers:

A. VTP is the VLAN Trunking Protocol. This is not a routing protocol.

B. RIP version one does not support VLSM. Note that RIPv2 does support VLSM, and would be a valid choice.

C, E. EIGRP and IGRP are Cisco proprietary routing protocols, and are not supported by other vendors.

F. CDP is the Cisco Discovery Protocol, which is used to exchange information between Cisco devices. It can only be used between Cisco routers and switches, and it is not a routing protocol.

QUESTION NO: 4

You need to configure a single router into load balancing traffic across 4 unequal cost paths. Which routing protocols can satisfy this requirement? (Select two)

- A. RIP v1
- B. RIP v2
- C. IGRP
- D. EIGRP
- E. OSPF
- F. IS-IS

Answer: C, D

Explanation:

In general, load balancing is the capability of a router to distribute traffic over all its network ports that are the same distance from the destination address. Load balancing increases the utilization of network segments, thus increasing effective network bandwidth. There are two types of load balancing: equal cost path and unequal cost path.

Every routing protocol supports equal cost path load balancing. In addition to that, **IGRP and EIGRP also support unequal cost path load balancing, which is known as variance.** The **variance** command instructs the router to include routes with a metric less than **n** times the minimum metric route for that destination, where **n** is the number specified by the **variance** command. The variable **n** can take a value between 1 and 128, with the default being 1, which means equal cost load balancing (**variance<n>** for example). Traffic is also distributed proportionally among unequal cost links, with respect to the metric.

QUESTION NO: 5

You need to choose a routing protocol for a new Testking network. This network will be running IP, IPX, and Appletalk, and you wish to utilize only one routing protocol. Which one would be the best choice?

- A. OSPF
- B. EIGRP
- C. RIP v2
- D. IGRP
- E. RIP v1

Answer: B

Explanation:

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Only EIGRP provides routing protocol support for IP, IPX, and Appletalk networks.

QUESTION NO: 6

Which of the routing protocols shown below support both VLSM and route summarization? (Select three)

- A. IGRP
- B. EIGRP
- C. RIP v1
- D. RIP v2
- E. OSPF
- F. VTP
- G. CDP

Answer: B, D, E

Explanation:

EIGRP and OSPF support Variable Length Subnet Masks (VLSM) and provide for both automatic and manual route summarization configurations. RIPv2 is an enhanced version of RIP, and overcame some of the limitations of RIP by introducing support for VLSM.

Incorrect Answers:

A, C. IGRP and RIP are relatively old and simplistic routing protocols that were developed before the concepts of VLSM and route summarization.

F. VTP is the VLAN Trunking Protocol, used in switched LAN environments to carry VLAN information. It is not a routing protocol.

G. CDP is the Cisco Discovery Protocol, used between neighboring Cisco devices to automatically discover information. It is not a routing protocol.

QUESTION NO: 7

Which of the following routing protocols support the use of VLSM (Variable Length Subnet Masking)? (Select three)

- A. RIPv1
- B. EIGRP
- C. OSPF
- D. IGRP
- E. RIPv2

Answer: B, C, E

Explanation:

Static routing, OSPF, IS-IS, EIGRP, BGP, and RIP version 2 all support VLSM.

Incorrect Answers:

A, D. RIPv1 and IGRP do not support VLSM.

Reference: Sybex CCNA Study Guide edition 4, Page 123

QUESTION NO: 8

Which of the following routing protocols do NOT support VLSM (variable length subnet masking)? (Choose all that apply).

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

Answer: A, B

Explanation:

RIP version 1 and IGRP are classful IP routing protocols. They do not support variable length subnet masks.

Incorrect Answers:

C, D, E, F. Static routing, OSPF, IS-IS, EIGRP, BGP, and RIP version 2 all support VLSM.

QUESTION NO: 9

You need to implement the use of a routing protocol that meets the following requirements:

2. Converges quickly
3. Supports VLSM, CIDR, IP, and IPX.
4. Uses minimal bandwidth for routing updates.

Which one of the following routing protocols would be the best choice?

- A. RIPv1
- B. RIPv2
- C. IGRP
- D. OSPF
- E. EIGRP

Answer: E

Explanation:

EIGRP would be the best choice as it provides support for VLSM and CIDR, has faster convergence times than other protocols, is scalable, and supports IP, IPX, and Appletalk. EIGRP is a Cisco proprietary routing protocol, so it will not work with other vendors. However, the requirements of the question made no mention of the use of non-Cisco routers, so it will not be an issue in this case.

Incorrect Answers:

A, C. Both of these routing protocols do not support VLSM.

B. While RIPv2 supports VLSM, it provides no support for IPX. The IPX RIP protocol is similar in function to RIP version 1. Both versions of RIP are also consume more bandwidth than EIGRP.

D. OSPF does not support IPX.

QUESTION NO: 10

See the WAN diagram below:



Testking has four offices, each with its own network, as shown in the graphic. Three of the networks have approximately 50 hosts each, and one network has 10 hosts. The multi-vendor routers are connected by serial links that use separate subnetwork numbers. The Testking network has leased one Class C address to be used for all networks and serial links, and they do not wish to replace any of their existing routers.

Which routing protocol would be most appropriate for this scenario?

- A. TCP/IP
- B. RIP version 1
- C. RIP version 2

- D. IGRP
- E. EIGRP
- F. All of the above are acceptable

Answer: C

Explanation:

The question describes 2 important requirements. The first is the fact that a routing protocol that supports VLSM is needed, as specified by the fact that one class C address range is to be used for all networks. The second important requirement is that routers from multiple vendors are being used, so the routing protocol chosen must be non-proprietary. RIP version 2 is a standards based routing protocol that supports variable length subnet masking (VLSM).

Incorrect Answers:

- A. This is not a routing protocol.
- B. RIP version 1 does not support VLSM
- D, E. Although these both support VLSM, IGRP and EIGRP are Cisco proprietary routing protocols which are not supported by other router vendors.

QUESTION NO: 11

RIP version 2 is being used as the routing protocol within the Testking network.

What does RIP version 2 use to prevent routing loops? (Choose two)

- A. CIDR
- B. Split horizon
- C. Authentication
- D. Classless masking
- E. Hold-down timers
- F. Multicast routing updates
- G. Path Vectoring

Answer: B, E

Explanation:

Distance Vector routing protocols employ the split horizon mechanism to reduce the possibility of routing loops. Split horizon blocks information about routes from being advertised by a router out of any interface from which that information originated. RIP versions 1 and 2 also use the concept of hold timers. When a destination has become unreachable (or the metric has increased enough to cause poisoning), the destination goes into "holddown". During this state, no new path will be accepted for the same destination for this amount of time. The hold time indicates how long this state should last.

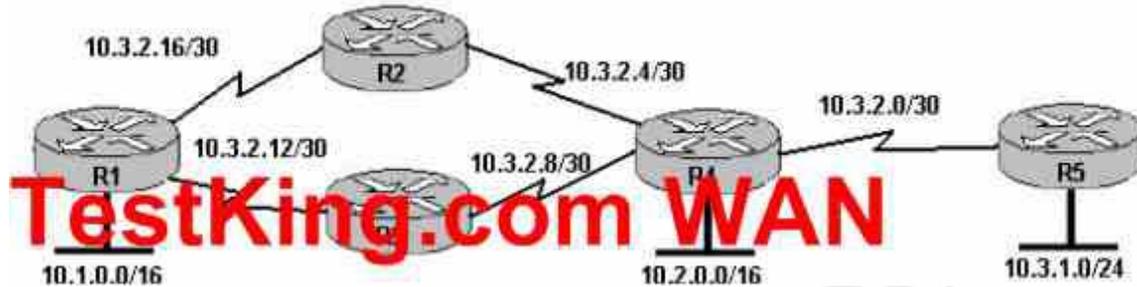
Incorrect Answers:

- A, C, D, F. Although these are all features and functions of RIP version 2, they are not mechanisms used to prevent routing loops.

G. Path Vectoring is a concept used by BGP routers. RIP version 1 and 2 are considered to be distance vector routing protocols.

QUESTION NO: 12

The Testking WAN is displayed in the diagram below:



Based on the information shown above, which routing protocols can be used within the Testking network show in the diagram? (Choose three).

- A. RIP v1
- B. RIP v2
- C. IGRP
- D. OSPF
- E. BGP
- F. EIGRP

Answer: B, D, F

Explanation: the exhibit showed routers with Variable Length Subnet Mask (VLSM), and asked which 3 protocols can be used. 3 protocols that support VLSM are RIP v2, OSPF and EIGRP.

Incorrect Answers:

- A, C. Both of these routing protocols do not support VLSM information.
- E. BGP is used for external routing between different autonomous systems, and is not generally used within a single AS.

QUESTION NO: 13

The Testking Network consists of the following 5 IP networks:

- NETWORK 1: 192.168.10.0/26
- NETWORK 2: 192.168.10.64/27
- NETWORK 3: 192.168.10.96/27
- NETWORK 4: 192.168.10.128/30

NETWORK 5: 192.168.10.132/30

Which of the following routing protocols will support this IP addressing scheme? (Choose all that apply).

- A. RIP version 1
- B. RIP version 2
- C. IGRP
- D. EIGRP
- E. OSPF
- F. BGP

Answer: B, D, E

Explanation:

Because this network is using IP subnets with variable length subnet masks, only routing protocols that support VLSM will fit this particular case. The routing protocols that support VLSM are RIP v2, EIGRP and OSPF.

Incorrect Answers:

A, C. RIP version 1 and IGRP do not support VLSM information within the routing updates.

F. BGP is used for inter-AS routing, such as the Internet. It is not normally used as an Interior routing protocol.

Design a simple internetwork using Cisco technology (7 questions)

QUESTION NO: 1

Which one of the following commands would you enter to terminate a VTY line session?

- A. close
- B. disable
- C. disconnect
- D. suspend
- E. exit
- F. None of the above

Answer: E

Explanation:

A VTY line is a telnet session. To end a telnet session from a remote device, enter the exit or logout command.

Incorrect Answers:

A, B, C, D. These are all invalid commands.

QUESTION NO: 2

You are implementing a new frame relay network to provide connectivity between you offices. To do this, you set up the frame relay network using point-to-point subinterfaces.

Which of the following does NOT need to be configured?

- A. The Frame Relay encapsulation on the physical interface.
- B. The local DLCI on each subinterface.
- C. An IP address on the physical interface.
- D. The subinterface type as point-to-point.

Answer: C

When using point to point subinterfaces in a frame relay network, the subinterfaces will each have their own IP addresses and will each be contained within their own IP subnet. The physical interface does not require an IP address.

Incorrect Answers:

- A. The physical interface will need to be configured with a layer two encapsulation type, so in this case it must be frame relay.
- B. The subinterfaces will have the local DLCI assigned to each one, using the “frame-relay interface-dlci” command for each of the subinterfaces.
- D. Each subinterface should be configured as a point to point network type.

QUESTION NO: 3



After the router interfaces shown in the diagram have been configured, it is discovered that hosts in the Branch LAN cannot access the Internet. Further testing reveals additional connectivity issues. What will fix this problem?

- A. Change the address of the Branch router LAN interface.
- B. Change the address of the Branch router WAN interface.
- C. Change the subnet mask of the HQ router LAN interface.
- D. Change the address of the HQ router LAN interface.
- E. Change the address of the HQ router interface to the Internet.
- F. Change the subnet mask of the HQ router interface to the Internet.

Answer: B

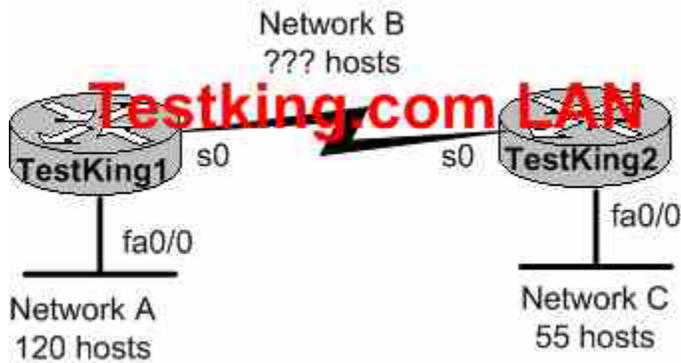
Explanation:

The serial line connection between the Branch office and the HQ office should have interfaces that belong in the same subnet. Based on the diagram above, the WAN interface of the Branch router is configured with an IP address that is in a different IP network than the serial interface of the HQ router. As it is set up currently, no traffic will pass from the Branch router to the HQ until these two interfaces are in the same subnet.

QUESTION NO: 4

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A portion of the Testking network is shown in the diagram below:



Consider the 192.1.1.0/24 network in this exhibit. This network uses RIP v2. Which combination of subnetwork assignments will satisfy the requirements for networks A, B, and C of this design? (Select three)

- A. Network A = 192.1.1.128/25
- B. Network A = 192.1.1.0/25
- C. Network B = 192.1.1.252/30
- D. Network B = 192.1.1.4/30
- E. Network C = 192.1.1.64/26
- F. Network C = 192.1.1.224/27

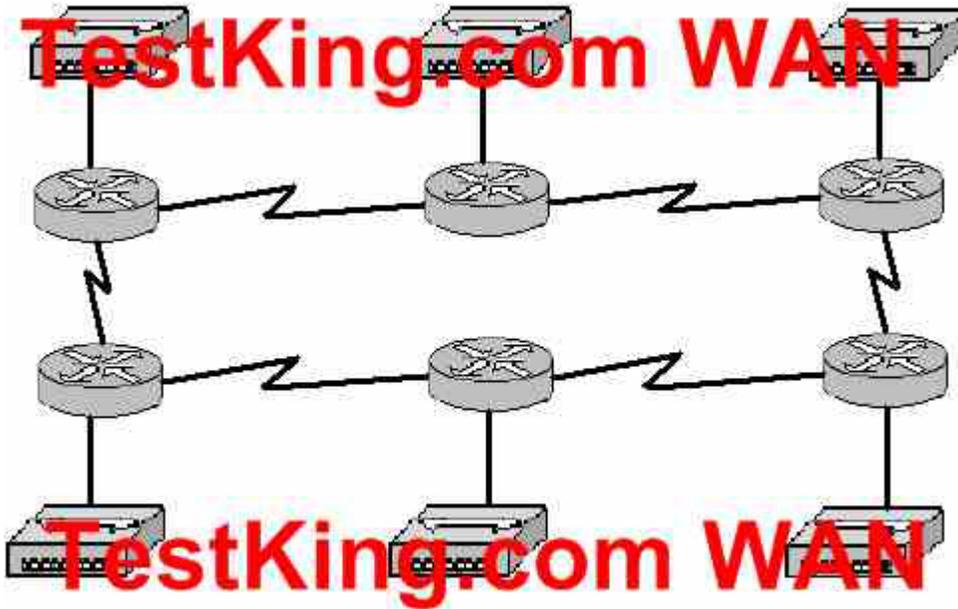
Answer: A, D, E

To properly answer this question, it is best to start from the end, which is network C. Since network C requires at least 55 host addresses, a /26 network must be used. A network mask of /26 will provide for 62 usable IP addresses while a /27 network will only provide for 30 so we must choose E. With choice E taken, hosts within the range of 192.1.1.65-192.1.1.126 will be used.

For network A, both choices A and B are using the correct subnet mask, but we are only limited to choice A since many of the hosts in choice B are already being used in network C. Finally, for network B we are left with choice D since hosts in choice C are already being used by network A.

QUESTION NO: 5

The Testking network topology is displayed in the following diagram:



Assume that RIP v1 is the only routing protocol in use. What is the Maximum number of usable IP address that can be supported on each LAN if the Testking network is using one Class C address block?

- A. 14
- B. 16
- C. 30
- D. 32
- E. 62
- F. 64

Answer: A

Explanation:

RIP version 1 does not support VLSM information, so all networks must have the same subnet mask. In the network above, there are a total of 12 networks (6 LANs and 6 different point to point WAN connections). Therefore, if each of the 12 networks use the 255.255.255.240 subnet mask, there will be a total of 16 networks with 14 usable hosts on each LAN.

Incorrect Answers:

- B. There are only 14 usable IP addresses in the 255.255.255.240 subnet mask, not 16, since we must subtract 2 for the network and broadcast IP addresses.
- C, E. These options will not provide enough separate networks. A total of 12 are required due to the use of a protocol that does not support VLSM.
- D, F. These options omit the fact that we must subtract 2 addresses from the usable range for the network and broadcast IP addresses for each subnet.

QUESTION NO: 6

You are a technician at TestKing. Your newly appointed TestKing trainee wants to know what the CDP is.

What would your reply be? (Choose all that apply.)

- A. It is globally enabled by default on Cisco routers.
- B. It is globally enabled by default on all routers.
- C. It is a proprietary protocol.
- D. It is a non-proprietary protocol.
- E. It can be used to gather hardware and protocol information about neighbor devices.

Answer: A, C, E

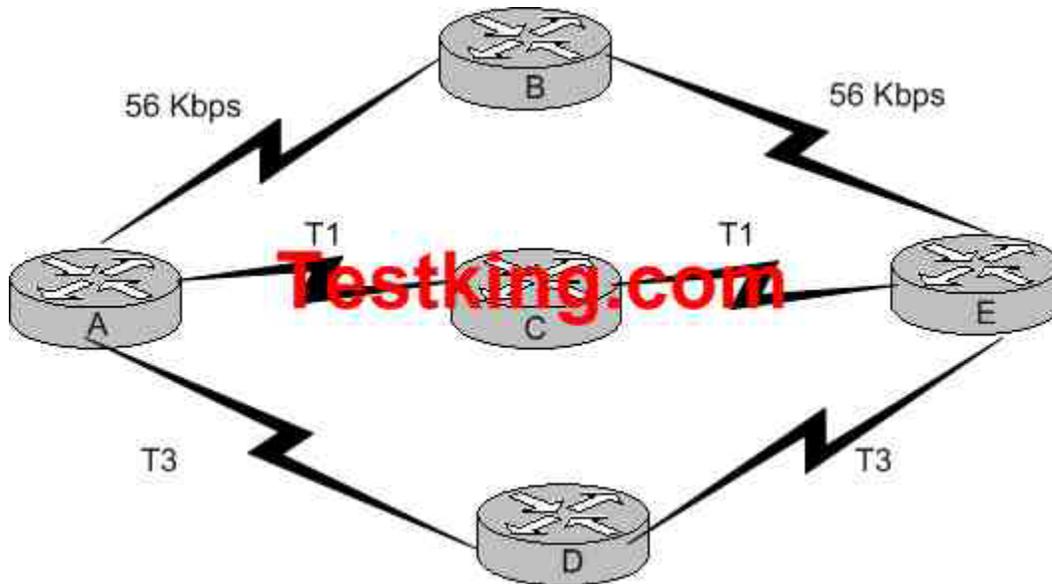
Explanation:

Cisco Discovery Protocol (CDP) is a Cisco proprietary protocol designed to help administrators collect information about local and remote devices. You can use the CDP to gather hardware and protocol information about neighbor devices, which can be useful for troubleshooting and documenting the network.

The CDP discovers basic information about neighboring routers and switches, without needing to know the passwords for the neighboring devices. CDP supports any LAN, HDLC, Frame Relay, and ATM interface- in fact, it supports any interface that supports the use of SNAP headers. The router or switch can discover Layer 2 and layer 3 addressing details of neighboring router without even configuring that Layer 3 protocol – this is because CDP is not dependant on any particular Layer 3 protocol.

QUESTION NO: 7

Five different routers are connected via varying point to point circuit types as displayed below:



Which of the following statements are true regarding how router A will chose a path to router E? (Choose three)

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

Answer: A, D, E

Explanation:

RIP simply uses hop counts as the metric for path determination, so RIP will see all routes as equal in this case. IGRP uses bandwidth and delay, by default, so it will prefer the paths over the T3 links. By default, IGRP routes are always preferred over RIP routes because IGRP has a lower Administrative Distance (AD) than RIP. The AD of IGRP is 100 while the AD of RIP is 120.

Develop an access list to meet user specifications (17 questions)

QUESTION NO: 1

When are packets processed in an inbound access list?

- A. Before they are routed to an outbound interface.
- B. After they are routed for outbound traffic.
- C. After they are routed to an outbound interface while queuing.
- D. Before and after they are routed to an outbound interface.
- E. Depends on the configuration of the interface
- F. None of the above

Answer: A

Explanation:

When a packet is received on an interface with an inbound access list configured, the packets are matched against the access list to determine if they should be permitted or denied. After this check, the packets are processed by the routing function. The access list check is always done first.

Incorrect Answers:

B, C. The packets are always processed by the inbound access list prior to being routed.
D. All packets are always checked against a specific access list only once. While packets traversing through a router may be checked against different access lists for each interface and in each direction (inbound and outbound), each access list is always only consulted once.

QUESTION NO: 2

Which of the following are benefits provided with access control lists (ACLs)? (Select all that apply)

- A. ACLs monitor the number of bytes and packets.
- B. Virus detection.
- C. ACLs identify interesting traffic for DDR.
- D. ACLs provide IP route filtering.
- E. ACLs provide high network availability.
- F. ACLs classify and organize network traffic.

Answer: C, D

Explanation:

IP access control lists allow a router to discard some packets based on criteria defined by the network engineer. The goal of these filters is to prevent unwanted traffic in the network – whether to prevent hackers from penetrating the network or just to prevent employees from using systems they should not be using.

IP access lists can also be used to filter routing updates, to match packets for prioritization, to match packets for VPN tunneling, and to match packets for implementing quality of service features. It is also used to specify the interesting traffic, which is used to trigger ISDN and Dial on Demand Routing (DDR) calls.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 427

Incorrect Answers:

A, F. ACLs do not provide for management and traffic analysis functions such as the monitoring and organization of network packets.

B. While ACLs can be used to filter out some unwanted traffic; they can not be used to routinely provide for virus detection and removal.

E. ACLs alone do not provide for any additional level of network availability.

QUESTION NO: 3

On the exhibit below, match the access list conditions on the left side with the corresponding design goal on the right side. (Not all the conditions will be used)

Select all from here, access List Condition

deny icmp any 192.168.47.5 0.0.0.0
permit ip 192.168.45.32 0.0.0.31 192.168.47.32 0.0.0.15
deny icmp any 192.168.47.5 0.0.0.31
permit tcp any 192.168.47.4 0.0.0.0 eq 80
permit tcp 192.168.47.4 0.0.0.0 any eq
deny ip any 192.168.47.32 0.0.0.15

Place here

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place here

Design Goals

Allow all web access to server 192.168.47.4
Block all IP access to subnet 192.168.47.32/28
Block all ping messages only to server 192.168.47.5/27
Allow access from subnet 192.168.45.32/27 to subnet 192.168.47.32/28

Answer:

Select all from here, access List Condition

deny icmp any 192.168.47.5 0.0.0.0

permit tcp 192.168.47.4 0.0.0.0 any eq

Place here

permit tcp any 192.168.47.4 0.0.0.0 eq 80

deny ip any 192.168.47.32 0.0.0.15

deny icmp any 192.168.47.5 0.0.0.31

permit ip 192.168.45.32 0.0.0.31 192.168.47.32 0.0.0.15

Design Goals

Allow all web access to server 192.168.47.4

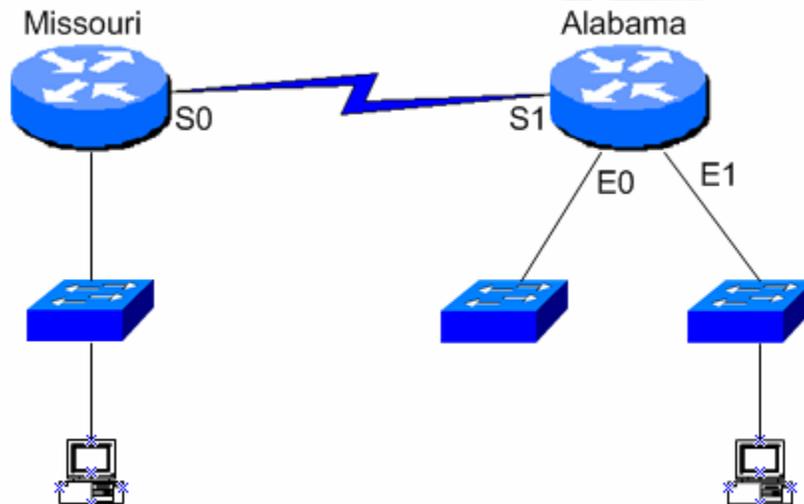
Block all IP access to subnet 192.168.47.32/28

Block all ping messages only to server 192.168.47.5/27

Allow access from subnet 192.168.45.32/27 to subnet 192.168.47.32/28

QUESTION NO: 4

The Testking network consists of the Missouri and Alabama routers as shown below:



You are a network administrator of a large corporation situated in the United States.

The network interfaces are:

Missouri: e0 – 192.168.35.17/28; s0- 192.168.35.33/28;

Alabama: e0- 192.168.35.49/28 e1 – 192.168.35.65/28, s1 -192.168.35.34/28.

The address of the accounting server is:

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Accounting Server: 192.168.35.66/28.

With your mouse; drag the access list conditions on the left with their corresponding objectives on the right. (Please note: Not all of the options on the left are going to be used.)

deny ip 192.168.35.35 0.0.0.0 host 192.168.35.66	Block only the users attached to the e0 interface of the Missouri router from access to the accounting server.
deny ip 192.168.35.16 0.0.0.15 host 192.168.35.66	Block a user from the Alabama e0 network from access to the accounting server.
permit ip any any	Prevent all users from outside the enterprise network from accessing the accounting server.
permit ip 192.168.35.0 0.0.0.255 host 192.168.35.66	

Answer:

Block only the users attached to the e0 interface of the Missouri router from access to the accounting server.	deny ip 192.168.35.16 0.0.0.15 host 192.168.35.66
Block a user from the Alabama e0 network from access to the accounting server.	deny ip 192.168.35.35 0.0.0.0 host 192.168.35.66
Prevent all users from outside the enterprise network from accessing the accounting server.	permit ip 192.168.35.0 0.0.0.255 host 192.168.35.66
permit ip any any	

QUESTION NO: 5

Choose the correct access list statements form the left and drag them to their corresponding IP address on the right. (Not all the access list statements are used.)

access-list 2 deny 172.26.48.0 0.0.15.255
 access-list 3 deny 172.26.64.0 0.0.31.255
 access-list 4 deny 172.26.128.0 0.0.31.255
 access-list 5 deny 172.26.192.0 0.0.31.254
 access-list 6 deny 172.26.192.1 0.0.31.254

172.26.92.10	Place here
172.26.198.94	Place here
172.26.50.173	Place here
172.26.144.17	Place here

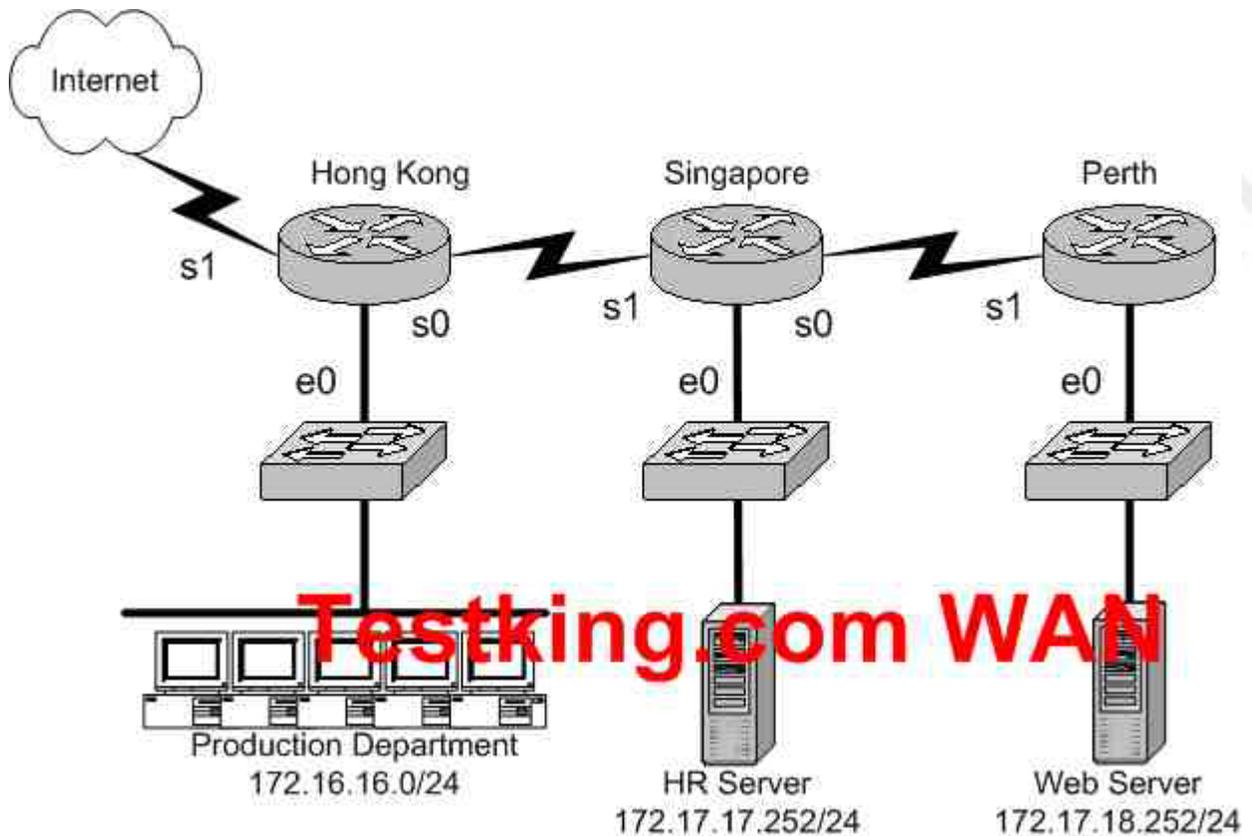
Answer:

172.26.92.10	access-list 3 deny 172.26.64.0 0.0.31.255
172.26.198.94	access-list 6 deny 172.26.192.1 0.0.31.254
172.26.50.173	access-list 2 deny 172.26.48.0 0.0.15.255
172.26.144.17	access-list 4 deny 172.26.128.0 0.0.31.255

access-list 5 deny 172.26.192.0 0.0.31.254

QUESTION NO: 6

The Testking worldwide WAN is shown in the exhibit below:



On the Hong Kong router an access list is needed that will accomplish the following:

1. Allow a Telnet connection to the HR Server through the Internet
2. Allow internet HTTP traffic to access the webserver
3. Block any other traffic from the internet to everything else

Which of the following access list statements are capable of accomplishing these three goals? (Select all that apply)

- A. access-list 101 permit tcp any 172.17.18.252 0.0.0.0 eq 80
- B. access-list 1 permit tcp any 172.17.17.252 0.0.0.0 eq 23
- C. access-list 101 permit tcp 172.17.17.252 0.0.0.0 any eq 23
- D. access-list 101 deny tcp any 172.17.17.252 0.0.0.0 eq 23
- E. access-list 101 deny tcp any 172.17.18.252 0.0.0.0 eq 80
- F. access-list 101 permit tcp any 172.17.17.252 0.0.0.0 eq 23

Answer: A, F

Explanation:

Because of the implicit deny rule at the end of every access list, only two choices need to be made, as the final requirement is automatic.

A. This is correct as we need to allow the access list to allow port 80 connections (port 80 = HTTP) from anywhere, to the web server's IP address.

F. This will fulfill the first requirement, as it allows port 23 (Telnet) traffic from anywhere.

Incorrect Answers:

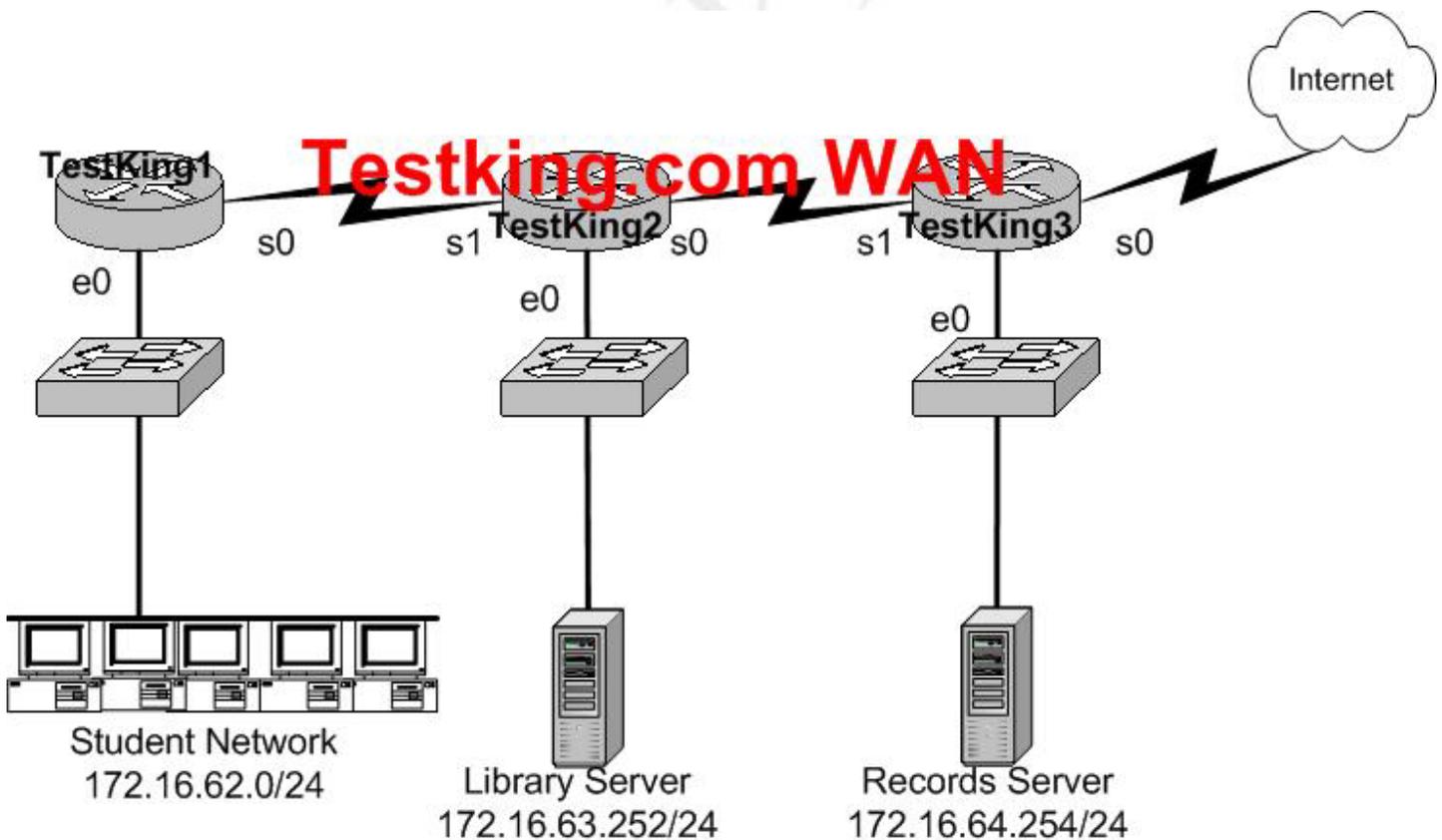
B. The answer asks you to create an access list, a single one. The answer choices require you to choose two answers. For two statements to be on the same list, you need them to have the same number. So answer choice B can be ruled out by process of elimination. In addition to this, access list 1 is an illegal number, since we need an extended access list to use source and destination information, and extended access lists are in the 100-199 range.

C. This is incorrect as it allows telnet traffic from the HR server to the Internet, but we need it to be the other way around.

D, E. Because of the implicit deny any rule, we need to only be concerned with the access rules that permit traffic.

QUESTION NO: 7

The Testking University network is shown below:



In the above network, an access list was created in order to prevent students and outsiders on the internet from changing student files in the Records Server, while still allowing other departments in the enterprise access. The access control list was applied to the e0 interface of the TestKing 3 router going outbound. Which two of the following conditions below were contained in the access control list? (Select two answer choices)

- A. permit 172.16.64.254 0.0.0.0 172.16.0.0 0.0.255.255
- B. permit 172.16.0.0 0.0.255.255 172.16.64.254 0.0.0.0
- C. deny 172.16.64.254 0.0.0.0 172.16.62.0 0.0.0.255
- D. deny 172.16.62.0 0.0.0.255 172.16.64.254 0.0.0.0
- E. deny 172.16.64.254 0.0.0.0 any
- F. permit any any

Answer: B, D

Explanation:

Answer choice B and D together will specifically deny the students and the internet from accessing the Records Server, while still allowing access to the Library Server. It is important to note that the rules in any access list are consulted in order. Because of this, the actual access list used in this case would need to have choice D first, and then choice B. If this was not done, then traffic coming from the students would be first allowed, before the rule denying them was consulted. The rule to prevent traffic from the Internet to the records server is handled by the implicit deny any rule.

QUESTION NO: 8

Which one of the access control list statements below will deny all telnet connections to subnet 10.10.1.0/24?

- A. access-list 15 deny telnet any 10.10.1.0 0.0.0.255 eq 23
- B. access-list 115 deny udp any 10.10.1.0 eq telnet
- C. access-list 15 deny tcp 10.10.1.0 255.255.255.0 eq telnet
- D. access-list 115 deny tcp any 10.10.1.0 0.0.0.255 eq 23
- E. access-list 15 deny udp any 10.10.1.0 255.255.255.0 eq 23

Answer: D

Explanation:

Telnet uses port TCP port 23. Since we are using source and destination IP address information, an extended access list is required. Extended access lists are access lists in the 100-199 range.

Incorrect Answers:

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- A, C, E. These access lists are numbered 15. Standard access lists are numbered 1-99, and in this case an extended access list is required.
- B. This access list specifies UDP port 23, and TCP port 23 is the port used by telnet.

QUESTION NO: 9

Which of the following answer choices are correct characteristics of named access list? (Select all that apply)

- A. You can delete individual statements in a named access list
- B. Named access lists require a numbered range from 1000 to 1099.
- C. Named access lists must be specified as standard or extended.
- D. You can use the **ip access-list** command to create named access lists.
- E. You cannot delete individual statements in a named access list.
- F. You can use the **ip name-group** command to apply named access lists.

Answer: A, C, D

Explanation:

Named access lists have two advantages over numbered access lists: the first one being that a name is easier to remember and the second being the fact that you can delete individual statements in a named access list. That makes A correct.

When you create a named access list you use the `ip access-list` command, and you have to specify whether it's standard or extended (since there are no numbers). So C and D are both correct. An example from the textbook is the command, "`ip access-list extended Barney`"

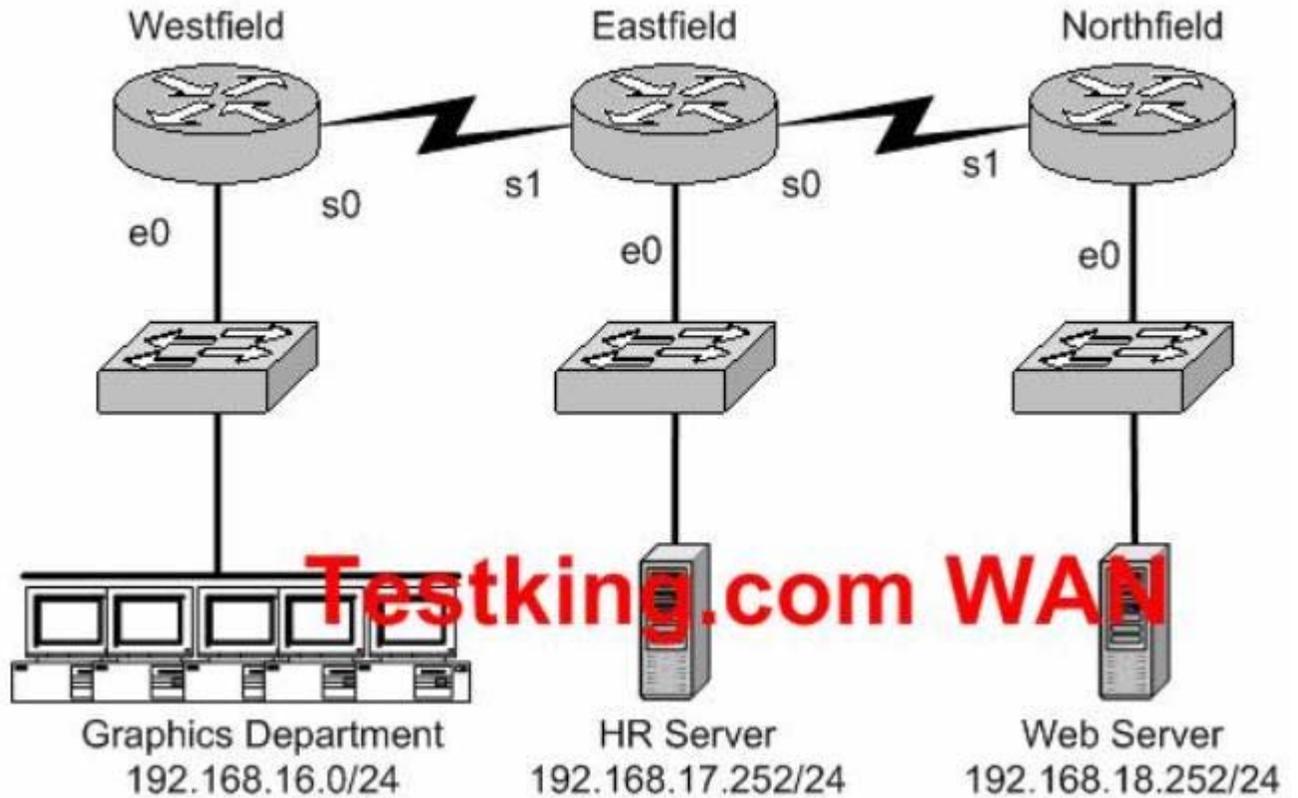
Incorrect Answers:

- B. Named access lists don't require a number range from 1000 to 1099 so B is incorrect.
- E. Answer choice E is not true.
- F. This is incorrect because the command `ip name-group` is absolutely unnecessary.

Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Pages 443-445

QUESTION NO: 10

The Testking WAN is displayed below:



An access list needs to be implemented that will block users from the Graphics Department from Telnetting to the HR server; and this list is to be implemented on the Ethernet 0 interface of the Westfield router for the inbound direction. All other office communications should be allowed. Which of the following answer choices would accomplish this?

- A. deny tcp 192.168.16.0 0.0.0.255 192.168.17.252 0.0.0.0 eq 23
permit ip any any
- B. permit ip any any
deny tcp 192.168.16.0 0.0.0.255 192.172.252 0.0.0.0 eq 23
- C. permit ip any any
deny tcp 192.168.17.252 0.0.0.0 192.168.0 0.0.0.255 eq 23
- D. deny tcp 192.168.18.262 0.0.0.0 192.168.16.0 0.0.0.255 eq 23
permit ip any any

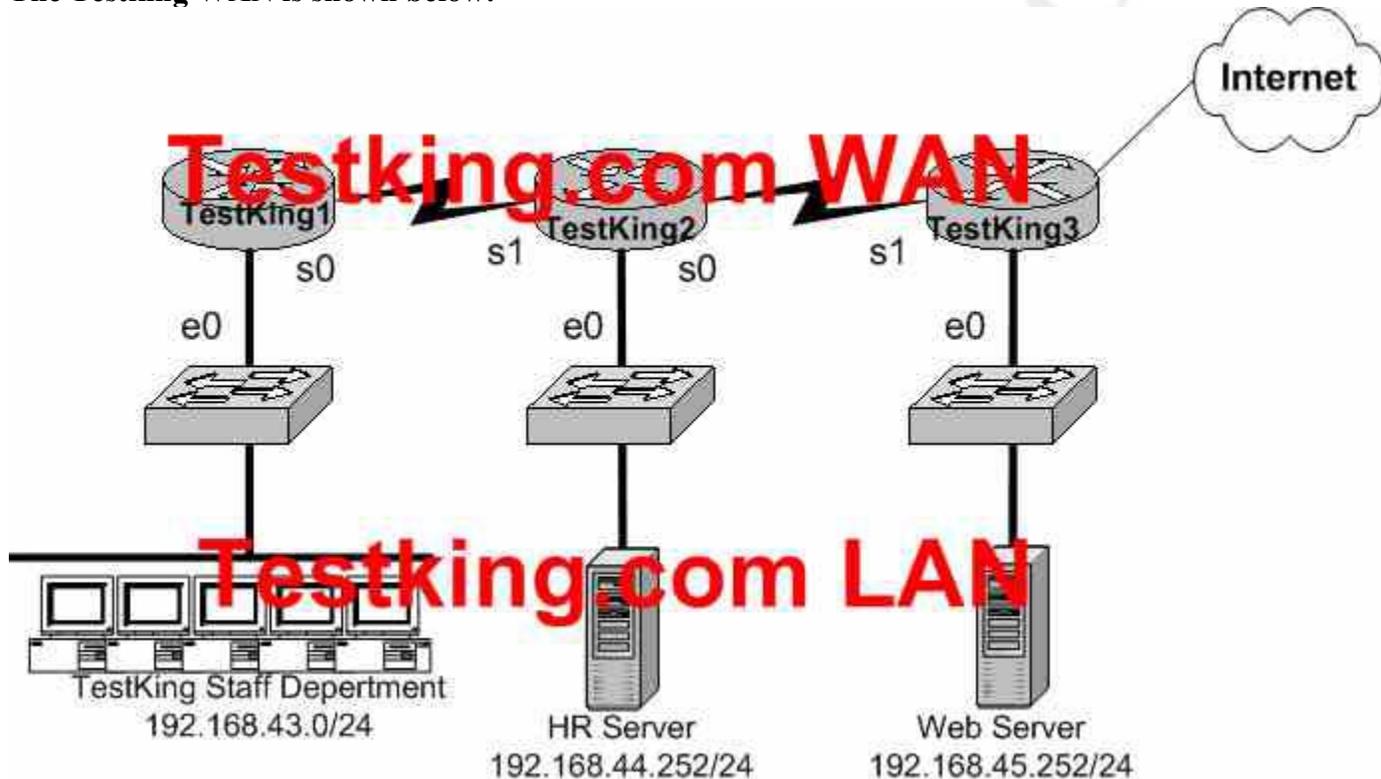
Answer: A

Explanation:

The syntax for an access list is the source address first then the destination address. In this case the source address is 192.168.16.0/24 and the destination address 192.168.17.252. The “permit ip any any” statement is required because of the implicit deny all at the end of every access list. Generally speaking, all access lists require at least one permit statement, otherwise all traffic will be denied through the interface.

QUESTION NO: 11

The Testking WAN is shown below:



Your goal is to allow FTP access to the HR server from the internet, while blocking out all other traffic. Which of the access list configurations below will fulfill your goal? (Select two answer choices)

- A. Access-list 101 Permit tcp any 192.168.44.252 0.0.0.0 eq 21
- B. Access-list 101 Permit tcp any 192.168.44.252 0.0.0.0 eq 20
- C. Access-list 101 Permit tcp 192.168.44.252 0.0.0.0 any eq 20
- D. Access-list 101 Permit tcp 192.168.44.252 0.0.0.0 any eq 21
- E. Access-list 101 Deny tcp any 192.168.44.255 0.0.0.0 gt 21
- F. Access-list 101 Permit tcp 192.168.44.255 0.0.0.0 any gt 21

Answer: A, B

Explanation:

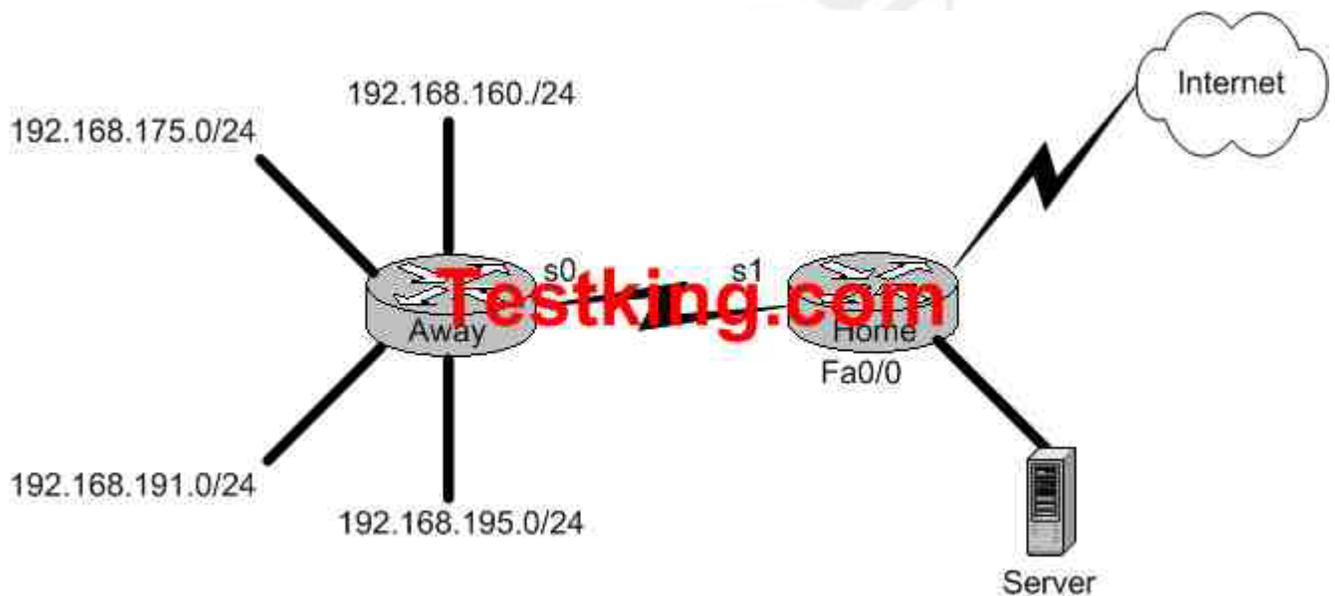
FTP uses two ports: TCP port 20 and TCP port 21. A and B allows all hosts to access the HR server through ftp and the implicit deny any rule will block everything else.

Incorrect Answers:

C, D. These two choices have the source and destination networks switched around. These two lists combined together will permit all FTP traffic sourced from the HR server and destined to the Internet. In this case, however, we wish to have an access list permitting FTP sourced from the Internet and destined to the HR server.
E, F. The gt denotes “greater than”, meaning that all TCP packets greater than port 21 will match the access list. This is not the desired result for this question.

QUESTION NO: 12

The Testking Network is displayed in the flowing diagram:



You need to place an access list on the Fa0 interface of the Home router; that will deny access to all hosts that lie within the range 192.168.160.0-192.168.191.0. Hosts in the 192.168.195.0 network should be granted full access. Which one of the following answer choices fulfills your needs?

- A. access-list 1 deny 192.168.163.0 0.0.0.255
- B. access-list 1 deny 192.168.128.0 0.0.127.255
- C. access-list 1 deny 192.168.0.0 0.0.255.255
- D. access-list 1 deny 192.168.0.0 0.0.31.255

Answer: D

Explanation:

This question is really more of an inverse subnet masking questions than a security question. Your goal is to block access to the host range 192.168.160.0- 192.168.191.0 while allowing everything else (including hosts from 192.168.195.0) full access. Answer choice D is correct because the address and mask are numbered correctly.

QUESTION NO: 13

Which of the following access list statements would deny traffic from a specific host?

- A. Router(config)# **access-list 1 deny 172.31.212.74 any**
- B. Router(config)# **access-list 1 deny 10.6.111.48 host**
- C. Router(config)# **access-list 1 deny 172.16.4.13 0.0.0.0**
- D. Router(config)# **access-list 1 deny 192.168.14.132 255.255.255.0**
- E. Router(config)# **access-list 1 deny 192.168.166.127 255.255.255.255**

Answer: C

Explanation:

Only choice C is the correct syntax for a specific host. The access list is denying all traffic from the host with IP address 172.16.4.13. It is important to note that in an access list, the subnet mask is the inverse. Normally, a host subnet mask is 255.255.255.255, but in an access list it is 0.0.0.0.

Incorrect Answers:

- A. The syntax is incorrect here, as there is no subnet mask at all specified.
- B. This would be an acceptable choice, if the “host” keyword were placed in front of the IP address, not after.
- D. The subnet mask here includes the entire class C network here, not an individual host.
- E. In an access list, the subnet mask is an inverse mask. The mask specified here would be equivalent to all 0’s in a subnet mask, meaning that the don’t care bits apply to the entire address.

QUESTION NO: 14

Which IP address and wildcard mask would you use in your ACL to block all the hosts in the subnet 192.168.16.43/28?

- A. 192.168.16.32 0.0.0.16
- B. 192.168.16.43 0.0.0.212
- C. 192.168.16.0 0.0.0.15
- D. 192.168.16.32 0.0.0.15
- E. 192.168.16.0 0.0.0.31

F. 192.168.16.16 0.0.0.31

Answer: D

Explanation:

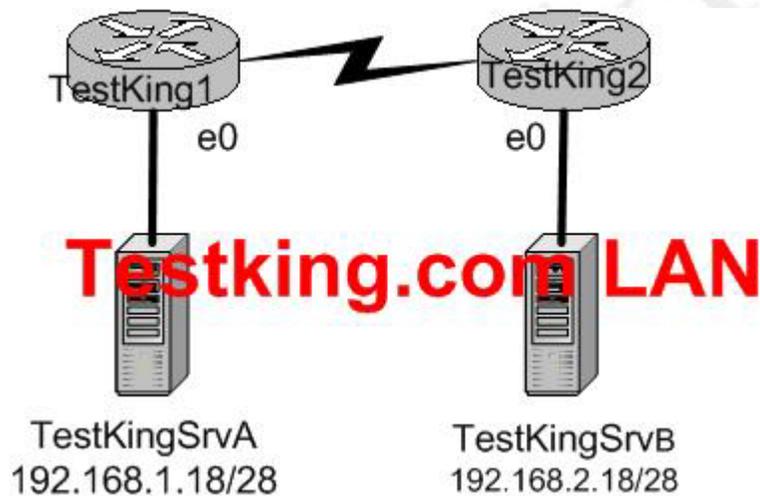
Since there are 28 bits in the subnet mask, we can find the inverse mask by reversing the 1's and 0's.

/28 = 11111111.11111111.11111111.11110000
 /28 Inverse = 00000000.00000000.00000000.00001111 = **192.168.16.32/15**

The address 192.168.16.32 and the wildcard mask 0.0.0.15 is the correct answer as shown. This will match all addresses in the 192.168.16.32-192.168.16.47 range.

QUESTION NO: 15

Study the following exhibit:



In order to control access on the TestKing network, the following access list is created:

```
access-list 101 permit tcp 192.168.1.16 0.0.0.15 192.168.2.16
0.0.0.15 eq 23
```

What would happen if you applied the following ACL to any one of the TestKing routers in the above exhibit? On what interface and what direction should you apply it? Once applied, what will this access list accomplish? (Select all valid answer choices)

- A. Telnet traffic from 192.168.1.16 0.0.0.15 to 168.2.16 0.0.0.15 is allowed.
- B. SMTP traffic from 192.168.1.16 0.0.0.15 to 168.2.16 0.0.0.15 is allowed.
- C. The ACL is configured to allow traffic from one specific host to another.
- D. The ACL should be applied inbound to the e0 interface of Router TestKing1.
- E. The ACL should be applied outbound to the e0 interface of Router TestKing1.

Answer: A, D

Explanation:

This is a two part question. The first part is the type of traffic that will match this specific access list entry. Since telnet uses TCP port 23, choice B is correct.

Next, to determine which interface and which direction to apply the access list, we see that the source of the traffic is the 192.168.1.16/28 network, while the destination is the 192.168.2.16/28 network. Therefore, only choice D makes sense.

Incorrect Answers:

B. SMTP uses TCP port 25.

C. There is a /15 network mask for both the source and destination in this access list, which translates to a /28 network.

E. This would not be useful if applied to the outbound, as no traffic would match then. Note that if this answer had stated that the access list be placed on the outbound serial (WAN) interface, then this would have been an acceptable choice.

QUESTION NO: 16

A standard IP access list is applied to an Ethernet interface of a router. What does this standard access list filter on?

- A. The source and destination addresses
- B. The destination port number
- C. The destination address
- D. The source address
- E. All of the above

Answer: D

Explanation:

The standard IP access-list will only filter on the source address contained in the packet. Extended access lists can filter on the source and destination address and port information.

QUESTION NO: 17

The TestKing network is subnetted using 29 Bits for the subnet mask. Which wild card mask should be used to configure an extended access list to permit or deny access to an entire subnetwork?

- A. 255.255.255.224
- B. 255.255.255.248
- C. 0.0.0.224
- D. 0.0.0.8
- E. 0.0.0.7
- F. 0.0.0.3

Answer: E

Explanation:

Wild card masks start with 0.0.0.x. The subnet used in this example is 29 bits, or subnet mask 255.255.255.248. Therefore, we are left with 7 hosts in the final octet (255-248) so the answer is 0.0.0.7.

Choose WAN services to meet customer requirements (10 questions)

QUESTION NO: 1

The Testking Corporation consists of the head office in New York with its regional offices in: Chicago, Detroit, Philadelphia, Toronto, and Atlanta. These offices need to be connected in a WAN, and Testking wishes to do this via a hub and spoke arrangement that will utilize packet-switched technology.

Which one of the WAN technologies below would be the best choice for Testking?

- A. ISDN
- B. Wireless
- C. Frame Relay
- D. T1 leased line
- E. ATM
- F. VPN

Answer: C

Explanation:

To provide efficient IP multicast support in Frame Relay networks, the underlying Frame Relay network architecture should be designed in a "hub and spoke" topology (hierarchical topology). The hub and spoke topology is also named a "star" topology, because the central hub acts as the center of a star and the connections to the remote sites act as light radiating from the star. In the hub and spoke topology, each remote router may also act as a hub and each connection to another remote site may act as a spoke (in a hierarchical fashion). In a multiple hub topology, the load associated with sending broadcast and multicast data can be distributed across multiple central hub sites rather than concentrated at a single central site. Thus, even though data may require extra hops to get to a particular location, data delivery is more efficient in a hub and spoke network than in other network topologies. This design also provides a scalable, hierarchical network that greatly reduces the resource requirements of the central router, allowing the Frame Relay network to utilize the advantages of IP multicast applications.

Incorrect Answers:

- A, B, D. These networks are typically not Hub and spoke, and do not operate via packet switching.
- E. ATM is a somewhat viable choice, as they work in a similar fashion to frame relay. However, ATM would be considering a cell switching technology, not a packet switching technology.
- F. VPN's work through the use of encryption, tunnels, or MPLS.

QUESTION NO: 2

You are a systems administrator of an HR company in Dallas. You want to connect your company's head office with a branch office in Detroit. To do this, you want to use two data link layer encapsulations: one exclusively for data and the other exclusively for signaling. Which one of the following WAN services would best suit your needs?

- A. ISDN
- B. ATM
- C. FDDI
- D. ATX
- E. Frame Relay

Answer: A

Explanation:

ISDN Q.931 messages are used for signaling.

ISDN B channels are used to transport data.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 327

QUESTION NO: 3

A brand new network application is required for the Acme Company, and they are considering the use of a connectionless service. What are the characteristics of a connectionless service? (Select two answer choices)

- A. It uses a Reliable transport mechanism.
- B. It uses a Non-reliable transport mechanism
- C. It is less bandwidth-intensive than connection oriented services
- D. it uses handshaking

Answer: B, C

Explanation:

The Transport layer is a good example of how both a connectionless and connection oriented service works.

UDP is a connectionless service that is considered unreliable, but it uses less bandwidth than a connection oriented service.

TCP is a connection oriented service and is considered reliable because it uses handshaking to create the service and acknowledgments.

Incorrect Answers:

A, D. These are the characteristics of a connection oriented service, such as TCP.

QUESTION NO: 4

You are a network administrator of a small company that's experiencing explosive growth. Within the next quarter the company is going to open up seven more regional offices with the potential of more in the future. These regional offices send and receive mission critical traffic, and will need to be connected to the head office around the clock. However, your head office doesn't have any additional free ports available on the router. Which of the following technologies would be the best choice for this new WAN?

- A. Frame Relay
- B. Broadband cable
- C. ISDN-BRI
- D. ADSL
- E. Dedicated PPP/HDLC links
- F. ISDN

Answer: A

Explanation:

Frame Relay is a dedicated service that would be acceptable for a mission critical WAN application, and multiple locations can connect to a single router port. The use of frame relay PVCs can connect all the locations together, while using only one physical port.

Incorrect Answers:

B, D. While DSL and Cable Modem are acceptable for home use, they have not yet achieved the availability and reliability associated with dedicated WAN technologies such as ATM, Frame Relay, and Point to Point links.

C, F. ISDN is usage based, and would it would be cost prohibitive to keep the ISDN links up at all times.

E. Dedicated leased lines would require a separate router port for each link.

QUESTION NO: 5

The Testking WAN is displayed in the diagram below:



Which dynamic routing protocol should be recommended for the Testking network shown in the graphic above? (Choose all that apply)

- A. OSPF
- B. RIP version 1
- C. RIP version 2
- D. IGRP
- E. EIGRP

Answer: A, C, E

Explanation:

In this network, the 192.168.23.0/24 network is subnetted into two other networks. Because this class C network is being subnetted, a routing protocol that supports variable length subnet mask information is required. OSPF, EIGRP, and RIP version 2 all support VLSM information to be shared across the network.

Incorrect Answers:

B, D. RIP version 1 and IGRP do not support VLSM, which will be required in order for this network to have the two LANs both be reachable.

QUESTION NO: 6

The Testking network is implementing dialup services for their remote employees. Testking uses several different Layer 3 protocols on the network. Authentication of the users connecting to the network is required for security. Additionally, some employees will be dialing long distance and will need callback support. Which protocol is the best choice for these remote access services?

- A. 802.1
- B. Frame relay
- C. HDLC
- D. PPP
- E. SLIP
- F. PAP

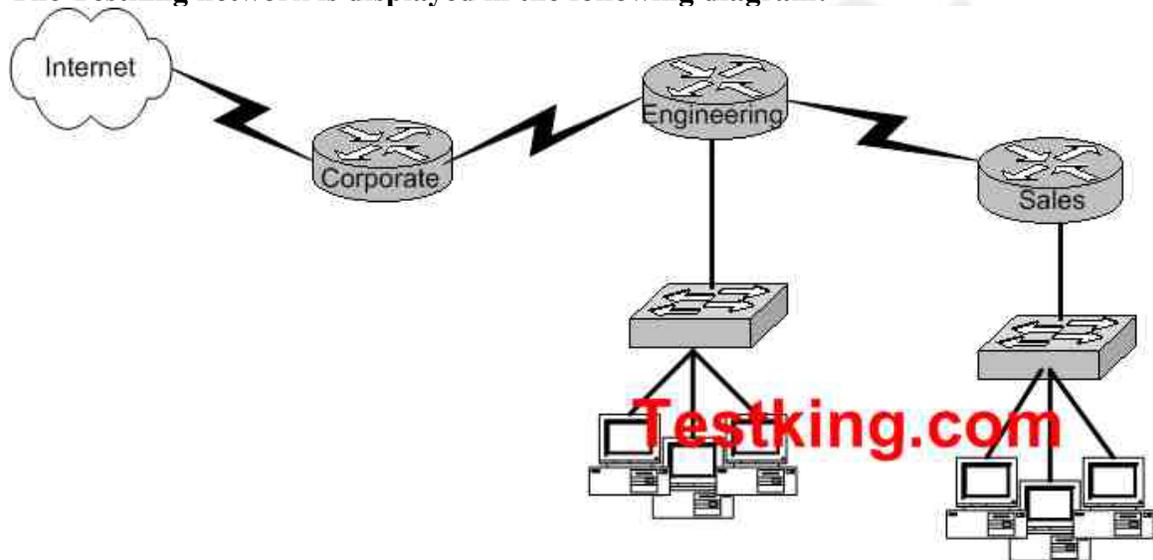
Answer: D

Explanation:

PPP is the Point to Point Protocol, and is used in the majority of dial-up connections. PPP includes support for numerous features, including caller ID check, PPP callback, and security support. For security, either CHAP or PAP can be used, although CHAP is normally used as it is more secure. PPP is a layer 2 protocol that can support any layer 3 protocols.

QUESTION NO: 7

The Testking network is displayed in the following diagram:



A network administrator would like to implement NAT in the network shown in the graphic to allow inside hosts to use a private addressing scheme.

Where should NAT be configured?

- A. Corporate router
- B. Engineering router
- C. Sales router
- D. All routes
- E. All routes and switches

Answer: A

Explanation:

Network Address Translation (NAT) can be used to hide the private IP addressing scheme of the entire network from the Internet. To do this, NAT needs to only be

configured on the router that resides between the Internet and the rest of the private internal network. In this case, it needs to only be implemented on the Corporate router.

QUESTION NO: 8

TestKing has 25 computers and decides to connect the network to the Internet. TestKing would like for all of the computers to have access to the Internet at the same time, but TestKing only has four usable publicly routable IP addresses. What should be configured on the router so that all computers can connect to the Internet simultaneously?

- A. Static NAT
- B. Global NAT
- C. Dynamic NAT
- D. Static NAT with ACLs
- E. Dynamic NAT with overload

Answer: E

Explanation:

NAT overload, also called many to one NAT or Port Address Translation (PAT) allows for many IP hosts to share a single IP address when connecting to the outside. In this case, the use of dynamic NAT with overloading will allow for the 25 hosts to use an IP address from the NAT pool, which will contain the 4 public IP addresses.

QUESTION NO: 9

A Cisco router has been configured with the following command:

IP nat pool nat-test 192.168.6.10 192.168.6.20 netmask 255.255.255.0

This is an example of what type of NAT?

- A. Static NAT
- B. Dynamic NAT
- C. Dynamic NAT with overload
- D. Port Address Translation
- E. None of the above

Answer: B

Explanation:

The configuration statement in this example is used to define a pool of IP addresses to be used for dynamic NAT translations.

Incorrect Answers:

A. Static NAT is used for 1 to 1 translation entries, using the “static” configuration keyword. In this example a range of addresses are being defined for the use in a pool.
 C, D. With NAT overload, also known as Port Address Translation (PAT), the keyword “overload” is added at the end of the configuration statement.

QUESTION NO: 10

You are a technician at TestKing. Your newly appointed TestKing trainee is setting up a new frame relay connection to a remote branch and wants to know what the valid options for frame relay LMI types are.

What would your reply be? (Choose all that apply.)

- A. EIA/TIA
- B. Q.932
- C. Q.933 A
- D. IEEE
- E. IETF
- F. Cisco
- G. ANSI

Answer: C, F, G

Explanation:

The following describe the various frame relay LMI options:

Name	Document	IOS LMI-Type
• Cisco	Proprietary	cisco
• ANSI	T1.617 Annex D	ansi
• ITU	Q.933. Annex A	q.933a

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 382

PART II: IMPLEMENTATION & OPERATION (121 questions)

Configure routing protocols given user requirements (27 questions)

QUESTION NO: 1

Which one of the following parameters is the very first thing that needs to be configured as part of the IGRP routing process?

- A. The wild card mask
- B. The IP address
- C. The IP address mask
- D. The metric weights
- E. The Autonomous System number

Answer: E

Explanation:

You configure IGRP just like RIP, except that the router `igrp` command has an additional parameter – the autonomous system (AS) number. The term autonomous system refers to a network that is within the control of a single company or organization. The term AS number refers to a number assigned to a single company or organization when it registers its connection to the Internet. However, for IGRP, you do not need a registered AS number. All that is needed for IGRP to work is for all the routers to use the same AS number.

Example configuration:

```
Router EIGRP 1
  Network 10.0.0.0
```

In this example, 1 is the AS number chose for EIGRP process 1.

QUESTION NO: 2

Which of the following answer choices is an additional parameter which must be supplied before the IGRP routing process can initialize?

- A. Connected subnet numbers
- B. Register administrative subnet masks
- C. IP address mask
- D. Autonomous system number
- E. Metric weights

Answer: D

Explanation:

You configure IGRP just like RIP, except that the router `igrp` command has an additional parameter – the autonomous system (AS) number. The term autonomous system refers to a network that is within the control of a single company or organization. The term AS number refers to a number assigned to a single company or organization when it registers its connection to the Internet. However, for IGRP, you do not need a registered AS number. All that is needed for IGRP to work is for all the routers to use the same AS number.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 165

QUESTION NO: 3

What parameters must you specify when you enable EIGRP routing?

- A. The broadcast address, and AS number
- B. The network number and AS number
- C. EIGRP routing, network number and passive interface
- D. EIGRP routing, network number, and AS

Answer: D

Explanation:

To enable EIGRP on your router, you must specify EIGRP routing, the network number, and the AS system number.

Example:

```
Router EIGRP 33
  Network 10.0.0.0
```

In the case above the AS process number is 33.

QUESTION NO: 4

Which of the following technologies can be used in distance vector routing protocols to prevent routing loops? (Select all valid answer choices)

- A. Spanning Tree Protocol
- B. Shortest path first tree
- C. Link-state advertisements (LSA)
- D. Hold-down timers
- E. Split horizon
- F. VRRP

Answer: D, E

Explanation:

Distance vector routing protocols use the rule of split horizons and hold down timers to prevent routing loops after a topology change.

- **Split horizon** – the routing protocol advertises routes out an interface only if they were not learned from updates entering that interface.
- **Hold-down timer** – After finding out that a router to a subnet has failed, a router waits a certain period of time before believing any other routing information about that subnet.

Incorrect Answers:

A. STP is used in bridged LANs to prevent bridging loops. It is a means for preventing loops at layer two, not layer 3.

B, C. These are two of the mechanisms of Link State Protocols, not distance vector protocols.

F. VRRP is the Virtual Router Redundancy Protocol, which is a standards based method similar to Cisco's proprietary HSRP. Neither of these two methods deal with distance vector routing protocols.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 154

QUESTION NO: 5

What is the reason for configuring a passive interface on a router? (Select only one answer)

- A. Allows interfaces to share common IP addresses.
- B. Allows an interface to remain up without the aid of keepalives.
- C. Allows a router to send routing and not receive updates via that interface.
- D. Allows a routing protocol to forward updates that is missing its IP address.
- E. Allows a router to receive routing updates on an interface but not send updates via that interface.

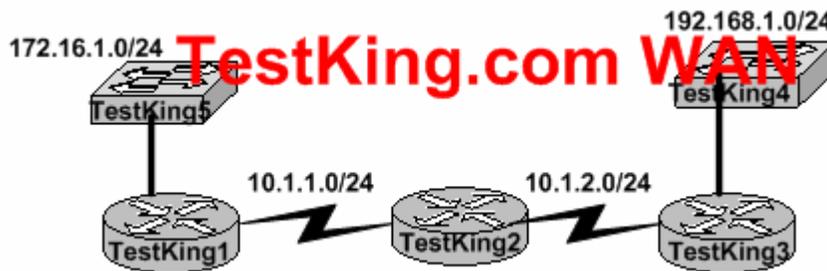
Answer: E

Explanation:

The **passive-interface** command is used to control the advertisement of routing information. The command enables the suppression of routing updates over some interfaces while allowing updates to be exchanged normally over other interfaces. For any interface specified as passive, no routing information will be sent. Routing information received on that interface will be accepted and processed by the router. This is often useful for DDR links such as ISDN.

QUESTION NO: 6

The Testking WAN is displayed in the diagram below:



You have just added the router TestKing1 to your network and wish it to have full connectivity with routers TestKing2 and Testking3. Which of the following configurations would suit TestKing1 most appropriately?

- A. TestKing1(config)# **router rip**
 TestKing1(config-router)# **network 10.0.0.0**
 TestKing1(config-router)# **network 172.16.0.0**
 TestKing1(config-router)# **network 192.168.1.0**
- B. TestKing1(config)# **router rip**
 TestKing1(config-router)# **network 10.0.0.0**
 TestKing1(config-router)# **network 192.168.1.0**
- C. TestKing1(config)# **router rip**
 TestKing1(config-router)# **network 10.0.0.0**
 TestKing1(config-router)# **network 172.16.0.0**
- D. TestKing1(config)# **router rip**
 TestKing1(config-router)# **network 10.0.0.0**

Answer: C

Explanation: When configuring RIP you configure only the directly connected networks that are to be advertised via the RIP routing process are to be configured.

Incorrect Answers:

- A. This choice implies that when configuring rip on a router every possible network in the entire system should be configured. This is not the case.
- B. Testking 1 requires the 172.16.0.0 network to be configured, not the 192.168.1.0 network.
- D. If the 172.16.0.0 network is omitted, then the other routers in the network will not be able to reach the LAN users of Testking 1 via RIP.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) page 167

QUESTION NO: 7

A new point to point circuit is installed, connecting Testking 1 to Testking 2 as shown below:



Users at Testking 1 wish to utilize the existing Internet connection at Testking 2. To do this, a gateway of last resort needs to be set. What is the command to do this?

- A. TestKing1(config)# ip route 172.16.4.2 0.0.0.0 0.0.0.0
- B. TestKing1(config)# ip route 0.0.0.0 0.0.0.0 S1
- C. TestKing1(config)# ip route 172.16.4.1 0.0.0.0 0.0.0.0
- D. TestKing1(config)# ip route S0 0.0.0.0 0.0.0.0
- E. TestKing1(config)# ip route 0.0.0.0 0.0.0.0 172.16.4.2

Answer: E

Explanation:

Setting the default gateway is done by issuing either the “ip route 0.0.0.0 0.0.0.0 serial 0” or the “ip route 0.0.0.0 0.0.0.0 172.16.4.2” command. The following excerpt provides some additional information:

The ip default-network command and the ip route 0.0.0.0 0.0.0.0 commands accomplish the goal of having the router use a known route as the default for packets that are not matched in the routing table. The ip route 0.0.0.0 0.0.0.0 command uses the fact that network 0.0.0.0 is used by Cisco IOS software to represent the default network.

Incorrect Answers:

- A, C. The IP address of the next hop needs to go after the route, not before.
- B. This would have been acceptable if the interface specified was S0, not S1.
- C. The interface used to forward packets for the route should be placed after the route, not before.

QUESTION NO: 8

You are configuring the serial interface of your Cisco router; which of the following are valid encapsulation types you can use?

(Select all that apply.)

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

Answer: C, D, E

Explanation:

HDLC, Frame Relay, and PPP are the most common encapsulation types set for serial interfaces in a Cisco router. HDLC is often used in point to point circuits with Cisco routers on each end. HDLC is Cisco proprietary and offers an alternative to PPP.

Incorrect Answers:

- A, B. Token Ring and Ethernet aren't encapsulation types used on serial interfaces; they are types of LAN networks.
- F. CHAP is the Challenge Authentication Protocol. It is used for authentication on PPP links.

QUESTION NO: 9

Which of the following OSPF commands, when used together, will put the network 192.168.10.0/24 into OSPF area 0? (Select all valid responses)

- A. Router(config-router)# **network 192.168.10.0 0.0.0.255 0**
- B. Router(config-router)# **network 192.168.10.0 0.0.0.255 area 0**

- C. Router(config-router)# **network 192.168.10.0 255.255.255.0 area 0**
- D. Router(config)# **router ospf 0**
- E. Router(config)# **router ospf 1**

Answer: B, E

Explanation:

B. The network command specifies the IP address (192.168.10.0) followed by the wildcard mask (not the subnet mask), and the area that is to be associated with the OSPF address range (in this case, area 0). The wildcard mask indicates in binary how much of the IP address must be matched with 0s indicating that the bits must match and 1 indicating that they may vary. Thus 0.0.0.255 or 00000000.00000000.00000000.11111111 indicates that any bit in the last octet can vary while all bits in the first 3 octets must match the network address (in other words, 192.168.10.xx)

E. The router ospf command enables OSPF routing and enters router configuration mode. This command takes a <process-id> argument which identifies the OSPF process.

Incorrect Answers:

- A. This command is correct, except for the fact that the keyword “area” is missing and needs to be inserted.
- C. For OSPF, the inverse mask must be used, not the regular subnet mask.
- D. OSPF can not use process ID 0, and the goal of this question is to put a specific network in area 0, not the entire routing process.

QUESTION NO: 10

Which of the following routing protocols are less likely prone routing loops and network reachability problems when used in discontinuous networks? (Select all valid responses)

- A. IGRP
- B. CDP
- C. OSPF
- D. RIP v1
- E. RIP v2
- F. EIGRP

Answer: C, E, F

Explanation: Only OSPF, RIP version 2, and EIGRP carry VLSM information. In a discontinuous network, subnet masks of different lengths can be used, but this information will need to be propagated via the routing protocol if all networks are to be reached.

Incorrect Answers:

A, D. With RIP version one and IGRP, discontinuous networks can be problematic, as VLSM is not supported.

B. CDP is the Cisco Discovery Protocol, which is used to exchange information between Cisco devices. It can only be used between Cisco routers and switches, and it is not a routing protocol.

QUESTION NO: 11

Which one of the following statements best explains the split horizon rule?

- A. Only routers can split boundaries (horizons) between networks in separate AS numbers.
- B. Each AS must keep routing tables converged to prevent dead routes from being advertised across boundaries.
- C. Once a route is received on an interface, advertise that route as unreachable back out the same interface.
- D. Information about a route should never be sent back in the direction from which the original update came.

Answer: D

Explanation:

The split horizon rule states:

- Never advertise a route out of the interface through which you learned it.

For instance, in Figure 4a below, if Router One is connected to Routers Two and Three through a single multipoint interface (such as Frame Relay), and Router One learned about Network A from Router Two, it will not advertise the route to Network A back out the same interface to Router Three. Router one assumes that Router Three would learn about Network A directly from Router Two.

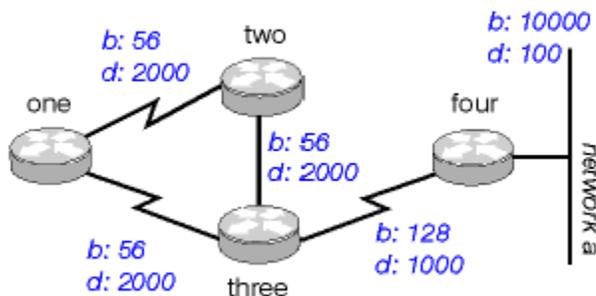


Figure 4a

Incorrect Answers

A: There is no such requirement

B: Distance vector protocols updates routing table at regular intervals instead of Topology changes

C: This is the definition of the poison reverse rule, not the split horizon rule.

Reference: Wendell Odom. CISCO CCNA Certification Guide (2000 Press) Page 369.

QUESTION NO: 12

In EIGRP, what kind of route information is stored in the RAM of the router and maintained by way of hello packets and update packets? (Select two answer choices)

- A. Neighbor Table
- B. SRF Table
- C. RTP Table
- D. Topology Table
- E. Query Table
- F. Dual Table

Answer: A, D

Explanation:

In EIGRP the only two tables of significance are the neighbor table and the topology table.

Incorrect Answers:

B, C, E, F. These are not tables used by EIGRP.

Reference: Sybex CCNA Study Guide edition 4, Page 271

QUESTION NO: 13

What is the maximum number of hops OSPF allows before it deems a network unreachable?

- A. 15
- B. 16
- C. 99
- D. 255
- E. Unlimited

Answer: E

Explanation:

OSPF is a link state protocol. Link state protocols do not use hops to mark networks as unreachable. Instead OSPF implements a steady state operation to its adjacent neighbors by sending and receiving small Hello packets periodically. When an OSPF router does not receive a Hello packet for a specified time period, it assumes that the neighbor is down. The router then runs the SPF algorithm to calculate new routes. Hops counts are not used.

QUESTION NO: 14

**On the topic of the OSPF hello protocol; which of the statements below are true?
(Select two answer choices)**

- A. The OSPF Hello protocol provides dynamic neighbor discovery.
- B. The OSPF Hello protocol detects unreachable neighbors in 90 second intervals.
- C. The OSPF Hello protocol maintains neighbor relationships.
- D. The OSPF Hello protocol negotiates the correct parameters between neighboring interfaces.
- E. The OSPF Hello protocol uses timers to elect the router with the fastest links at the designated router.
- F. The OSPF Hello protocol broadcast hello packets throughout the internetwork to discover all routers that are running OSPF.

Answer: A, C

Explanation:

OSPF contains a protocol (the Hello protocol) that is used to establish and maintain relationships between neighboring nodes. These relationships are called adjacencies. Adjacencies are the basis for the exchange of routing data in OSPF.

It is through the use of this protocol, and packet type, that an OSPF node discovers the other OSPF nodes in its area. Its name is intentionally significant; the Hello protocol establishes communications between potential neighboring routers. The Hello protocol uses a special subpacket structure that is appended to the standard 24-octet OSPF header. Together, these structures form a hello packet.

All routers in an OSPF network must adhere to certain conventions that must be uniform throughout the network. These conventions include the following:

- The network mask
- The interval at which hello packets will be broadcast (the hello interval)
- The amount of time that must elapse before a non responding router will be declared dead (that is, the router dead interval) by the other routers in the network
- All routers in an OSPF network must agree to use the same value for each of these parameters; otherwise, the network might not operate properly. These parameters are exchanged using hello packets. Together, they comprise the basis for neighborly communications. **They ensure that neighbor relationships (known as adjacencies) are not formed between routers in different subnets and that all members of the network agree on how frequently to stay in contact with each other.**

The hello packet also includes a listing of other routers (using their unique router IDs) that the source router has recently been in contact with. **This field, the Neighbor field, facilitates the neighbor discovery process.** The hello packet also contains several other fields such as Designated Router and Backup Designated Router. **These fields are useful**

in maintaining adjacencies and support the operation of the OSPF network in both periods of stability and convergence.

QUESTION NO: 15

A routing table contains static, RIP, and IGRP routes destined to the same network with each route set to its default administrative distance. Which route will be the preferred route?

- A. The RIP route
- B. The static route
- C. The IGRP route
- D. All three will load balance.

Answer: B

Explanation:

To decide which route to use, IOS uses a concept called Administrative Distance. The administrative distance is a number that denotes how believable an entire routing protocol is on a single router. The lower the number, the better, or more believable the routing protocol.

Route Type	Administrative Distance
• Static	1
• IGRP	100
• RIP	120

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 177

QUESTION NO: 16

You are an administrator and you've just configured OSPF on a router with both physical and logical interfaces. Which of the following factors determine the router ID?

- A. The lowest IP address of any interface.
- B. The highest IP address of any interface.
- C. The highest IP address of any logical interface.
- D. The middle IP address of any logical interface.
- E. The lowest IP address of any physical interface.
- F. The highest IP address of any physical interface.
- G. The lowest IP address of any logical interface.

Answer: B

Explanation:

The OSPF topology database includes information about routers and the subnets, or links, to which they are attached. To identify the routers in the neighbor table's topology database, OSPF uses a router ID (RID) for each router. A router's OSPF RID is that router's highest IP address on any interface when OSPF starts running.

Note: The OSPF router ID is a 32-bit IP address selected at the beginning of the OSPF process. The highest IP address configured on the router is the router ID. If a loopback address is configured, then it is the router ID. In case of multiple loopback addresses, the highest loopback address is the router ID. Once the router ID is elected it doesn't change unless the IP address is removed or OSPF restarts.

Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 208.

QUESTION NO: 17

Under which circumstance would an OSPF router establish a neighbor adjacency, even though the DR/BDR election process was not performed?

- A. Point-to-point
- B. Broadcast multicast
- C. Nonbroadcast multicast
- D. Backbone area 0
- E. Virtual Link

Answer: A

Explanation: If there's a point to point connection, there's no need for a designated router or a backup designated router election. By definition, only two routers exist on a point to point connection.

Incorrect Answers:

B, C. In these network types, the potential for more than two routers on the segment exist, so the Designated Router and Backup Designated Routers are elected.

D. This is not a network type. Area 0 is the backbone of any OSPF network.

E. Virtual Links are used in OSPF to link an area to area 0. Every area must be directly connected to area 0 at some point, and virtual links are used for areas that do not meet this requirement.

QUESTION NO: 18

On the assumption that every OSPF router in a particular area is configured with the same priority value; which secondary value would be used as a router ID when there is no loopback interface set?

- A. The IP address of the first Fast Ethernet interface.
- B. The IP address of the console management interface.
- C. The highest IP address among its active interfaces.
- D. The lowest IP address among its active interfaces.
- E. There will be no router ID until a loopback interface is configured.

Answer: C

Explanation: Ordinarily the loopback interface would be selected as the router ID. In the event that no loopback interface is configured, the router ID will be the first active interface that comes up on the router. If that particular interface has more than one IP address, then the highest address will be selected as the Router ID.

Incorrect Answers:

B. Putting an IP address on the management console is a concept that is configured on a Catalyst switch, not a router.

QUESTION NO: 19

The statements below compare and contrast link state and distance vector routing protocols. Which of these are true? (Choose two).

- A. Distance vector protocols send the entire routing table to directly connected neighbors.
- B. Distance vector protocols are responsible for sending updates to all networks listed in the routing table.
- C. Link state protocols are responsible for sending the entire routing table to the whole network.
- D. Link state protocols send updates regarding their own links status to all other routers on the network.

Answer: A D

Explanation:

Distance Vector Protocols:

Distance Vector Protocols advertise routing information by sending messages, called routing updates, out the interfaces on a router. These updates contain a series of entries, with each entry representing a subnet and a metric.

Link-State Protocols:

Send partial updates when link status changes and floods full routing table updates every 30 minutes. The flooding, however, does not happen all at once, so the overhead is minimal.

Incorrect Answers:

- B. Distance Vector protocols only send information to adjacent neighbors.
- C. Only partial routing updates and sent to neighbors on a regular basis. The entire table is not sent to all neighbors. This would obviously create far too much overhead traffic.

Reference:

CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 413 + 419

QUESTION NO: 20

What are the characteristic of link state routing protocols? (Choose all that apply.)

- A. The exchange of advertisement is triggered by a change in the network.
- B. All routers exchange routing tables with each other iIn a multipoint network.
- C. Packets are routed based upon the shortest path to the destination.
- D. Paths are chosen depending on the cost efficiency factor.
- E. Every router in an OSPF area is capable of representing the entire network topology.
- F. Only the designated router in an OSPF area can represent the entire network topology.

Answer: A C E

Explanation:

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.

Reference:

CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 417

QUESTION NO: 21

On the topic of OSPF routing; which of the following are the traits of an OSPF area? (Select all that apply)

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

Answer: C, E

Explanation: OSPF 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.

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 NO: 22

If the bandwidth of an OSPF interface is configured with the “bandwidth 64” command, what would be the calculated cost of the link?

- A. 1
- B. 64
- C. 1562
- D. 64000
- E. 1500

Answer: C

Explanation: 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 $100,000,000/\text{bandwidth}$. So, in this example:

$$100,000,000 / 64000 = 1562.5$$

QUESTION NO: 23

Which two are NOT characteristics of the OSPF routing protocol? (Select all that apply)

- 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

Answer: B, D

Explanation: Through the use of areas, routing information and instability's are reduced to specific areas. This will reduce the routing overhead on a network, not increase it. OSPF is not used to provide routing information between different systems. BGP is predominately used for this purpose.

Incorrect Answers:

A, C, E. These are all true statements that describe the features and functionality of OSPF.

QUESTION NO: 24

Which of the following are true statements regarding the characteristics of OSPF areas?

- A. All OSPF networks require the use of multiple areas
- 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: OSPF divides its routing domain into areas. Area 0, the backbone, is required. This divides interior routing into two levels. If traffic must travel between two areas, the packets are first routed to the backbone. This may cause non-optimal routes, since interarea routing is not done until the packet reaches the backbone. Once there, it is

routed to the destination area, which is then responsible for final delivery. This layering permits addresses to be consolidated by area, reducing the size of the link state databases. All areas must be connected to area 0, either directly or through the use of virtual links.

Incorrect Answers:

- A. OSPF network can only consist of a single area.
- C. Single area networks can use any area number. If more than one area is configured in the network, then at least one of the areas must be area 0.
- D. The area-id can be an integer between 0 and 4294967295.
- F. While loopback interfaces are commonly used in OSPF networks, it is not a requirement.

QUESTION NO: 25

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

- A. Point-to-point
- B. Point to multipoint
- C. Broadcast
- D. Non-broadcast multi-access

Answer: C, D

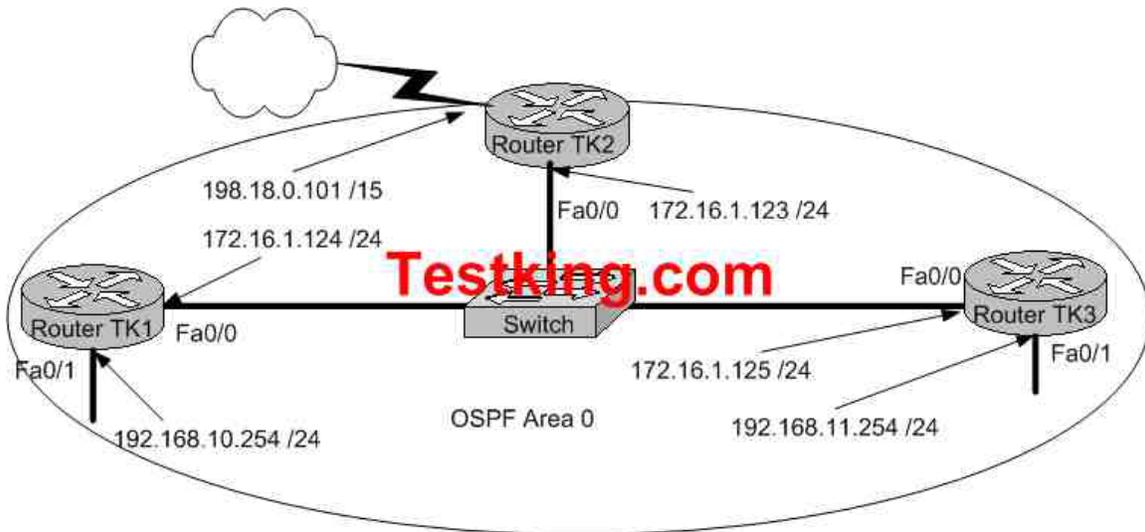
Explanation: The DR and BDR election process is performed on broadcast and non-broadcast multi-access networks.

Incorrect Answers:

A, B. There is no DR or BDR on point to point and point to multipoint links. On a point to point link, only two routers exist so there is no need for a DR or BDR.

QUESTION NO: 26

Three Testking routers are configured for OSPF area 0 as shown in the diagram below:



You wish to ensure that router TK2 will be preferred as the designated router (DR) for the 172.16.1.0 /24 LAN segment.

What configuration tasks could be used to establish this preference? (Choose all that apply)

- A. Configure the priority value of the Fa0/0 interface of RouterTK2 to a higher value than any other interface on the Ethernet network.
- B. Change the router id for Router TK2 by assigning the IP address 172.16.1.130/24 to the Fa0/0 interface of RouterTK2.
- C. Configure a loopback interface on RouterTK2 with an IP address higher than any IP address on the other routers.
- D. Change the priority value of the Fa0/0 interface of RouterTK2 to zero.
- E. Change the priority values of the Fa0/0 interfaces of RouterTK1 and RouterTK3 to zero.
- F. No further configuration is necessary.
- G. All of the above will make TK2 the DR

Answer: A, C, E

Explanation:

In order to ensure that a router will become the OSPF DR for any given segment, there are a number of options. One way is to manually configure the interface priority as described in option A above using the “ip ospf priority” interface configuration command. The second method is described in option C. OSPF routers will always use the loopback interface IP address as the router ID, when configured, and the router with the highest IP address will be chosen as the DR when the priorities are the same. The final method is to change the priority of the other routers in the segment to zero. When the OSPF priority is set to 0, the router is ineligible to become the DR or the BDR. Important Note: The OSPF DR/BDR election process is not pre-emptive, so any changes

to the network regarding the DR/BDR election process will only occur when the routers are restarted.

Incorrect Answers:

B. This method will not work as the router ID is taken by using the highest IP address of all interfaces in the router, or from the loopback interface if it is configured. Although choosing this option will give router TK2 the highest IP address on the LAN segment, the router ID will be taken from the highest IP address in the router, which as shown will be 192.168.0.101.

D. This will make TK2 ineligible to become either the DR or the BDR.

QUESTION NO: 27

The Testking router has been configured for EIGRP. Information relating to the configuration is displayed in the output shown below:

```

Routing Protocol is "eigrp 478"
-- output omitted --
Redistributing: eigrp 478
  Automatic network summarization is not in effect
  Maximum path: 4
  Routing for Networks:
    172.26.168.128/26
    172.26.169.0/26
  Routing Information Sources:
    Gateway         Distance   Last Update
    172.26.168.129   90        01:01:59
  Distance: internal 90 external 170
  
```

The EIGRP configuration in the Testking router used a single network statement. From the output shown in the graphic, which network statement was used to advertise these networks in EIGRP?

- A. network 172.26.168.128 0.0.0.127
- B. network 172.26.168.128 area 478
- C. network 172.26.0.0
- D. network 172.26.168.0 area 478

Answer: C

Explanation:

The correct configuration statements used in the above were:

```

Router eigrp 478
  Network 172.26.0.0
  
```

Incorrect Answers:

- A. A wildcard mask is not required at the end of the network statement in order to configure EIGRP. It is only required for an OSPF configuration.
- B, D. In EIGRP, the concept of an area does not exist. This is only used by OSPF.

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Configure IP addresses, subnet masks, and gateway addresses on routers and hosts (19 questions)

QUESTION NO: 1

You are a systems administrator and you are about to assign static IP addresses to various servers on your network. For the network 192.168.20.24/29 the router is assigned to the first usable host address, while the last usable host address goes to your Sales server.

Which one of the following commands would you enter into the IP properties box of the sales server?

- A. IP address: 192.168.20.14 Subnet Mask: 255.255.255.248 Default Gateway: 192.168.20.9
- B. IP address: 192.168.20.254 Subnet Mask: 255.255.255.0 Default Gateway: 192.168.20.1
- C. IP address: 192.168.20.30 Subnet Mask 255.255.255.248 Default Gateway: 192.168.20.25
- D. IP address: 192.168.20.30 Subnet Mask 255.255.255.240 Default Gateway: 192.168.20.17
- E. IP address: 192.168.20.30 Subnet Mask 255.255.255.240 Default Gateway: 192.168.20.25

Answer: C

Explanation

A subnet mask uses 29 bits. This means that it uses 5 bits in the 4th octet. This equates to 255.255.255.248. This network has 3 bits for hosts. Using the $2^n - 2$ formula ($2^3 - 2$) in this case), we are left with 6 ($2 * 2 * 2 - 2 = 6$) host addresses. 192.168.20.24 is the network address. Therefore the next address (192.168.20.25) would be the first host address. This address must be assigned to the router, which serves as the gateway for the network. The last available host address would be 192.168.20.30 ($192.168.20.24 + 6$). This address is assigned to the server. The broadcast address is 192.168.20.31.

QUESTION NO: 2

You've been assigned a single Class C address. From this, you need 8 subnets, and your subnet mask is 255.255.255.224. Which one of the following configuration commands would you have to use before you begin?

- A. Router(config)# ip classless

- B. Router(config)# **ip subnet-zero**
- C. Router(config)# **ip version 6**
- D. Router(config)# **no ip classful**
- E. Router(config)# **ip unnumbered**
- F. Router(config)# **ip all-nets**

Answer: B

Explanation: To get 8 subnets from a class C address, and a mask of 255.255.255.224 use the reserved subnet space. To do this, you need the command 'ip subnet-zero.' This will allow the router to use the very first subnet, which is normally reserved and unused as the network address.

Prior to Cisco IOS® Software Release 12.0, Cisco routers, by default, did not allow an IP address belonging to subnet zero to be configured on an interface. However, if a network engineer working with a Cisco IOS software release older than 12.0 finds it safe to use subnet zero, the ip subnet-zero command in the global configuration mode can be used to overcome this restriction. As of Cisco IOS Software Release 12.0, Cisco routers now have ip subnet-zero enabled by default, but if the network engineer feels that it is unsafe to use subnet zero, the no ip subnet-zero command can be used to restrict the use of subnet zero addresses.

In versions prior to Cisco IOS Software Release 8.3, the service subnet-zero command was used.

It should be noted that even though it was discouraged, the entire address space including subnet zero and the all-ones subnet have always been usable. The use of the all-ones subnet was explicitly allowed and the use of subnet zero is explicitly allowed since Cisco IOS Software Release 12.0. Even prior to Cisco IOS Software Release 12.0, subnet zero could be used by entering the ip subnet-zero global configuration command.

On the issue of using subnet zero and the all-ones subnet, RFC 1878 states, "This practice (of excluding all-zeros and all-ones subnets) is obsolete. Modern software will be able to utilize all definable networks." Today, the use of subnet zero and the all-ones subnet is generally accepted and most vendors support their use. However, on certain networks, particularly the ones using legacy software, the use of subnet zero and the all-ones subnet can lead to problems.

QUESTION NO: 3

Study the following exhibit:



Taking the information from the above exhibit; which command line below would correctly configure serial port0 on the TestKing2 router with the LAST usable host addresses on the 192.216.32.32 subnet?

- A. TestKing2(config-if)# ip address 192.216.32.63 255.255.255.248
- B. TestKing2(config-if)# ip address 192.216.32.38 255.255.255.240
- C. TestKing2(config-if)# ip address 192.216.32.39 255.255.255.248
- D. TestKing2(config-if)# ip address 192.216.32.63 255.255.255.248 no shut
- E. TestKing2(config-if)# ip address 192.216.32.39 255.255.255.248 no shut
- F. TestKing2(config-if)# ip address 192.216.32.38 255.255.255.248

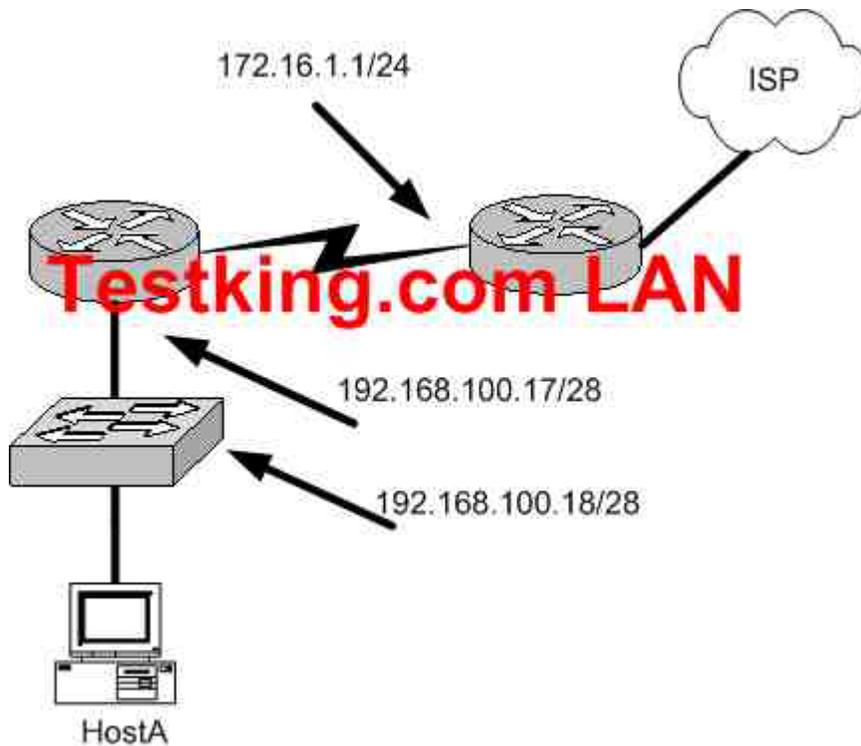
Answer: F

Explanation: F is the correct answer, as the last usable IP address on this subnet is 192.216.32.38. The subnet mask for a /29 is 255.255.255.248

Mask/29	11111111.11111111.11111111.11111000	255.255.255.248
Subnet	11000000.11011000.00100000.00100000	192.216.32.32
Broadcast	11000000.11011000.00100000.00100111	192.216.32.39
Address range =	192.216.32.33 – 192.216.32.38	

QUESTION NO: 4

The Testking Network is displayed as follows:



What is a valid possible IP address configuration for Host A?

- A. IP 192.168.100.31 255.255.255.240 default-gateway 192.168.100.18
- B. IP 192.168.100.30 255.255.255.240 default-gateway 172.16.1.1
- C. IP 192.168.100.20 255.255.255.240 default-gateway 192.168.100.17
- D. IP 192.168.100.21 255.255.255.248 default-gateway 192.168.100.17
- E. IP 192.168.100.19 255.255.255.248 default-gateway 172.16.1.1

Answer: C

Explanation:

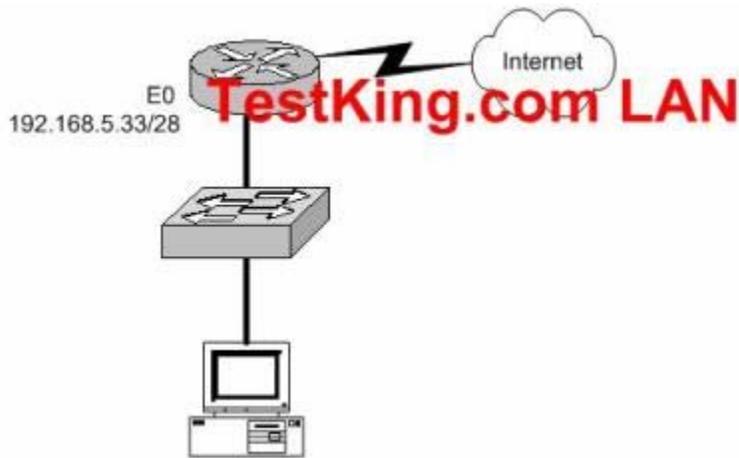
The network mask for a /28 is 255.255.255.240. The default gateway is always the IP address of the router on the local subnet, and the valid IP range for this network is 192.168.100.17 – 192.168.100.30. Choice C is the only one that meets all of these.

Incorrect Answers:

- A. The IP address 192.168.100.31 is the broadcast address. It cannot be used for the host.
- B. The default gateway should be the first exit point for the network that the host is on. In this case it should be the router interface address 192.168.100.17.
- D. The network uses a 28 bit subnet mask (11111111.11111111.11111111.11110000). This equates to 255.255.255.240, not 255.255.255.248.
- E. The network uses a 28 bit subnet mask (11111111.11111111.11111111.11110000). This equates to 255.255.255.240, not 255.255.255.248. Also, the default gateway should be the first exit point for the network that the host is on. In this case it should be the router interface address 192.168.100.17.

QUESTION NO: 5

Study the exhibit below:



Which of the following would be a valid IP address of the PC?

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

Answer: C

Explanation

The network uses a 28bit subnet (255.255.255.240). This means that 4 bits are used for the networks and 4 bits for the hosts. This allows for 14 networks and 14 hosts ($2^n - 2$). The last bit used to make 240 is the 4th bit (16) therefore the first network will be 192.168.5.16. The network will have 16 addresses (but remember that the first address is the network address and the last address is the broadcast address). In other words, the networks will be in increments of 16 beginning at 192.168.5.16/28. The router interface E0 has the IP address 192.168.5.33. Therefore it is on the 2nd network (192.169.5.32/28). The host must also be on this network. Valid IP addresses for hosts on this network are: 192.168.5.33-192.168.5.46.

Incorrect Answers:

- A. 192.168.5.55 is on network 192.168.5.48. It is not on the same network as the router interface.
- B. This is the broadcast address.

- D. This is the network address.
- E. This is not a valid address for a 28 bit subnet mask. The first network address should be 192.168.5.16.

QUESTION NO: 6

In any NAT (network address translation) configuration, what is the Inside Global IP address?

- A. The summarized address for all internal subnetted addresses.
- B. A private IP address assigned to a host on the inside network.
- C. A registered address that represents an inside host to an outside network.
- D. A unique IP address used on an internal network
- E. Non of the above

Answer: C

Explanation:

With NAT, Cisco defines 4 different types of addresses as follows:

- **Inside local address** - The IP address assigned to a host on the inside network. This is the address configured as a parameter of the computer's OS or received via dynamic address allocation protocols such as DHCP. The address is likely not a legitimate IP address assigned by the Network Information Center (NIC) or service provider.
- **Inside global address** - A legitimate IP address assigned by the NIC or service provider that represents one or more inside local IP addresses to the outside world.
- **Outside local address** - The IP address of an outside host as it appears to the inside network. Not necessarily a legitimate address, it is allocated from an address space routable on the inside.
- **Outside global address** - The IP address assigned to a host on the outside network by the host's owner. The address is allocated from a globally routable address or network space.

The above definitions still leave a lot to be interpreted. For this example, this document redefines these terms by first defining "local address" and "global address." Keep in mind that the terms "inside" and "outside" are NAT definitions. Interfaces on a NAT router are defined as "inside" or "outside" with the NAT configuration commands, **ip nat inside** and **ip nat outside**. Networks to which these interfaces connect can then be thought of as "inside" networks or "outside" networks, respectively.

- **Local address** - A local address is any address that appears on the "inside" portion of the network.
- **Global address** - A global address is any address that appears on the "outside" portion of the network.

QUESTION NO: 7

The following configuration command was entered into a router:

```
ip route 172.16.3.0 255.255.255.0 192.168.2.4
```

**Which of the following statements are true regarding this configuration change?
(Select two)**

- A. The default administrative distance is used.
- B. The command is used to establish a static route.
- C. The command is used to configure the router interfaces.
- D. The command is used to establish a stub network.
- E. The subnet mask for the source address is 255.255.255.0

Answer: A, B

Explanation:

This command specifies a static route, and tells the router that it should forward all traffic destined for the 172.16.3.0/24 subnet to the next hop router located at 192.168.2.4. The default Administrative Distance for a static route is one, and since there is no AD value specified at the end of this configuration change, the default is used.

Incorrect Answers:

- C. This command is done in global configuration mode, not in interface mode.
- D. Stub networks are used in OSPF topologies. The example in this question is simply applying a single static route.
- E. There is not source network or subnet specified in a static route. All traffic destined to the target of 172.16.3.0/24 is to be forwarded, regardless of the source.

QUESTION NO: 8

Which of the commands below can you use to configure a default route? (Select two answer choices)

- A. TK1(config)# **ip route 0.0.0.0 0.0.0.0 E0**
- B. TK1(config)# **ip route 0.0.0.0 255.255.255.255 S0**
- C. TK1(config-interface)# **ip route 255.255.255.255 0.0.0.0 192.168.1.21**
- D. TK1(config)# **ip route 0.0.0.0 0.0.0.0 192.168.1.21**
- E. TK1(config)# **ip route 0.0.0.0 192.168.1.21 255.255.255.255**
- F. TK1# **ip default-network 0.0.0.0 192.168.1.21 255.255.255.255**

Answer: A, D

Explanation:

There are two ways to specify a default static route. One is to specify the interface to use for forwarding packets, like the example in A. The other way is to specify the IP address of the next hop router, such as the example in D. The ip route 0.0.0.0 0.0.0.0 command uses the fact that network 0.0.0.0 is used by Cisco IOS software to represent the default network.

Reference: CCNA ICND Exam Certification Guide By Wendell Odem Pg.524

Incorrect Answers:

- B. All zero's must used for the subnet mask of a default route, not all 1's.
- C. The default route is made in global configuration mode.
- D, E. A subnet mask is not needed after the next hop router is specified.

QUESTION NO: 9

Which of the following commands would you use, to configure a default route to any destination NOT found in the routing table?

- A. Router(config)# **ip default-route 0.0.0.0 255.255.255.255 s0**
- B. Router(config)# **ip route 0.0.0.0 255.255.255.255 s0**
- C. Router(config)# **ip default-route 0.0.0.0 0.0.0.0 s0**
- D. Router(config)# **ip route 0.0.0.0 0.0.0.0 s0**
- E. Router(config)# **ip route any any e0**

Answer: D

Explanation:

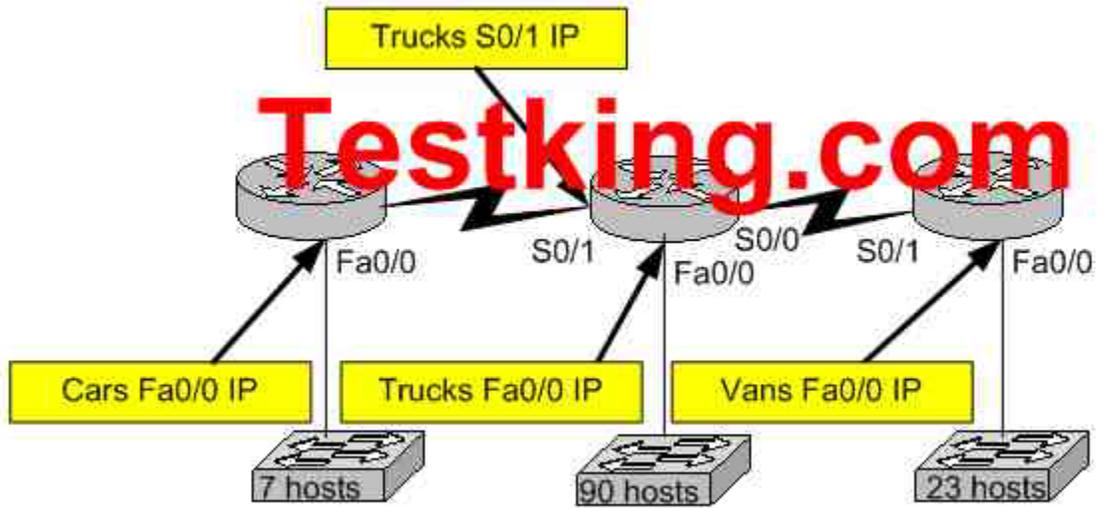
Choice D is the correct syntax for configuring a gateway of last resort. Note that an alternative way is to specify the IP address of the next hop router, for example, “ip route 0.0.0.0 0.0.0.0 10.1.1.1.”

QUESTION NO: 10

You are on the TestKing network design team and have the task of networking three TestKing locations together. Your team will be using the address range 192.168.55.0. RIP v2 will be used as the routing protocol, and “ip subnet-zero” will be configured. Your goal is to fulfill the address needs of the network while conserving unused addresses for potential future growth.

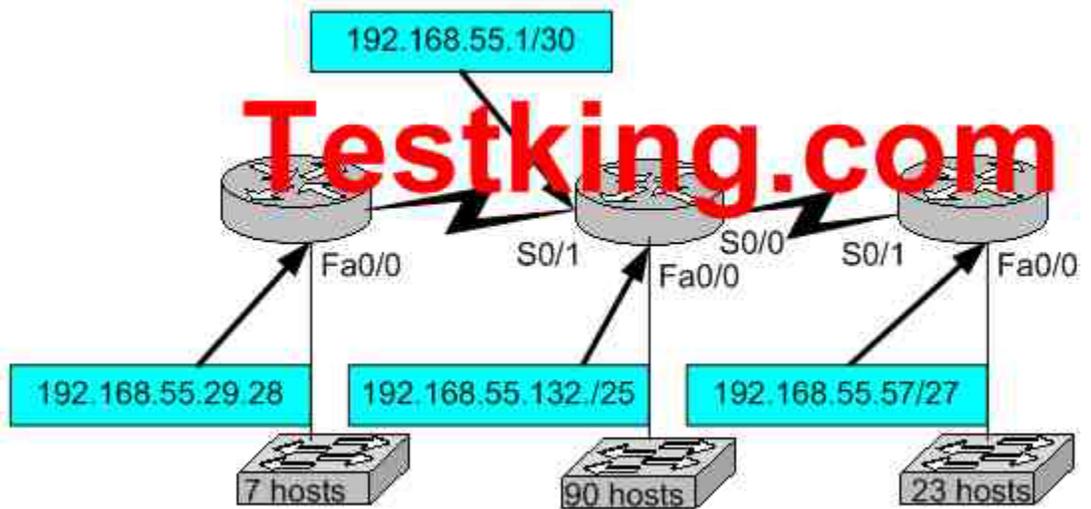
With these goals in mind, drag the host addresses on the left side to the correct router interface on the right side. Not all the addresses are going to be used, and one of the routers is already partially configured.

- 192.168.55.57/27
- 192.168.55.29.28
- 192.168.55.1/30
- 192.168.55.132 /25
- 192.168.55.0/30
- 192.168.55.127/26



Answer:

- 192.168.55.0/30
- 192.168.55.127/26



QUESTION NO: 11

The TestKing network is shown in the following exhibit:



What command would you use to configure the correct IP address and subnet mask on TestKing2's serial interface?

- A. TESTKING2(config-if)# ip address 172.16.17.1 255.255.255.0
- B. TESTKING2(config-if)# ip address 172.16.18.2 255 255.255.252.0
- C. TESTKING2(config-if)# ip address 172.16.17.2 255.255.255.252
- D. TESTKING2(config-if)# ip address 172.16.16.0 255.255.255.0

Answer: B

Explanation: The address 172.16.17.0/22 is in the 172.16.16.0/22 network. This means that the IP addresses in all four answers are valid. However, the /22 subnet mask equals 255.255.252.0 in decimal. Therefore, answer B is correct.

Incorrect Answers:

A, C, D. The subnet mask used in the diagram shows a /22, which equates to 255.255.252.0. The subnet masks in choices A, C, and D are incorrect.

QUESTION NO: 12

You have been asked to configure a default route. Which of the IOS commands mentioned below will accomplish this task? (Select two answer choices)

- A. LTD(config)# ip route 0.0.0.0 0.0.0.0 192.168.15.36
- B. LTD(config)# ip route 0.0.0.0 192.168.15.36 255.255.255.255
- C. LTD# ip default-network 0.0.0.0 192.168.15.36 255.255.255.255
- D. LTD(config)# ip route 0.0.0.0 0.0.0.0 E0
- E. LTD(config)# ip route 0.0.0.0 255.255.255.255 S0
- F. LTD(config-router)# ip route 255.255.255.255 0.0.0.0 192.168.15.36

Answer: A, D

Explanation: The default route is the IP address of the next hop when no other routes are known. To configure the default route you type in 'ip route' and then two address sets of 0 followed by the address (as is the case in A) or the interface (as is the case in D).

QUESTION NO: 13

The Testking network is displayed below:



In this network, you must configure router TK1 to provide connectivity to router TK2. The entire network must utilize the 192.1.1.0/24 network. If RIP is being used as the routing protocol, which 3 sets of commands will need to be completed on TK1? (Choose 3).

- A. TK1(config)# **interface ethernet 0**
TK1(config-if)# **ip address 192.1.1.129 255.255.255.192**
TK1(config-if)# **no shutdown**
- B. TK1(config)# **interface ethernet 0**
TK1(config-if)# **ip address 192.1.1.97 255.255.255.192**
TK1(config-if)# **no shutdown**
- C. TK1(config)# **interface serial 0**
TK1(config-if)# **ip address 192.1.1.4 255.255.255.252**
TK1(config-if)# **clock rate 56000**
- D. TK1(config)# **interface serial 0**
TK1(config-if)# **ip address 192.1.1.6 255.255.255.252**
TK1(config-if)# **no shutdown**
- E. TK1(config)# **router rip**
TK1(config-router)# **network 192.1.1.4**
TK1(config-router)# **network 192.1.1.128**
- F. TK1(config)# **router rip**
TK1(config-router)# **version 2**
TK1(config-router)# **network 192.1.1.0**

Answer: A, D, F

Explanation:

Subnetting a Class C Address

We start by using the first subnet mask available with a Class C address, which borrows 2 bits for subnetting.

For this example, I'll be using 255.255.255.192. To review the binary translation of 192:
192 = 11000000

Here, the 1s represent the subnet bits, and the 0s represent the host bits available in each subnet. 192 provides 2 bits for subnetting and 6 bits for defining the hosts in each subnet. What are the subnets? Since the subnet bits can't be both off or on at the same time, the only two valid subnets are these:

01000000 = 64 (all host bits off) **revealing host addresses from .65-----.127**

10000000 = 128 (all host bits off) **revealing host addresses from .129-----.190**

The valid hosts would be defined as the numbers between the subnets, minus the all-host-bits-off and all-host-bits-on numbers.

In Choice A, a valid host is configured on E0 interface of the router 192.1.1.129/26 so it is correct. Choice D is correct because each WAN link uses the /30 or 255.255.255.252 mask revealing 2 valid host addresses. Serial 0 is configured with the address 192.1.1.6/30, which comes from the subnet 192.1.1.4/30. Valid hosts in this subnet are 192.1.1.5/30 and 192.1.1.6/30

Choice F is correct because we RIP version 2 will be required in this case as VLSM information needs to be carried throughout the network, and VLSM is not supported on RIP version 1.

QUESTION NO: 14

The TestKing Corporation (an online training facility) has three production facilities which have their own routers: QA, Study Guide, and Examiner. QA and Study Guide already have network connectivity between them. Configure Examiner's router's IP to the e0 and s1 interfaces so e0 resolves the first usable subnet and S1 receives the second usable subnet. (From the network 192.168.81.0/27) Both interfaces should get the first available IP of the subnet.

Configure the Examiner router's IP addresses on the E0 and S1 interfaces so that the E0 resolves the first usable subnet while S1 receives the second usable subnet from the network 192.168.81.0/27. Both interfaces should receive the first available IP of the subnet. The zero subnet should not be used. The routers have been configured with the following specifications:

- The routers are named QA, StudyGuide, and Examiner
- RIP is the routing protocol
- Clocking is provided on the serial 0 interfaces.
- The secret password on the Examiner router is "testking"
- The IP addresses are listed in the chart below.
- The zero subnet shouldn't be used

Name: QA

E0 : 192.168.83.1

S0 : 192.168.85.1

Name: StudyGuide

E0 : 192.168.88.1

S0 : 192.168.81.89

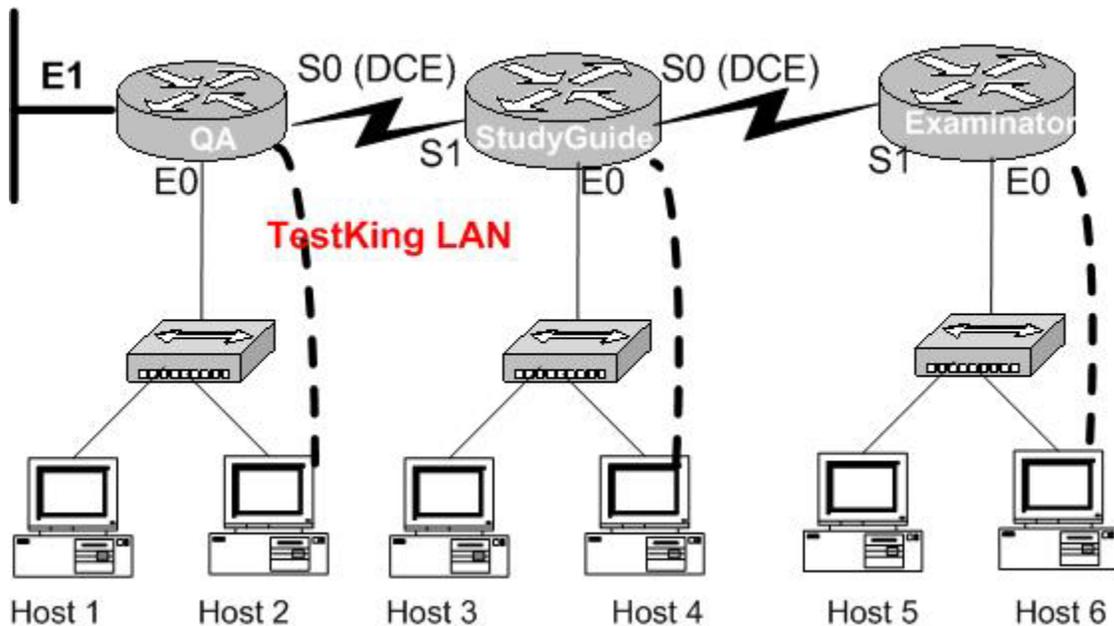
S1 : 192.168.85.2

Name: Examiner

E0 : to be determined

S1 : to be determined

Secret Password: testking



Task: To configure the router click on the host icon that is connected to the router by a serial cable.

Answer:

```

Examinator#config t
Enter configuration commands, one per line. End with END.
Examinator(config)#int e 0
Examinator(config-if)#ip add 192.168.81.33 255.255.255.224
Examinator(config-if)#no shut
Examinator(config-if)#exit
Examinator(config)#int s 1
Examinator(config-if)#ip add 192.168.81.65 255.255.255.224
Examinator(config-if)#no shut
Examinator(config-if)#CTRL+Z
Examinator#copy ru st
..
..
[OK]
Examinator#

```

QUESTION NO: 15

You work as a technician at TestKing. You are configuring a Cisco router. You want to configure the IP address on an interface.

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Which command should you use?

- A. router(config-if)#ip address 142.8.2.1 subnet mask 255.255.252.0
- B. router(config-if)#142.8.2.1 0.0.3.255
- C. router(config-if)#ip address 142.8.2.1 255.255.252.0
- D. router(config-if)#142.8.2.1 subnet mask 255.255.252.0
- E. router(config-if)#ip address 142.8.2.1 0.0.3.255
- F. router(config-if)#ip address 142.8.2.1 subnet mask /22

Answer: C

Explanation:

ip address address subnet-mask – Interface configuration mode command that sets the IP address for interfaces. Only choice C uses the correct syntax.

QUESTION NO: 16

The Testking connection between the BMW and ATL routers are displayed below:



Based on the information above, which of the following commands can be used to configure the address on the ATL serial 0/0 interface?

- A. ATL(config-if)# ip address 172.16.17.1 255.255.255.0
- B. ATL(config-if)# ip address 172.16.18.255. 255.255.252.0
- C. ATL(config-if)# ip address 172.16.17.2 255.255.255.252
- D. ATL(config-if)# ip address 172.16.16.0 255.255.255.0
- E. None of the above

Answer: B

Explanation:

CIDR Notation /22 implies that the subnet mask be 255.255.252.0. The IP address 172.16.18.255 falls within the same network range as the 172.16.17.0/22 network.

QUESTION NO: 17

A portion of the Testking network is displayed below



```
TK1(config)# interface FastEthernet 0/0.2
TK1(config-subif)# encapsulation dot1q 1
TK1(config-subif)# ip address 192.1.1.129 255.255.255.240
TK1(config)# interface FastEthernet 0/0.3
TK1(config-subif)# encapsulation dot1q 2
TK1(config-subif)# ip address 192.1.1.65 255.255.255.192
```

Host A in the graphic is connected to a switch port assigned to VLAN 1. Which two settings on host A are required to allow connectivity with Host B on VLAN 2? (Choose two)

- A. IP address: 192.1.1.68 255.255.255.240
- B. IP address: 192.1.1.130 255.255.255.192
- C. IP address: 192.1.1.142 255.255.255.240
- D. Default gateway: 192.1.1.129
- E. Default gateway: 192.1.1.65
- F. Default gateway: 192.1.1.1

Answer: C, D

Explanation:

Sub-interface Fast Ethernet 0/0.2 was created for VLAN 1 through the use of the “encapsulation dot1q 1” command. Therefore, since host A resides in VLAN 1 it must be configured with an IP address in the 192.1.1.128/28 subnet and it must be configured with the IP address of the default gateway, which is the IP address assigned to the corresponding sub-interface of the router.

Incorrect Answers:

- A. This IP address is not in the same subnet as the Fast Ethernet 0/0.2 sub-interface.
- B. The subnet mask is incorrect in this choice.
- E, F. The default gateway needs to be set as the IP address for the sub-interface created in the router for VLAN 1.

QUESTION NO: 18

An 802.1Q trunk is configured between a Testking switch and router TK1 as shown below:

```

Router configuration:
interface fastethernet 0/1.1
 encapsulation dot1q q
 ip addr 192.1.1.65 255.255.255.192
interface fastethernet 0/1.10
 encapsulation dot1q 10
 ip addr 192.1.1.129 255.255.255.224

```



Which of the following are valid configuration values for the host shown in the graphic? (Choose three)

- A. host A IP address: 192.1.1.65
- B. host A subnet mask: 255.255.255.224
- C. host B IP address: 192.1.1.125
- D. host B default gateway: 192.1.1.65
- E. host C IP address: 192.1.1.166
- F. host C subnet mask: 255.255.255.224

Answer: C, D, F

Explanation:

Host B resides on port 3, which is configured for VLAN 1. As shown in the configuration, the default gateway for VLAN is the IP address associated with the Fast Ethernet 0/1.1 sub-interface. Valid IP hosts for the VLAN 1 subnet is 192.1.1.65-192.1.1.126.

Incorrect Answers:

- A. The 192.1.1.65 IP address is already assigned to the router.
- B. Host A is in VLAN 1, so the subnet mask should be 255.255.255.192
- E. Host C belongs to VLAN 10, and this IP address is not in the 192.1.1.128/27 subnet.

QUESTION NO: 19

Which of the following addresses can be assigned to a host when using a subnet mask of 255.255.254.0? (Select all that apply)

- A. 113.10.4.0
- B. 186.54.3.0
- C. 175.33.4.255
- D. 26.35.3.255
- E. 152.135.7.0
- F. 17.35.36.0

Answer: B, C, E

Explanation:

These are all valid host IP addresses within the /23 subnet.

Incorrect Answers:

A. This is the network address for the 113.10.4.0/23 subnet.

D. This is the broadcast address for the 26.35.2.0/23 subnet.

F. This is the network address for the 17.35.36.0/23 subnet.

Configure a router for additional administrative functionality (11 questions)

QUESTION NO: 1

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

- A. SMTP
- B. SNMP
- C. DHCP
- D. DARP
- E. CDP

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. SMTP is the Simple Mail Transfer Protocol, which is used by email servers
- B. SNMP is the Simple Network Management Protocol, which is used for remotely managing network devices.
- D. DARP does not exist.
- E.. CDP is the Cisco Discovery Protocol, which is used to exchange information between Cisco devices. It can only be used between Cisco routers and switches.

QUESTION NO: 2

You are working as an administrator at TestKing, and you need to set the bandwidth of your routers serial port to 56K. Which of the following commands would you use?

- A. Bandwidth 56000
- B. Bandwidth 56000000
- C. Bandwidth 56
- D. Bandwidth 56kbps

Answer: C

Explanation: Cisco IOS translates the bandwidth command to kbps, so after issuing the “bandwidth 56” interface command the router will display the bandwidth as 56 kbps.

QUESTION NO: 3

Which of the following commands can you issue if you want to configure a default route to any destination network not found on router TK1's routing table?

- A. TK1(config)# ip default-route 0.0.0.0 255.255.255.255 s0
- B. TK1(config)# ip route 0.0.0.0 255.255.255.255 s0
- C. TK1(config)# ip default-route 0.0.0.0 s0
- D. TK1(config)# ip route 0.0.0.0 0.0.0.0 s0
- E. TK1(config)# ip route any any e0

Answer: D

Explanation: There are two ways to specify a default static route. One is to specify the interface to use for forwarding packets, the other way is to specify the IP address of the next hop router. The ip route 0.0.0.0 0.0.0.0 command uses the fact that network 0.0.0.0 is used by Cisco IOS software to represent the default network.

Incorrect Answers:

- A, B. All zero's must used for the subnet mask of a default route, not all 1's.
- C. The default-route command does not exist.
- E. the "any" keyword is used in access lists, not for configuring static routes.

QUESTION NO: 4

The Testking network is displayed below:



You are a network administrator and you've just finished configuring the static route 10.5.6.0 /24 on router TestKing. Which command should you use if you want TestKing to consider this route the most reliable?

- A. TestKing(config)# ip route 10.5.6.0 0.0.0.255 fa0/0
- B. TestKing(config)# ip route 10.5.6.0 0.0.0.255 10.5.4.6
- C. TestKing(config)# ip route 10.5.6.0 255.255.255.0 fa0/0

- D. TestKing(config)# **ip route 10.5.6.0 255.255.255.0 10.5.4.6**
- E. TestKing(config)# **ip route 10.5.4.6 0.0.0.255 10.5.6.0**
- F. TestKing(config)# **ip route 10.5.4.6 255.255.255.0 10.5.6.0**

Answer: C, D

Explanation: There are two ways to specify a default static route. One is to specify the interface to use for forwarding packets, like the example in C. The other way is to specify the IP address of the next hop router, such as the example in D.

Additional Info:

The following is the command you use to add a static route to a routing table:

```
Ip route [destination_network] [mask] [next-hop_address or exitinterface]
[administrative_distance][permanent]
```

This list describes each command in the string:

ip route The command used to create the static route.

destination network The network you're placing in the routing table.

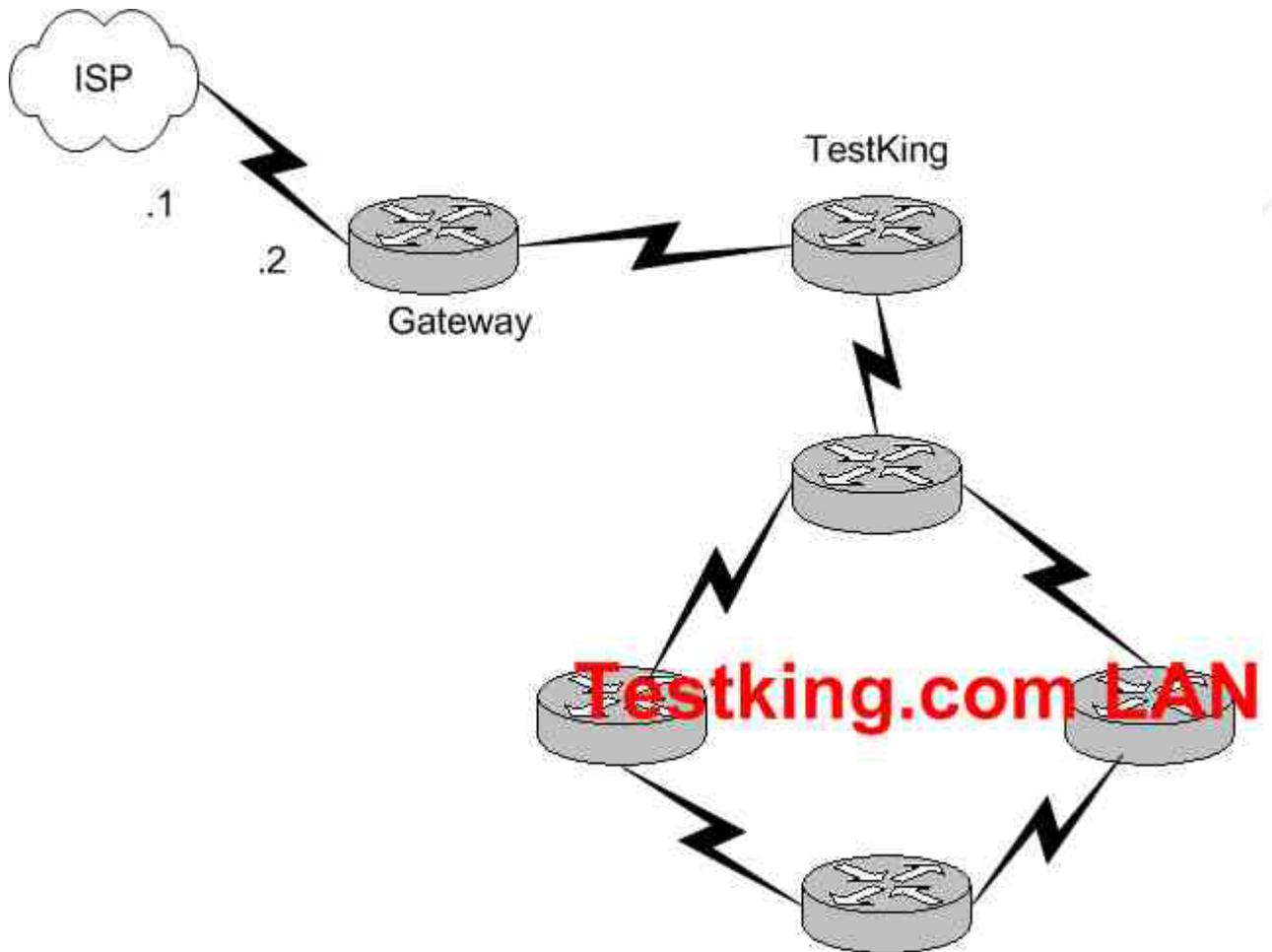
mask The subnet mask being used on the network.

next-hop address The address of the next-hop router that will receive the packet and forward it to the remote network. This is a router interface that's on a directory connected network.

administrative_distance By default, static routes have an administrative distance of 1. You can change the default value by adding an administrative weight at the end of the command.

QUESTION NO: 5

A new Internet T1 is being added to the Testking network as shown:



The ISP assigned you the class C IP address 207.134.6.0/30 for this Internet connection. A default route to the Internet should be set up. Which of the following are acceptable ways to configure this on the Gateway router? (Select all that apply)

- A. Gateway(config)# ip route 0.0.0.0 0.0.0.0 207.134.6.1.
- B. Gateway(config)# router rip
Gateway(config-router)# network 207.134.6.0 default
- C. Gateway(config)# ip route 207.134.6.0 255.255.255.0 Serial0/0
- D. Gateway(config)# router OSPF
Gateway(config-router)# network 207.134.6.0
- E. Gateway(config)# ip default-network 207.134.6.0

Answer: A, E

Explanation: This question only involves the configuration of the gateway router to the ISP, nothing else. You have two choices to accomplish this: the command “ip route” or

the command “ip default-network”. Both of these methods will configure a default route to the ISP as desired.

Incorrect Answers:

B, D. RIP and OSPF are interior routing protocols. The T1 Internet connection that is being set up here is between two different Autonomous Systems. The only routing protocol that could be potentially used is BGP, but that is not an option.

C. This command will only set up a static route to the 207.134.6.0/24 network. We wish to set up a static default route.

QUESTION NO: 6

Which of the following commands would you execute if you wanted to enable others to establish a Telnet session on a Cisco router?

- A. testking1(config)# line console 0
testking1(config-if)# enable password testking
- B. testking1(config)# line vty 0
testking1(config-line)# enable password testking
- C. testking1(config)# line vty 0
testking1(config-line)# enable secret testking
testking1(config-line)# login
- D. testking1(config)# line console 0
testking1(config-line)# enable secret testking
testking1(config-line)# login
- E. testking1(config)# line console 0
testking1(config-line)# password testking
testking1(config-line)# login
- F. testking1(config)# line vty 0
testking1(config-line)# password testking
testking1(config-line)# login

Answer: F

Explanation: Telnet sessions use virtual terminal sessions, which are configured under the “line vty” portion of the configuration. There are 5 total vty sessions that can be configured, numbered 0-4. In order to be prompted for a password, one must be configured. Choice F gives the 3 commands needed to allow a single telnet session.

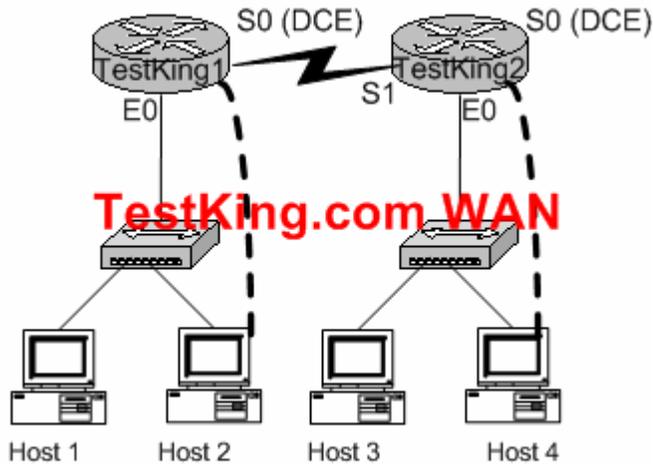
Incorrect Answers:

A, B, C, D. The telnet password needs to be configured in addition to the enable password. Without the initial password configured, users that try to telnet to the router will receive a “password required, but none set” message.

D, E. Telnet uses VTY ports, not the console port.

QUESTION NO: 7

The Testking network is displayed below:



You need to perform the following functions on router Testking2:

- Login using the current enable password: Testking
- Configure the console password to be: test
- Configure all telnet line passwords to be: king

To configure the router click on a host icon that is connected to a router by a serial cable.

Answer:

Click on Host 4:

Router Con0 is now available

Press RETURN to get started ! We press enter

Router TestKing2:

TestKing2> **enable** !We enter enable mode

Password: **testking** !We enter "testking"

TestKing2 # **config terminal** !We enter the terminal

Enter configuration commands, one per line. End with CTRL/Z

TestKing2 (config) # **line console 0** !Configure the terminal connection

TestKing2 (config-line)# **login**

TestKing2 (config-line)# **password test** !Specify the terminal connection password

TestKing2 (config-line)# **exit**

TestKing2 (config) # **line vty 0 4** !Configure the telnet connections. Numbered 0,1,2,3,4.

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TestKing2 (config-line)# **login**
 TestKing2 (config-line)# **password king** !specify the password
 TestKing2 (config-line) # **exit** !Exit from configuration mode.
 TestKing2 (config) # **exit**
 TestKing2 # **copy running-config startup-config** !Saves the running config to NVRAM.

Reference:

CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 177

QUESTION NO: 8

Your goal is to restrict all access to your router except for Telnet. To make this happen, move the commands on the left side to corresponding functions on the right side using the diagram below for reference. Note that not every option will be used.

line telnet 0	Enter the mode to configure Telnet access.	Place here
line vty 0	Enable Telnet login.	Place here
line vty 0 4	Set the password to testking.	Place here
login	Return to global configuration mode.	Place here
line login	Encrypt passwords in show run/start output.	Place here
exit		
service password-encryption		
password testking		
set password testking		

Answer:

line telnet 0	Enter the mode to configure Telnet access.	line vty 0 4
line vty 0	Enable Telnet login.	login
line vty 0 4	Set the password to testking.	password testking
line login	Return to global configuration mode.	exit
	Encrypt passwords in show run/start output.	service password-encryption
set password testking		

QUESTION NO: 9

You wish to increase the security of all of the routers within your network. What can be done to secure the virtual terminal interfaces on a router? (Choose two)

- A. Administratively shut down the interface.
- B. Physically secure the interface.
- C. Create an access list and apply it to the virtual terminal interfaces with the **access-group** command.
- D. Configure a virtual terminal password and login process.
- E. Enter an access list and apply it to the virtual terminal interfaces using the **access-class** command.

Answer: D, E

Explanation:

There are a total of 5 logical Virtual terminal interfaces in a Cisco router (lines 0-4) and they are used for remote access into the device via telnet. Configuring these interfaces correctly with a login and password information can be used for security, as each user will be prompted for a password in order to obtain access. A second method is to use the "access-class" command. Combined with an access list, this command can be used to specify the hosts or networks that will be allow access to the device.

Incorrect Answers:

- A. Virtual terminal interfaces are logical interfaces that can not be manually shut down.
- B. Virtual terminal lines are logical interfaces that reside within a router, so there is nothing that can be physically secured.

C. This command is used with access-lists for LAN and WAN interfaces, but is not used for the VTY lines.

QUESTION NO: 10

You wish to limit telnet access into your Cisco router to only a single host. In order to accomplish this, access list 1 has been written to allow host 172.16.1.224 access to the router vty lines. What command would assign this access- list to the Virtual Terminal Lines?

- A. router(config-line)# ip access-group 1 in
- B. router(config-line)# access-class 1 in
- C. router(config-line)# ip access-list 1 in
- D. router(config-line)# access-line 1 in

Answer: B

Explanation:

To restrict incoming and outgoing connections between a particular vty (into a Cisco device) and the addresses in an access list, use the access-class command in line configuration mode.

Example:

The following example defines an access list that permits only the host 172.16.1.224 to connect to the virtual terminal ports on the router, as described in this question:

```
access-list 1 permit 172.16.1.224 0.0.0.0
line 1 5
access-class 1 in
```

QUESTION NO: 11

You need to allow only Telnet connection to a router.

Match the commands on the left that will accomplish this task with their function on the right. (Note that not all answer choices will be used).

line telnet 0	Enter the mode to configure Telnet access.	Place here
line vty 0	Enable Telnet login.	Place here
line vty 0 4	Set the password to testking.	Place here
login	Return to global configuration mode.	Place here
line login	Encrypt passwords in show run/start output.	Place here
exit		
service password-encryption		
password testking		
set password testking		

Answer:

line telnet 0	Enter the mode to configure Telnet access.	line vty 0 4
line vty 0	Enable Telnet login.	login
line vty 0 4	Set the password to testking.	password testking
line login	Return to global configuration mode.	exit
	Encrypt passwords in show run/start output.	service password-encryption
set password testking		

Configure a switch with VLANs and inter-switch communication (18 questions)

QUESTION NO: 1

Which of the following steps are necessary in order to add a new VLAN to a switched network? (Select all that apply.)

- A. Create the VLAN.
- B. Name the VLAN.
- C. Configure an IP address for the VLAN.
- D. Add the desired ports to the new VLAN.
- E. Add the VLAN to the VTP domain.

Answer: A B D

Explanation: The following are the basic requirements for creating VLANs:

- Creating the VLAN numbers and names
- Configuring each port's assigned VLAN

Incorrect Answers:

- C. This is an optional feature, but not a necessary step for creating a VLAN.
- E. Adding any VLAN to a Virtual Trunking Protocol (VTP) domain may be desired in a complex multi-switch and multi-VLAN network. However, it is not a necessary step for creating stand-alone VLANs on a single switch.

QUESTION NO: 2

You are bringing up a new Cisco Catalyst switch, and wish to connect it via a trunk to another switch from a different vendor, which uses the IEEE standard for the trunking method. When setting the encapsulation type on the trunk, what should you configure on the Cisco switch?

- A. Switch(config)# **switchport trunk encapsulation isl**
- B. Switch(config)# **switchport trunk encapsulation ietf**
- C. Switch(config-if)# **switchport trunk encapsulation isl**
- D. Switch(config-if)# **switchport trunk encapsulation ietf**
- E. Switch(config-if)# **switchport trunk encapsulation dot1q**

Answer: E

Explanation: The only real choices for setting up switching trunks are ISL and 802.1Q. ISL is Cisco proprietary, while 802.1Q uses the IEEE defined standard for trunking between switches. To configure the 802.1Q standard, the keyword “dot1q” is used in Cisco switches.

Incorrect Answers:

A, B, D. These are not valid options in a Cisco switch.

C. ISL is a Cisco proprietary method for setting up trunks, and will only work between Cisco switches.

QUESTION NO: 3

A new switch is being installed and you have been assigned the task of connecting it to an existing switch. In doing this, you want to set up the VLAN Trunking Protocol so that VLAN information can be passed between the switches. Which of the following must you do to accomplish this? (Choose all that apply).

- A. You must set each end of the trunk line to IEEE 802.1e encapsulation.
- B. You must set the same VTP management domain name on both switches.
- C. You must set all ports on the two switches as access ports.
- D. You must configure one of the switches as a VTP server.
- E. You must use a rollover cable to connect the two switches.

Answer: B, D

Explanation:

The following describes what is needed in order to correctly set up VTP:

VTP operates in one of three modes:

- Server mode
- Client mode
- Transparent mode

For VTP to exchange information, some switches act as servers, and some act as clients. VTP servers can create, modify, and delete VLANs and other configuration parameters for the entire VTP domain; this information, in turn, is propagated to the VTP clients and servers in that same domain. VTP servers save VLAN configurations in the Catalyst NVRAM, whereas in clients, the VLAN configuration is not stored at all. A VTP client cannot create, change, or delete VLANs, nor can it save VLAN configurations in nonvolatile memory.

Incorrect Answers:

A. The encapsulation can be either ISL or 802.1Q, and need to match at each end of the trunk.

C. Ports must only be assigned to VLANs. Once that is done and the trunk is up and running, the VLAN information will be passed between the switches.

E. A regular CAT5 cable is used to connect the switches, assuming 10/100 ethernet is used.

QUESTION NO: 4

A new switch is installed into an existing LAN and a new VTP trunk is set up with an existing switch. Which VLANs will be allowed on this new trunk?

- A. All defined VLANs are allowed on the trunk by default.
- B. Each VLAN, or VLAN range, that is specified with the **switchport mode** command.
- C. Each VLAN, or VLAN range, that is specified with the **vtp domain** command.
- D. Each VLAN, or VLAN range, that is specified with the **vlan database** command.

Answer: C

Explanation:

By default, all VLANs that are configured to be in the same VTP domain will be allowed by the VTP trunk.

Incorrect Answers:

- A. Only the VLANs contained in the same VTP domain will traverse the trunk.
- B, D. These commands do not have any influence on the VLANs that will be allowed over a trunk.

QUESTION NO: 5

Which of the following are true statements regarding the use of VLANs to segment a network? (Select all that apply.)

- A. They increase the size of collision domains
- B. They allow logical grouping of users by function.
- C. They can enhance network security.
- D. They increase the size of the broadcast domain while decreasing the number of collision domains.
- E. They increase the number of broadcast domains while decreasing the size of the broadcast domains.
- F. They simplify switch administration.

Answer: B, C, E

Explanation:

VLANs are used to segment a LAN into multiple, smaller LANs. This can be used to enhance security as local traffic from one VLAN will not be passed to users in other VLANs.

Incorrect Answers:

- A. VLANs are used to decrease the size of a collision domain, not increase it.
- D. The opposite is true.
- F. The default operation of a switch is to allow all traffic and to enable all ports in VLAN 1. The use of VLANs will increase the complexity of the switch environment, making for more difficult administration.

QUESTION NO: 6

What is a characteristic of ISL and 802.1q frame tagging in a switched LAN environment?

- A. They are used to find the best path through a network.
- B. They allow the exchange of filtering tables.
- C. They specify different implementations of the Spanning-Tree Protocol.
- D. They allow the exchange of routing tables
- E. They provide inter-switch VLAN communication.

Answer: E

Explanation: A trunk link is the other type of Layer 2 port supported on Cisco switches. When a trunk port is configured, it begins marking frames as they exit the port to indicate which VLAN each frame is associated with. The trunk port can also read the markings, called tags, as they enter the trunk port. This enables the switch to send a frame only to the ports for the given VLAN associated with the incoming frame.

The main purpose of trunking is to carry traffic between switches and maintain the VLAN information. Unlike an access link, the trunk link does not belong to a single VLAN but instead can carry traffic from several VLANs over a point-to-point link between two devices that understand the protocol.

Two forms of trunking are used for Cisco switches on Ethernet networks: An IEEE industry standard called IEEE 802.1Q. This is a frame-tagging mechanism that adds a VLAN identifier to the frame by inserting a tag at Layer 2.

Another form of trunking on Cisco switches is called Inter-Switch Link (ISL), which is a Cisco proprietary trunking mechanism. ISL uses a frame encapsulation method that adds a header to identify the VLAN.

Incorrect Answers:

- A, D. These are the functions of routers, not switches.
- B. Filtering tables can be used on certain Catalyst switches via the use of VLAN access control lists, but this information is never shared between switches.
- C. A separate STP instance is created for each VLAN, but the STP implementation remains the same.

QUESTION NO: 7

A new VLAN needs to be created for an existing network. Which of the following are the minimum tasks that must be accomplished in order to create the new VLAN? (Select three answer choices)

- A. The VLAN must be created
- B. The VLAN must be named
- C. An IP address and subnet mask must be configured for the new VLAN
- D. The desired ports must be added to the new VLAN
- E. The VLAN must be added to the existing VTP Domain

Answer: A, B, D

Explanation:

The best answers are A, B, D. In order to create a simple VLAN, you must create the VLAN, name it, and then assign ports to it. These are the minimum requirements for a functioning VLAN.

Incorrect Answers:

- C. Although an IP address is often configured, it is not required in order to create a functioning VLAN.
- E. By default, the VLAN will already be added to the VTP domain. Even if the new VLAN was not part of the VTP domain, it would still work as a new VLAN on the switch.

QUESTION NO: 8

What are some of the characteristics of a 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 typically increase the number of switches needed
- F. VLANs typically decrease the number of switches needed

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. VTP makes this possible.

Incorrect Answers:

C. Although trunking information does indeed add some level of overhead, the overall traffic overhead is greatly reduced through the use of VLANs.

E, F. The number of total switches needed in a network is the result of the number of devices on the entire LAN that need to be connected. Whether VLANs are used or not will have little, if any, impact on the total number of switches needed in a LAN.

QUESTION NO: 9

Which one of the following protocols allows the information about the configuration of a new VLAN to be distributed across entire switched network?

- A. STP
- B. VTP
- C. EIGRP
- D. SNMP
- E. CDP
- F. None of the above

Answer: B

Explanation:

Sybex CCNA Study Guide 4th Edition states on page 359:

”The basic goals of VLAN Trunking Protocol (VTP) are to manage all configured VLANs across a switched internetwork and to maintain consistency throughout that network. VTP allows an administrator to add, delete, and rename VLANs—information that is then propagated to all other switches in the VTP domain.”

Incorrect Answers:

- A. STP is the Spanning Tree Protocol, used to prevent bridging loops in a LAN.
- C. EIGRP is a routing protocol used to exchange routing information, not VLAN information.
- D. SNMP is the Simple Network Management Protocol, used to provide information to remote network management stations.
- E. CDP is the Cisco Discovery Protocol, which is used to exchange information between Cisco devices. It can only be used between Cisco routers and switches.

QUESTION NO: 10

Which encapsulation types are configurable on a Cisco switch for a trunk? (Select two answer choices)

- A. VTP
- B. ISL
- C. CDP
- D. 802.1Q
- E. 802.1p
- F. LLC
- G. IETF

Answer: B, D

Explanation: Trunks are used to carry traffic belonging to multiple VLANs between devices over the same link. A device can determine which VLAN the traffic belongs to by its VLAN identifier. The VLAN identifier is a tag that is encapsulated with the data. ISL and 802.1q are two types of encapsulations used to carry data from multiple VLANs over trunk links.

ISL is a Cisco proprietary protocol for interconnecting multiple switches and maintaining VLAN information as traffic goes between switches. ISL provides VLAN trunking capabilities while maintaining full wire speed performance on Ethernet links in full-duplex or half-duplex mode. ISL operates in a point-to-point environment and will support up to 1000 VLANs. In ISL, the original frame is encapsulated and an additional header is added before the frame is carried over a trunk link. At the receiving end, the header is removed and the frame is forwarded to the assigned VLAN. ISL uses Per VLAN Spanning Tree (PVST) which runs one instance of Spanning Tree Protocol (STP) per VLAN. PVST allows for optimal root switch placement for each VLAN and supports load balancing of VLANs over multiple trunk links.

802.1Q is the IEEE standard for tagging frames on a trunk and supports up to 4096 VLANs. In 802.1Q, the trunking device inserts a four-byte tag into the original frame and re-computes the Frame Check Sequence (FCS) before sending the frame over the trunk link. At the receiving end, the tag is removed and the frame is forwarded to the assigned VLAN. 802.1Q does not tag frames on the native VLAN. It tags all other frames transmitted and received on the trunk. While configuring a 802.1 trunk, you must make sure that the same native VLAN is configured on both sides of the trunk. IEEE 802.1Q defines a single instance of spanning tree running on the native VLAN for all the VLANs in the network which is called Mono Spanning Tree (MST). This lacks the flexibility and load balancing capability of PVST available with ISL. However, PVST+ offers the capability to retain multiple Spanning Tree topologies with 802.1Q trunking.

QUESTION NO: 11

You need to create a new VLAN on your Catalyst switch. This VLAN is to be named TESTKING. Which of the following need to be completed for the creation of this new VLAN? (Select all that apply)

- A. The TESTKING VLAN must be created.
- B. The desired ports must be added to the new TESTKING VLAN.

- C. The TESTKING VLAN must be added to all of the domains.
- D. The TESTKING VLAN must be named.
- E. An IP address must be configured for the TESTKING VLAN.
- F. None of the above. VLAN creations are automatic.

Answer: A, B, D

Explanation:

Creating a VLAN is done in 3 steps:

1. Create the VLAN
2. Name the VLAN
3. Assign ports to the VLAN

From there, other features and functionality can be configured, but these are the only steps that are required for the addition of a VLAN.

Incorrect Answers:

C. The VLAN needs only to be added to a single switch, where it can act as a stand-alone VLAN, or it can be transferred to other switches in the network through the use of the VTP protocol.

E. VLANs operate at layer 2, and although many are configured with a layer 3 IP address, it is not absolutely necessary to do this.

QUESTION NO: 12

When a switch port is used as a VLAN trunk, which of the following trunk modes are valid? (Select all that apply.)

- A. blocking
- B. auto
- C. desirable
- D. on
- E. transparent
- F. learning
- G. off

Answer: B, C, D, G

Explanation:

A trunk port can be configured as one of the following 5 different modes: on, off, desirable, auto, or nonegotiate.

The table below is a summary of the configuration modes.

Mode	Function	DTP Frames Transmitted	Final State (Local Port)
------	----------	------------------------------	-----------------------------

Auto(default)	Makes the port willing to convert the link to a trunk. The port becomes a trunk port if the neighboring port is set to on or desirable mode.	Yes, periodic.	Trunking
On	Puts the port into permanent trunking mode and negotiates to convert the link into a trunk. The port becomes a trunk port even if the neighboring port does not agree to the change.	Yes, periodic.	Trunking, unconditionally.
Nonegotiate	Puts the port into permanent trunking mode but prevents the port from generating DTP frames. You must configure the neighboring port manually as a trunk port to establish a trunk link. This is useful for devices that do not support DTP.	No	Trunking, unconditionally.
Desirable	Makes the port actively attempt to convert the link to a trunk link. The port becomes a trunk port if	Yes, periodic.	It will end up in trunking state only if the remote mode is on, auto, or desirable.

	the neighboring port is set to on, desirable, or auto mode.		
Off	Puts the port into permanent non-trunking mode and negotiates to convert the link into a non-trunk link. The port becomes a non-trunk port even if the neighboring port does not agree to the change.	No in steady state, but will transmit informs to speed up remote end detection after the change from on.	Non-trunking

QUESTION NO: 13

Which of following VLAN frame encapsulation types are configurable on a Cisco switch? (Select two answer choices.)

- A. VTP
- B. 802.1Q
- C. LLC
- D. ISL
- E. CDP
- F. PAP

Answer: B, D

Explanation:

ISL and 802.1Q are the two trunking encapsulations that can be configured on a Cisco switch. ISL is Cisco proprietary and 802.1Q is the IEEE standard method.

Incorrect Answers:

- A. VTP is the VLAN Trunking Protocol, which is used to carry VLAN information across the trunks. The question is asking for the encapsulation options for the trunk, which will be used by VTP.
- C. LLC is the Logical Link Control, which is a sub-layer of the data link layer.
- E. CDP is the Cisco Discovery Protocol, which is used by Cisco devices to discover information on neighboring Cisco devices.

F. PAP is the Password Authentication Protocol, which is used as an authentication mechanism on PPP links.

QUESTION NO: 14

Which VTP mode should a Cisco switch be set to if this switch is to add or delete VLANs to a management domain?

- A. Transparent
- B. Server
- C. Auto
- D. Client
- E. User

Answer: B

Explanation:

VTP Modes:

If you intend to make a switch part of a VTP management domain, each switch must be configured in one of three possible VTP modes. The VTP mode assigned to a switch will determine how the switch interacts with other VTP switches in the management domain. The three VTP modes that can be assigned to a Cisco switch include server mode, client mode, and transparent mode. Each of these roles is outlined below:

Server Mode Once VTP is configured on a Cisco switch, the default mode used is Server Mode. In any given VTP management domain, at least one switch must be in Server Mode. When in Server Mode, a switch can be used to add, delete, and modify VLANs, and this information will be passed to all other switches in the VTP management domain.

Client Mode When a switch is configured to use VTP Client Mode, it is simply the recipient of any VLANs added, deleted, or modified by a switch in Server Mode within the same management domain. A switch in VTP client mode cannot make any changes to VLAN information.

Transparent Mode A switch in VTP Transparent Mode will pass VTP updates received by switches in Server Mode to other switches in the VTP management domain, but will not actually process the contents of these messages. When individual VLANs are added, deleted, or modified on a switch running in transparent mode, the changes are local to that particular switch only, and are not passed to other switches in the VTP management domain.

Based on the roles of each VTP mode, the use of each should be more or less obvious. For example, if you had 15 Cisco switches on your network, you could configure each of them to be in the same VTP management domain. Although each could theoretically be left in the default Server Mode, it would probably be easier to leave only one switch in this configuration, and then configure all remaining switches for VTP Client Mode. Then, when you need to add, delete, or modify a VLAN, that change can be carried out on the VTP Server Mode switch and passed to all Client Mode switches automatically. In cases

where you need a switch to act in a relatively standalone manner, or do not want it to propagate information about its configured VLANs, use Transparent Mode.

Incorrect Answers:

A. A switch in VTP Transparent Mode will pass VTP updates received by switches in Server Mode to other switches in the VTP management domain, but will not actually process the contents of these messages.

C, E. These are not valid VTP modes.

D. Client mode merely accepts changes made by the switch that is connected and in SERVER mode.

QUESTION NO: 15

What must an administrator do in order to successfully configure a VLAN trunk between two switches? (Select two answer choices)

- A. Set each end of the trunk line to IEEE 802.1Q encapsulation.
- B. Set the same VTP management domain name on both switches.
- C. Set all ports on the two switches as access ports.
- D. Configure one of the two switches as a VTP server.
- E. Connect the two switches using a rollover cable.
- F. Use a router to forward VTP traffic between the VLANs.

Answer: B, D

Explanation:

All servers that need to share VLAN information must use the same domain name, and a switch can only be in one domain at a time. This means that a switch can only share VTP domain information with other switches if they're configured into the same VTP domain. You can use a VTP domain if you have more than one switch connected in a network, but if you've got all your switches in only one VLAN, you don't need to use VTP. VTP information is sent between switches via a trunk port.

Switches advertise VTP management domain information, as well as a configuration revision number and all known VLANs with any specific parameters. There's also something called VTP transparent mode, in it, you can configure switches to forward VTP information through trunk ports, but not to accept information updates or update their VTP databases. At least one of the switches will need to be configured as the VTP server in order to pass the VLAN info.

Incorrect Answers:

A. Although this is a valid option, it is not a requirement since using ISL as the encapsulation type is also a valid option.

E. A rollover cable is not used between switches for any of the port types.

F. Routers will be required for sending traffic from one VLAN to the other, but not to forward the actual VTP traffic.

QUESTION NO: 16

Which of the following can be an expected outcome of a VLAN? (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. VLANs can span multiple switches.
- E. VLANs typically decrease the number of switches needed

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. VTP makes this possible.

Incorrect Answers:

- C. Although trunking information does indeed add some level of overhead, the overall traffic overhead is greatly reduced through the use of VLANs.
- E, F. The number of total switches needed in a network is the result of the number of devices on the entire LAN that need to be connected. Whether VLANs are used or not will have little, if any, impact on the total number of switches needed in a LAN.

QUESTION NO: 17

How could a large corporation with many specialized divisions benefit from using VLANs on their networks? (Select three answer choices.)

- A. VLANs allow access to network services based on department, not physical location.
- B. VLANs utilize packet filtering to enhance network security.
- C. VLANs provide a low-latency, high bandwidth internetworking alternative.
- D. VLANs provide a method of communication between IP addresses in large networks.
- E. VLANs establish segmented broadcast domains in switched networks.
- F. VLANs can greatly simplify adding, moving, or changing hosts on the network.

Answer: A, E, F

Explanation:

VLANs establish broadcast domains in switched networks, so by virtue of having the option to create many efficient broadcast domains, congestion is reduced and network throughput is greatly enhanced. VLANs allow networks to be divided by department or resource needs, rather than by physical location. When people move departments, leave a department, or join a department, administration is easy and convenient with a few keystrokes.

Incorrect Answers:

B, D. These would be router functions at layer 3. Switches and VLANs operate at layer 2 of the OSI model.

C. The use of VLANs may actually increase the latency in some cases, as traffic from one VLAN to the other will need to be routed.

QUESTION NO: 18

Which commands, when used together, would create an 802.1Q link? (Select two answer choices)

- A. Switch(vlan)# **mode trunk**
- B. Switch(config)# **switchport access mode trunk**
- C. Switch(config-if)# **switchport mode trunk**
- D. Switch(config-if)# **switchport trunk encapsulation dot1q**
- E. Switch(config)# **switchport access mode 1**
- F. Switch(vlan)# **trunk encapsulation dot1q**

Answer: C, D

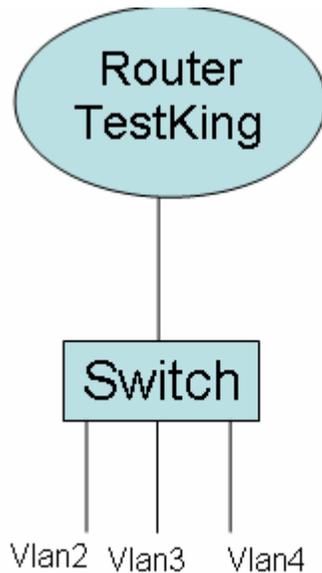
Explanation:

Creating this trunk link is a two step process. First you have to set the switchport mode to trunk, and then you configure the encapsulation. The giveaway on this question is the fact that to create a trunk on an interface, you have to be in interface configuration mode. So C sets the trunk, and D sets the encapsulation.

Implement a LAN (5 questions)

QUESTION NO: 1

The TestKing network Topology is displayed in the exhibit below:



A switch has been configured for three different VLANs: VLAN 2, VLAN 3, and VLAN 4. For the purposes of communication between VLANs a router is to be added. Host from one VLAN should be able to reach the hosts in the other VLANs. Based on this requirement, what type of connection is acceptable between the router and switch?

- A. 10 Mbps Ethernet
- B. 56 kbps serial
- C. 100 Mbps Ethernet
- D. 1,544 Mbps serial
- E. 1000 Mbps Ethernet

Answer: C, E

Explanation:

For all hosts to be able to reach each other, inter-VLAN routing will need to be configured. In order to provide Inter-VLAN routing between the router and the switch, a trunk will need to be set up. This trunk can be either ISL or 802.1Q. On a router, the interface that is to be used as the trunk can be 100 Mbps Ethernet, Gigabit Ethernet, or 10 Gigabit Ethernet. Therefore, only choices C or E are correct.

QUESTION NO: 2

A router has been configured to provide the nine users on the branch office LAN with Internet access, as shown in the diagram below:



```
Branch#show interfaces FastEthernet 0
FastEthernet0 is up, line protocol is up
Hardware address is 000c.ce8d.8860
Internet address is 192.168.10.30/30
MTU 1500 bytes, BW 10000 Kbit,
DLY 1000 usec, reliability 255/255,
txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Half-duplex, 10Mb/s, 100BaseTX/FX
(... output omitted ...)
```

It is found that some of the users on the LAN cannot reach the Internet. Other users are not having any problems. Based on the topology and router output shown, which of the following commands should be issued on the router to correct the problem? (Choose all that apply).

- A. Branch(config-if)# **no shutdown**
- B. Branch(config-if)# **duplex full**
- C. Branch(config-if)# **no keepalive**
- D. Branch(config-if)# **bandwidth 100**
- E. Branch(config-if)# **encapsulation 802.3**

Answer: B, D

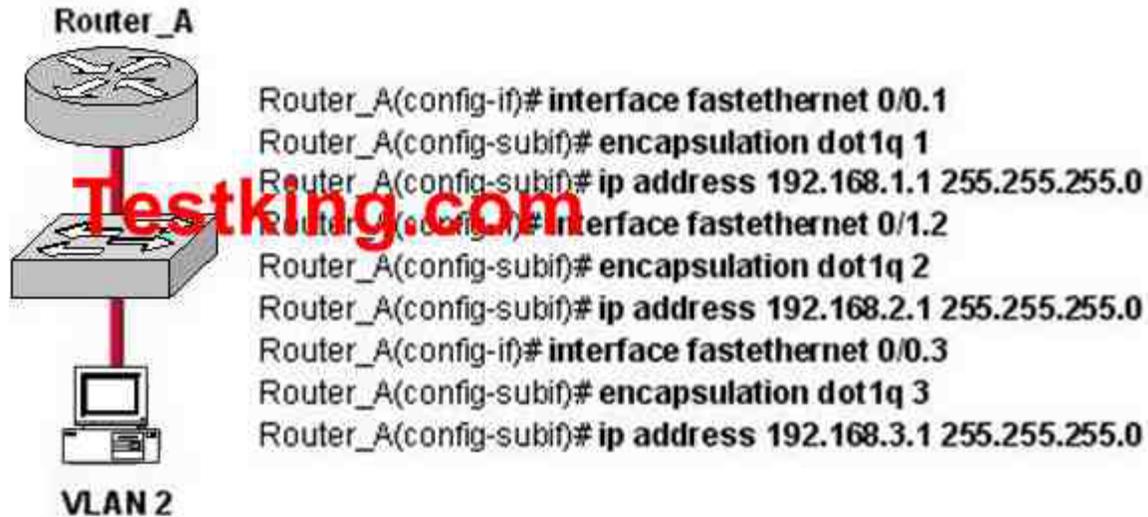
When some of the users on a LAN are experiencing problems while others are not, the problem could be mismatched settings between the router and the PC. Mismatched duplex and speed settings could result in connectivity issues. To see if this may be the problem the Ethernet interface can be set to 10, 100 or auto for the speed settings and half, full, or auto for the duplex settings.

Incorrect Answers:

- A. This may be the problem if all users on the Branch LAN were having problems. The fact that at least one user on the LAN is not experiencing any problems means that the interface must be enabled already.
- C. This will force the router to not rely on keepalives to maintain an operational status, effectively making the interface “up” even if nothing is plugged into the interface. However, it will not fix any issues that some PC users would have.

E. Although 802.3 is the correct terminology for the Ethernet standard, it is not an encapsulation option for any interface.

QUESTION NO: 3



A router is configured as shown in the graphic. The switch is connected to the router over a VLAN trunk. The switch has been configured with three VLANs: VLAN1, VLAN2, and VLAN3. In addition, the IP address of the switch is 192.168.1.2. A host is being added to the switch on VLAN 2.

What is the correct default gateway for this computer?

- A. 192.168.1.1
- B. 192.168.1.2
- C. 192.168.2.1
- D. 192.168.2.2
- E. 192.168.3.1
- F. 192.168.3.2

Answer: C

The default gateway for this host should be the IP address of the local router on that VLAN. Based on the router configuration, this IP address is 192.168.2.1. In the router configuration, the number that follows the “encapsulation dot1q” command is the VLAN that is assigned to it. In this case, the PC host belongs to VLAN 2, so the subinterface fast Ethernet 0/0.2 is the one that should be chosen.

Incorrect Answers:

A. This is the IP address that hosts in VLAN 1 should use as their default gateway.

- B. Even though this is the IP address of the switch itself as stated in the question, it should not be chosen as the default gateway for any of the hosts in any of the VLANs. This IP address would be used only to administer and make changes to the switch.
- D, F. These are incorrect choices.
- E. This is the IP address that hosts in VLAN 3 should use as their default gateway.

QUESTION NO: 4

The LAN needs are expanding at the Testking corporate office, which is quickly growing. You are instructed to enlarge the area covered by a single LAN segment on the TestKing network.

Which of the following are layer 1 devices that you can use? (Choose all that apply.)

- A. A switch.
- B. A router.
- C. A network adapter card.
- D. A hub.
- E. A repeater.

Answer: D E

Explanation:

A hub simply repeats the electrical signal and makes no attempt to interpret the electrical signal (layer 1) as a LAN frame (Layer 2). So, a hub actually performs OSI layer 1 functions, repeating an electrical signal, whereas a switch performs OSI layer 2 functions, actually interpreting Ethernet header information, particularly addresses, to make forwarding decisions. Hubs can be used to increase the number of stations that can be supported on a LAN.

Because the repeater does not interpret what the bits mean, but does examine and generate electrical signals, a repeater is considered to operate at Layer 1. Repeaters can be used to physically extend the LAN to greater distances.

QUESTION NO: 5

You are experiencing intermittent issues relating to congestion with your network. What are the possible causes of congestion on a LAN? (Choose all that apply.)

- A. A broadcast domain with too many hosts.
- B. Full duplex operation.
- C. Broadcast storms.
- D. Multicasting.
- E. Network Segmentation.
- F. Low bandwidth.

Answer: A, C, F

Explanation:

A LAN segment with too many hosts can mean that there are a large number of stations contending for bandwidth. It can also mean an increase in the number of collisions on the segment, which can cause further congestion issues. Broadcast storms are the result of a large number of broadcasts sent over the LAN. Because each station listens to these broadcast messages, congestion can occur quickly. Finally, low bandwidth can simply mean that the LAN can not process all of the LAN traffic that is being sent. This can mean that TCP sessions are retransmitted, which can lead to additional congestion.

Incorrect Answers:

B. This can alleviate congestion, as data can be sent and received at the same time. In addition, collisions are not possible in a full duplex LAN.

D. Multicasting can actually alleviate congestion issues, as single streams of information can reach multiple hosts at the same time, instead of using a series of point to point connections.

E. Segmentation breaks up a large LAN into multiple, smaller LANS. This will mean fewer hosts per broadcast domain.

Customize a switch configuration to meet specified network requirements (4 questions)

QUESTION NO: 1

You have a server that's directly connected to a Cisco switch by way of its Fa0/1 port, and you don't want any other MAC addresses from any other servers to access this port. How would you accomplish this? (Select two answer choices)

- A. Configure port Fa0/1 to accept connections only from the static IP address of the server.
- B. Employ a proprietary connector type on Fa0/1 that is incompatible with other host connectors.
- C. Configure the MAC address of the server as a static entry associated with port Fa0/1.
- D. Bind the IP address of the server to its MAC address on the switch to prevent other hosts from spoofing the server IP address.
- E. Configure port security on Fa0/1 to reject traffic with a source MAC address other than that of the server.
- F. Configure an access list on the switch to deny server traffic from entering any port other than Fa0/1.

Answer: C, E

Explanation: You can configure a MAC address to be associated only with a particular port, with the restriction that frames destined to that MAC address have to enter through that particular port. So answer choice C is correct.

Another feature you can use is port security. It can preset a limit to the number of sources (including limiting to one) that can forward frames into the said port switch. When a device with a different MAC address than the one configured for port security is connected to the switch, the port will administratively shut itself down. The port will only forward traffic again after an administrator manually enables it.

Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Pages 583-585.

QUESTION NO: 2

Which switching mode provides the highest level of integrity and error-free transport, rather than maximizing speed?

- A) 802.1q forwarding
- B) VTP transparent mode
- C) cut-through
- D) store-and-forward
- E) fragment-free
- F) frame-filtering

Answer: D

Explanation:

The Switch receives and stores all bits in the frame before forwarding the frame. This allows switch to check the FCS before forwarding the frame. The FCS is the frame check sequence, and the information contained in it is used by the switch to prevent frames with errors from being forwarded through the network.

Incorrect Answers:

- E. The Switch performs the address table lookup as soon as the destination address field in the header is received. The first bits in the frame can be sent out to out port before the final bits in the incoming frame are received. This does not allow the switch to discard frames that fail the FCS check.
- C. Cut through will not perform any error checking. This would be the best choice for ports where speed was most important.

QUESTION NO: 3

A new switch is installed in the Testking network. This switch is to be configured so that VLAN information will be automatically distributed to all the other Cisco Catalyst switches in the network.

Which of the conditions below have to be met in order for this to occur? (Choose all that apply).

- A. The switch that will share the VLAN information must be in the VTP Server mode.
- B. The switches must be in the same VTP domain.
- C. The switch that will share the VLAN information must be configured as the root bridge.
- D. The switches must be configured to use the same VTP version.
- E. The switches must be configured to use the same STP version.
- F. The switches must be configured to use the same type of ID tagging.

Answer: A, B, F

Explanation:

For the VLAN information to pass automatically throughout the network, VTP must be set up correctly. In order for VTP to work, a VTP server is needed, the VLAN's must be

in the same VTP domain, and the encapsulation on each end of the trunk must both set to either 802.1Q or ISL.

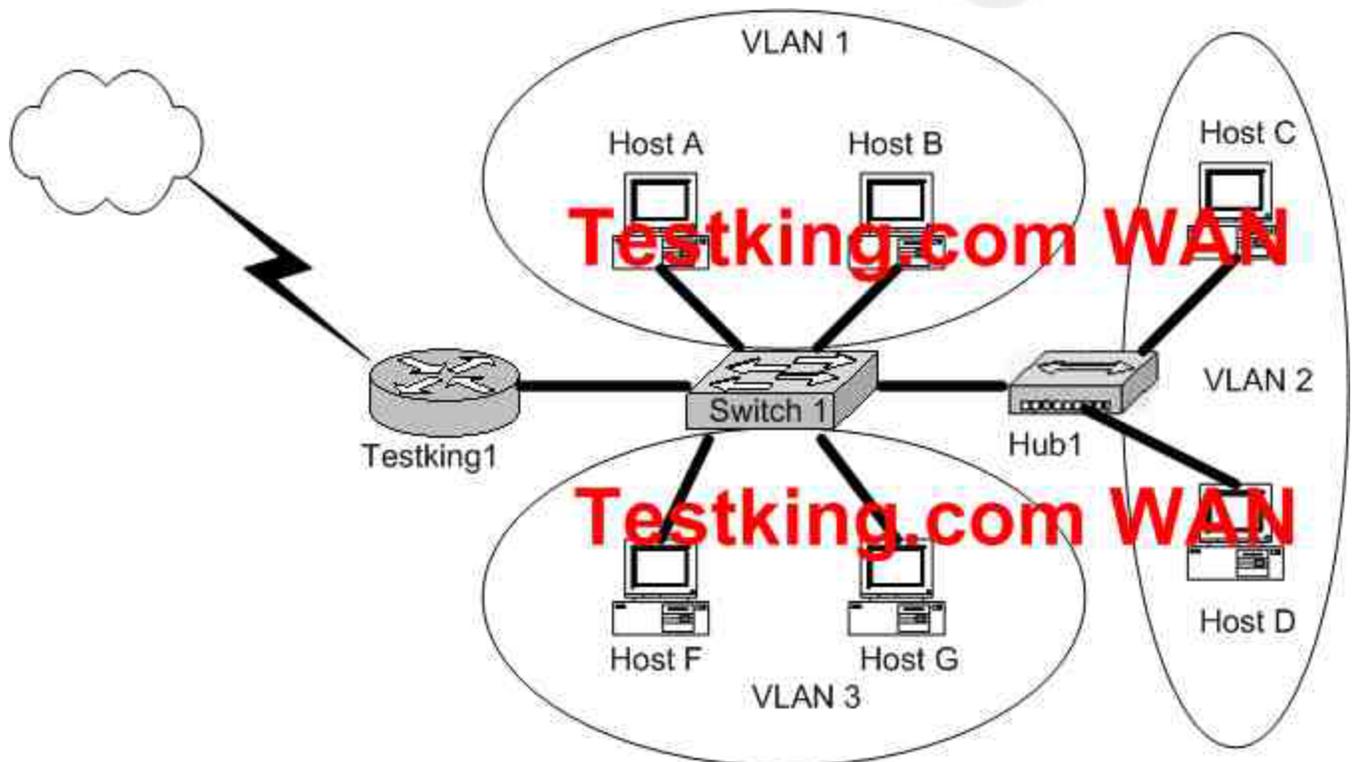
Incorrect Answers:

C. Root bridges and other functions of the Spanning Tree Protocol (STP) have no impact of the VTP configuration.

D, E. There is only one version of VTP and STP.

QUESTION NO: 4

The Testking Network consists of a router, switch, and hub as shown below:



In accordance with the above diagram; which of the statements below correctly describe the switch port configuration and the router port configurations? (Select three answer choices)

- A. The Testking1 WAN port is configured as a trunking port.
- B. The Testking1 port connected to Switch1 is configured using subinterfaces.
- C. The Testking1 port connected to Switch1 is configured as 10 Mbps.
- D. The Switch1 port connected to Testking1 is configured as a trunking port.
- E. The Switch1 port connected to Host B is configured as an access port.
- F. The switch1 port connected to Hub1 is configured as full duplex.

Answer: B, D, E

Explanation:

B is correct because the diagram and the function match the description of a subinterface. Subinterfaces are needed because for inter-vlan communication, routing needs to take place. D is correct because all 3 VLAN's are trunked to reach the router. E is correct because access ports are correct in this case.

Incorrect Answers:

A. This is incorrect because trunks only work between switches, and not between a router and a WAN.

C, F. Although these may be true, we are not given enough information in this diagram to confirm it.

Manage system image and device configuration files (25 questions)

QUESTION NO: 1

When you power up a Cisco router; in what memory is the start-up configuration normally stored in?

- A. RAM
- B. ROM
- C. FLASH
- D. NVRAM

Answer: D

Explanation:

The startup configuration is stored in the Non-Volatile RAM.

Incorrect Answers:

- A, B. No configuration information is stored in RAM or ROM.
- C. The IOS is normally stored in the flash memory, not the saved configuration.

QUESTION NO: 2

You are the administrator of the Testking network and you have forgotten the password to one of your routers. After completing the password recovery procedure the router returned to its normal operation. The config-register was set back to the initial default value. What is this value?

- A. 0x2112
- B. 0x2104
- C. 0x2102
- D. 0x2142
- E. 0x2100

Answer: C

Explanation:

The config-register's default factory setting is 0x2102. The following display the possible configuration register values and their meanings:

Configuration Register Values and their Meaning:

The table below contains some common settings which are valid on most platforms.

640 - 801

Note: Before changing the configuration register on your router to one of the values below, verify that it can be used by checking the appropriate hardware installation guide.

Configuration Register Setting	Router Behavior
0x102	<ul style="list-style-type: none">• Ignores break• 9600 console baud
0x1202	<ul style="list-style-type: none">• 1200 baud rate
0x2101	<ul style="list-style-type: none">• Boots into bootstrap• Ignores break• Boots into ROM if initial boot fails• 9600 console baud rate
0x2102	<ul style="list-style-type: none">• Ignores break• Boots into ROM if initial boot fails• 9600 console baud rate default value for most platforms
0x2120	<ul style="list-style-type: none">• Boots into ROMmon• 19200 console speed
0x2122	<ul style="list-style-type: none">• Ignores break• Boots into ROM if initial boot fails• 19200 console baud rate
0x2124	<ul style="list-style-type: none">• NetBoot• Ignores break• Boots into ROM if initial boot fails• 19200 console speed
0x2142	<ul style="list-style-type: none">• Ignores break• Boots into ROM if initial boot fails

	<ul style="list-style-type: none"> • 9600 console baud rate • Ignores the contents of Non-Volatile RAM (NVRAM) (ignores configuration)
0x2902	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails • 4800 console baud rate
0x2922	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails • 38400 console baud rate
0x3122	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails • 57600 console baud rate
0x3902	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails • 2400 console baud rate
0x3922	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails • 115200 console baud rate

Reference:

http://www.cisco.com/en/US/products/hw/routers/ps133/products_tech_note09186a008022493f.shtml

Incorrect Answers:

D. This is the setting that would be used during the password recovery procedure.

QUESTION NO: 3

Which of the commands below would you enter if you wanted to see the configuration register of your router?

- A. show boot
- B. show flash

- C. show register
- D. show version
- E. show config

Answer: D

Explanation:

To display the configuration of the system hardware, the software version, the names and sources of configuration files, and the boot images, use the **show version** command in EXEC mode.

Example:

The following is sample output from the show version command:

```
Router1> show version
```

```
Cisco Internetwork Operating System Software
IOS (tm) 7200 Software (C7200-J-M), Experimental Version
11.3(19970915:164752) [
hampton-nitro-baseline 249]
Copyright (c) 1986-1997 by cisco Systems, Inc.
Compiled Wed 08-Oct-97 06:39 by hampton
Image text-base: 0x60008900, data-base: 0x60B98000
ROM: System Bootstrap, Version 11.1(11855) [beta 2], INTERIM SOFTWARE
BOOTFLASH: 7200 Software (C7200-BOOT-M), Version 11.1(472), RELEASE
Router1 uptime is 23 hours, 33 minutes
cisco 7206 (NPE150) processor with 57344K/8192K bytes of memory.
R4700 processor, Implementation 33, Revision 1.0 (512KB Level 2 Cache)
Last reset from power-on
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
8 Ethernet/IEEE 802.3 interface(s)
2 FastEthernet/IEEE 802.3 interface(s)
4 Token Ring/IEEE 802.5 interface(s)
4 Serial network interface(s)
1 FDDI network interface(s)
125K bytes of non-volatile configuration memory.
1024K bytes of packet SRAM memory.
20480K bytes of Flash PCMCIA card at slot 0 (Sector size 128K).
20480K bytes of Flash PCMCIA card at slot 1 (Sector size 128K).
4096K bytes of Flash internal SIMM (Sector size 256K).
Configuration register is 0x2102
```

QUESTION NO: 4

Which three of the following basic network services are provided by the Cisco IOS? (Select three answer choices)

- A. Defines the network topology
- B. Access to network resources
- C. Routing and switching functions

- D. Content Filtering
- E. Intrusion Detection

Answer: A, B, C

Explanation

These are all basic network services provided by all IOS versions. These services are included in all IOS versions and feature sets.

Incorrect Answers:

- D. Content filtering, such as java applet stripping, URL filtering, virus removal, etc are not normally performed by Cisco router and switch IOS.
- E. Intrusion detection and network security services are normally performed by firewalls and servers.

Reference:

CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5)

QUESTION NO: 5

After logging into a router, you type in “enable” and then enter the correct password when prompted. What is the current router prompt symbol at this point?

- A. >
- B. #
- C. ?
- D. *
- E. All of the above
- F. None of the above

Answer: B

Explanation:

When you enter the privileged mode by typing enable the router prompt will change to a # character.

Incorrect Answers:

- A. This is the prompt given after initially logging on.
- C, D. These are not valid router prompts.

QUESTION NO: 6

In the Cisco IOS, what is the definition of a global command?

- A. A command that can be entered in any configuration mode.
- B. A command that supports all protocols.

- C. A command that is implemented in all IOS versions.
- D. A command that is set once and affects the entire router.
- E. A command that is available in every release of IOS.

Answer: D

Explanation:

When you enter global configuration mode and enter a command, it is applied to the running configuration file that is currently running in ram. The configuration of a global command affects the entire router. An example of a global command is one used for the hostname of the router.

Incorrect Answers:

- A. Global configuration commands must be performed while in global configuration mode. For example, when you are in the interface configuration mode, you most likely will need to exit out into global mode to type in the commands.
- B. Global commands do not necessarily support every protocol.
- C. This is not necessarily true, since there are certain global commands that are supported on one feature set that are not on a different feature set of IOS.
- E. Global commands can become outdated, and can be replaced by newer commands in the newer releases of IOS.

QUESTION NO: 7

You just purchased a refurbished router that contains a configuration from a previous deployment. What should you do, before entering a new configuration into the router?

- A. RAM should be erased and the router restarted.
- B. Flash should be erased and the router restarted.
- C. NVRAM should be erased and the router restarted.
- D. The new configuration should be entered and saved.

Answer: D

Explanation: It is never in your best interest to completely purge the contents of a router. It's safer to save a new configuration and implement it later while the router is up and running, then it is to start from scratch. That way if there's a problem with the router, you'll be more likely to isolate it while it is still running on the original configuration.

QUESTION NO: 8

After logging into a router and typing in a few show commands, you press the up arrow key. What will this do?

- A. It will recall the previous command line
- B. It will move the cursor one line up
- C. It will redisplay the current command line
- D. It will capitalize the command line
- E. None of the above

Answer: A

Explanation:

The up arrow key is used to recall the previous command line entry. The commands that were entered previously can be displayed by repeatedly pressing the up arrow key, or by entering the “show history” command.

QUESTION NO: 9

After working on a router, some problems arise and you wish to view the commands that you recently entered. Which IOS command opens the history buffer and displays the most recently entered commands?

- A. Show history
- B. Show buffers
- C. Show typed commands
- D. Show terminal buffer
- E. Show command

Answer: A

Explanation:

The router will buffer previously entered commands. By default, the “show history” command will display the previous ten commands that were entered. To see the contents of the buffer you enter the show history command.

Incorrect Answers:

- B. This command will show the memory buffer information
- C, D. These are invalid commands.

QUESTION NO: 10

You have just purchased a brand new router and wish to have the router prompt you through the initial configuration commands. Which router mode does this describe?

- A. ROM Monitor mode
- B. SETUP mode
- C. Autoflash mode

- D. RXBOOT mode
- E. None of the above

Answer: B

Explanation:

Setup mode is a convenient mode that walks you through the setup procedure by prompting you with specific questions and options one by one.

QUESTION NO: 11

After working all night and successfully configuring a Cisco router for the TestKing network you save your changes on the startup config, reboot the router, and go out for a cigarette. When you return, none of your changes are active and the router boots to the initial configuration mode! Which of the choices below indicates the source of your problem?

- A. Hardware failure in NVRAM prevents the router from loading the config
- B. Startup-config in flash is corrupt and cannot be analyzed
- C. Router configuration-register set to bypass startup configuration
- D. Startup-config in NVRAM is corrupt and cannot be analyzed
- E. None of the above

Answer: C

Explanation:

The default configuration-register setting of 0x2102 loads the IOS from flash and the configuration from NVRAM.

However, for password recovery, you can set the register to 0x2142 and the startup-config file in NVRAM will be bypassed. The problem described here is that the config register was not changed back to 0x2102 before the router was rebooted, so the active configuration is bypassed. Simply setting the config register back to 0x2102 will fix this problem.

Incorrect Answers:

A, B, D. All of these describe hardware or software errors. In the event that this is the problem, errors will be generated and the router will fail to boot properly. In these cases, the router will not return to the initial startup configuration.

QUESTION NO: 12

While working in setup mode, a configuration line is typed incorrectly. What should you do to exit setup mode, without executing or saving any of the mistakes you made? (Select two answer choices)

- A. Type **exit** at the setup dialog.
- B. Type **close** at the setup dialog.
- C. Press the **Ctrl-C** key combination.
- D. Press the **Ctrl-X** key combination.
- E. Issue the **copy startup-config** command.
- F. Issue the **'write e'** command.
- G. Issue the **"write mem"** command

Answer: A, C

Explanation:

The command 'exit' will set you back from wherever you were without saving any changes. Pressing Ctrl-C will do the same thing.

Incorrect Answers:

- B. This is an invalid command
- E. This command is used to save the configuration stored on NVRAM to a location.
- F. This will have the effect of erasing the running configuration, and setting the router configuration back to the factory default settings.
- G. This is an old command that is still supported on the latest Cisco IOS. It is short for "write memory" and has the same effect as the "copy running-config startup-config" command.

QUESTION NO: 13

You are a senior network administrator at TestKing, and while performing the password recovery procedure on your 2500 series Cisco router, you type in the following command:

`o/r 0x2142`

What is the purpose of this command?

- A. It is used to restart the router.
- B. It is used to bypass the configuration in NVRAM.
- C. It is used to enter ROM Monitor mode.
- D. It is used to view the lost password.
- E. It is used to save the changes to the configuration.

Answer: B

Explanation:

The `o/r 0x2142` command changes the value of config-register to 2142 in a Cisco 2500 series router, so that the Router ignores the NVRAM contents and reverts to the initial setup configuration mode when it boots.

QUESTION NO: 14

Which of the following commands will display the name of the IOS image file being used in a Cisco router?

- A. Router# show IOS
- B. Router# show version
- C. Router# show image
- D. Router# show protocols
- E. Router# show flash

Answer: B, E

The IOS command "Show flash" displays all the image files in it. There could be more than one file. However, "show version" displays the one that is currently in use by the router.

Incorrect answers:

A, C. These are invalid commands.

D. The command "show protocols" will show the routed protocols in use by the router and by interface conditions and their IP address, if configured.

QUESTION NO: 15

After making changes to the router, you issue the "copy running-config startup-config" command to save changes. After reloading the router, the router comes up in setup mode. You again make changes, save them, and reboot. Again, the router comes up in setup mode.

What is the most likely cause of this?

- A. The NVRAM is corrupted.
- B. The **boot system** commands were omitted in the configuration.
- C. The configuration register setting is incorrect.
- D. The upgraded configuration incompatible with the hardware platform.
- E. The upgraded IOS incompatible with the hardware.

Answer: C**Explanation:**

When you enter the command, "copy running-config startup-config" you save your current settings to NVRAM. The problem described in this question is that it appears the router is set to bypass the NVRAM, making it come up in the initial configuration dialog. The most likely cause of a router with the configuration register settings set incorrectly is that the router recently went through the password recovery procedure.

QUESTION NO: 16

You need to upgrade the IOS of an existing router on your network. The new IOS image is located on a TFTP server that you have set up within the network. What command should you issue in order to download the new IOS version?

- A. Router# **copy tftp flash**
- B. Router# **copy flash run**
- C. Router(config)# **restore flash**
- D. Router(config)# **repair flash**
- E. Router# **copy flash tftp**
- F. Router# **copy start flash**

Answer: A

The command “copy tftp flash” will copy the new IOS version upgrade from your networks TFTP server (assuming of course you have a TFTP server with the new version of IOS standing by).

Incorrect Answers:

- C, D. The copy tftp flash command should be issued from the enable command prompt. It is not necessary to go into configuration mode.
- E. This will have the reverse effect, and will copy the IOS image on your router onto a folder in your TFTP server.

QUESTION NO: 17

Study the exhibit below:



A systems administrator in Lisbon configured a new router to connect with his company's head office in Gibraltar. He attempted to create and save an image file of the new router on the TFTP server in Gibraltar but failed. Based on the information given by above exhibit, what is the underlying problem?

- A. The IP address of the TFTP server not correct.
- B. There is an incorrect subnet mask of the TFTP server.
- C. The default gateway of the TFTP server not properly set.
- D. The subnet mask on the Lisbon router not correct
- E. There is an incorrect IP address configured on E0 of the Gibraltar router

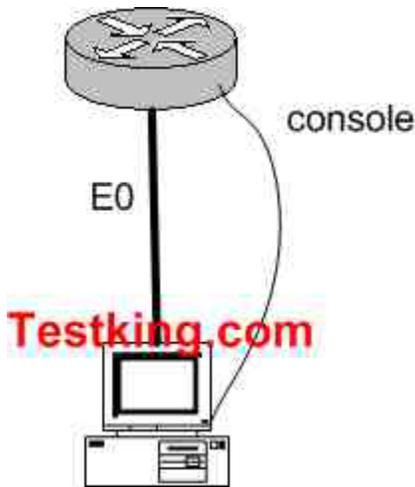
Answer: B

Explanation:

An incorrect subnet mask on the TFTP server is the cause of this problem. If you look at the subnet masks of all the other devices you'll notice that they are /28. If you rewrite the subnet mask of the TFTP server, of 255.255.255.192 you'll notice that it translates to a subnet mask of /26. A subnet mask of 255.255.255.240, which is a /28, applied to the TFTP server will fix this problem.

QUESTION NO: 18

Study the exhibit below:



You just connected your computer directly to the E0 port of a router and you're running a console session. Which of the following steps below are required to successfully implement the "copy flash tftp" command and upload the flash image onto the TFTP server? (Select three answer choices)

- A. TFTP server software must be activated.
- B. TFTP server software must be running on the administrator's workstation.
- C. There must be space in the flash memory of the router to accommodate the file to be copied.
- D. The **copy flash tftp** command must provide the IP address of the administrator's workstation.
- E. The administrator's workstation must be on the same subnet as the router E0 interface.
- F. The Ethernet connection between the router and the administrator's workstation must be via straight-through cable.

Answer: B, D, E

Explanation:

The sole purpose of the 'copy flash tftp' command is to copy the routers configuration file to the TFTP server to save it. The first logical variable for this operation is that the TFTP software is actually running. So B is correct. D is correct because the IOS won't be able to send off if it doesn't even know where the TFTP server is. Finally, TFTP server must be on the same subnet as the connectivity must be direct and the TFTP and router will need to know how to reach each other.

Incorrect Answers:

- A. The TFTP can't just be activated, it has to be running in the right place.
- C. This is not valid because you aren't downloading into the flash, you're uploading out of the flash, so space isn't a concern.
- F. A cross over cable must be used when connecting from a PC directly into the router's Ethernet interface.

QUESTION NO: 19

After issuing the “show version” command on your Cisco router, you notice that the image is named “C7200-ajs40-mx”. What does the C7200 portion of the filename represent?

- A. The memory capacity requirements
- B. The hardware product platform
- C. The distribution channel
- D. The feature capabilities
- E. The run location and compression status

Answer: B

Explanation:

Cisco has a Cisco IOS image naming convention for identifying the platform or board for which the binary software is built, the package feature content of the image, and the area of memory used by the image at run time. The image name follows a three-part format:

PPPPP-FFFF-MM

Where PPPPP represents the platform; FFFF represents features; and MM represents run-time memory and compression format. In this case, the C7200 means that it is a Cisco 7200 series router.

QUESTION NO: 20

What kind of information can you deduce from an IOS image file name? (Select three answer choices)

- A. Distribution channel failures
- B. Feature capabilities
- C. Memory capacity needs
- D. Hardware product platform
- E. Programming language requirements
- F. Run location and compression status

Answer: B, D, F

Explanation:

Image Naming Conventions

You can identify the platform, features, and image location by the name of the image. The naming convention is platform-features-type for images that are stored on a UNIX system.

The platform variable indicates which platforms can use this image. Examples of platform variables include rsp (Cisco 7000 series with RSP7000 and Cisco 7500 series), c1600 (Cisco 1600 series), and c1005 (Cisco 1005).

The features variable identifies the feature sets supported by the image.

The type field can contain the following characters:

- f-The image runs from Flash memory.
- m-The image runs from RAM.
- r-The image runs from ROM.
- l-The image is relocatable.
- z-The image is zip compressed.
- x-The image is mzip compressed.

QUESTION NO: 21

After logging into the RtrB router, you issue the “show interface” command as displayed below:

```
RtrB#show interface serial0/0
Serial0/0 is up, line protocol is up
  Hardware is PowerQUICC Serial
  Internet address is 10.0.15.2/21
  MTU 1500 bytes, BW 128 Kbit, DLY 20000 usec,
    Reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation PPP, loopback not set
  Keepalive set (10 sec)
  LCP Open
  Closed: IPXCP
  Listen: CCP
  Open: IPCP, CDPCP
  Last input 00:00:00, output 00:00:00, output hang never
  Last clearing of "show interface" counters 00:52:02
  Input queue: 0/75/0/0 (size/max/drops/flushes): total output
drops: 0
  Queuing strategy: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
```

After considering the effects of the command output illustrated in the exhibit above, which of the following protocols are operational on the serial link? (Select two options)

- A. PPP
- B. IP

- C. Compression
- D. IPX
- E. Multilink
- F. ATX

Answer: A, B

Explanation:

The interface displays show that the line protocol is up, so we can safely assume that everything is working from layers one and two. This interface is configured with PPP encapsulation, which is a layer two protocol that appears to be operational on this interface. The interface is also configured with a valid IP address and subnet mask, so IP is also operational on this interface.

Incorrect Answers:

- C. There is nothing in the output displayed that would suggest any type of compression has been enabled on this interface.
- D. There is only an IP address configured on this interface. If IPX was enabled, there would be a layer 3 IPX address configured on it.
- E. Although multilink works with PPP to provide for the bonding of interfaces into a larger, logical interface, there is nothing that suggests that multilink has been enabled. PPP multilink uses bundle interfaces, and the bundle interface would have the IP address assigned to it, not the physical serial interface.
- F. There is nothing to suggest that this protocol has been enabled on this interface.

QUESTION NO: 22

You wish to upgrade the IOS of a router without removing the image currently installed.

What command will display the amount of memory that is being used by the current IOS image and whether there is enough room available to hold both the current and new images?

- A. Router# **show version**
- B. Router# **show flash**
- C. Router# **show memory**
- D. Router# **show buffers**
- E. Router# **show running-config**
- F. All of the above

Answer: B

Explanation:

The “show flash” command is used to display the layout and contents of the flash memory file system. It will show name of the file system, as well as the number of bytes used and the number available within the flash memory.

QUESTION NO: 23

The “show version” command was issued on a Testking router as shown below:
System Image file is "Flash: C2600-ik8035-m2.122-8.T5.bin"

Cisco 2620(MPC860)processor(revision 0x200) with 16384/2048K bytes of memory

Processor board ID JAD05076EF6

M60 processor part number 0, mark 49

Bridging Software

X.25 Software, Version 3.0.0

2 FastEthernet/IEEE 802.3 interface(s)

2 Serial(sync/async)network interface(s)

2 Low speed serial(sync/async)network interface(s)

32K bytes of non-volatile configuration memory

16384 bytes of processor board system flash (Read/Write)

Configuration register is 0x2102

The Network administrator at TestKing.com wants to upgrade the IOS of this router. The new Image requires 64 MB of RAM & 16 MB for Storage of the File. Given the Output Shown in the Graphic, which of the following is true?

- A. This router meets the requirements for the new image.
- B. This router will require a DRAM upgrade to meet the requirements for the Image.
- C. This router will require a FLASH upgrade to meet the requirements for the Image.
- D. This router will require a NVRAM upgrade to meet the requirements for the Image.

Answer: B

Explanation:

Based on the output above, the router above will not require a Flash memory upgrade, as only 16 MB is required and the Testking router does indeed have 16 MB of flash (16384 bytes). However, a DRAM upgrade is required, as 64 MB of RAM is needed but this router has only slightly more than 16 MB as shown by the 16384/2048 value.

QUESTION NO: 24

You are a trainee technician at TestKing, Inc. Your instructor tells you to backup an IOS image of a Cisco device to a Windows 2003 server on the network.

What should you do first? (Choose all that apply.)

- A. Make sure that the network server can be accessed.

- B. Check that the authentication for access is set.
- C. Assure that the network server has adequate space for the code image.
- D. Verify any file naming and path requirements.
- E. Make sure that the server can load and run the bootstrap code.

Answer: A, B, C, D

Explanation:

In order to properly back up the Cisco IOS image onto a Windows server, you should ensure that the server is reachable and that you have the proper permissions to save files to the server. In addition to this, the server will need enough space to hold the backup file.

Incorrect Answers:

E. In order to simply back up the IOS file, the server needs to only be able to save it to a hard disk. It does not need to load, read, or boot the image.

QUESTION NO: 25

The relevant system information regarding a Testking router is shown in the following display:

System image file is "flash: c2600-das35-m2.120-5.T1"

Cisco2621(MPC860)processor(revision 0x600) with 53248K/12288K bytes of memory

Processor board ID JAD05280307(3536592999)

MPC860 processor, part number 0, mark 49

IOS Software, Version 3.0.0

2 FastEthernet/IEEE 802.3 interface(s)

2 Serial(sync/async)network interface(s)

2 Low speed serial(sync/async)network interface(s)

16 terminal line(s)

32K bytes of non-volatile configuration memory

16384 bytes of processor board system flash (Read/Write)

Refer to the partial Command output shown. Which two statements are correct regarding the router hardware? (Choose Two)

- A. Total RAM Size is 32 KB.
- B. Total RAM Size is 16384 KB.(16 MB)
- C. Total RAM Size is 65536 KB.(64 MB)
- D. FLASH Size is 32 KB.
- E. FLASH Size is 16384 KB.(16 MB)
- F. FLASH Size is 65536 KB.(64 MB)

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Answer: C, E

Explanation:

The RAM is found by adding up the memory, so in this case it is 53248K+12288K = 65536K. The Flash is found at the very bottom of the output, which is shown as 16384K

How Do I Know What Platform I Have?

Type the **show version** command at the enable command prompt of the router to see the platform, RAM, flash memory, and current version of code you are running.

This example shows a Cisco 2600 router with 48 MB of RAM (43617 K + 5534 K), 16 MB of flash memory (16384 K), and a code image called flash:c2600-jk8s-mz.122-6.bin.

```
wilson#show version
Cisco Internetwork Operating System Software
IOS (tm) C2600 Software (C2600-JK8S-M), Version 12.2(6), RELEASE SOFTWARE (Fc2)
Copyright (c) 1986-2001 by Cisco Systems, Inc.
Compiled Wed 07-Nov-01 21:07 by pwade
Image text-base: 0x80008088, data-base: 0x814FF2C4

ROM: System Bootstrap, Version 11.3(2)XA3, PLATFORM SPECIFIC RELEASE SOFTWARE (fc1)

Wilson uptime is 1 week, 2 days, 7 hours, 41 minutes
System returned to ROM by power-on
System image file is "flash:c2600-jk8s-mz.122-6.bin"

cisco 2611 (MPC860) processor (revision 0x202) with 43617K/5534K bytes of memory.
Processor board ID JAB0305069Z (209339692)
M860 processor: part number 0, mask 49
Bridging software.
X.25 software, Version 3.0.0.
SuperLAT software (copyright 1990 by Meridian Technology Corp).
TN3270 Emulation software.
2 Ethernet/IEEE 802.3 interface(s)
32K bytes of non-volatile configuration memory.
16384K bytes of processor board System flash (Read/Write)

Configuration register is 0x2102

Wilson#
```

Reference:http://www.cisco.com/en/US/products/sw/secursw/ps1018/products_tech_note09186a00800949e4.shtml

Perform an initial configuration on a router (6 questions)

QUESTION NO: 1

The TestKingA router is configured as shown below:

```
TestKingA(config)# interface loopback 0
TestKingA(config-if)# ip address 192.168.16.24 255.255.255.255
```

As a result of this change, which of the statements below are true? (Select all valid responses)

- A. It creates a virtual, software only, interface.
- B. It provides a way to test the convergence of OSPF routing updates.
- C. The mask of 255.255.255.255 is called a host mask.
- D. It uses a wildcard mask of 255.255.255.255.
- E. It ensures that an interface is always active for OSPF processes.
- F. Loopback interfaces must be numbered 0.

Answer: A, C, E

Explanation:

When the OSPF process starts, the Cisco IOS uses the highest local IP addresses its OSPF router ID. If a loopback interface is configured, that address is used regardless of its value.

A loopback interface is a logical, software interface that is always up.

A 32-bit mask is sometimes called a host mask, because it specifies a single host and not a network or subnetwork.

Incorrect Answers:

- B. The addition of a loopback interface will in no way test the convergence speed of any OSPF process.
- D. A wildcard mask of value 255.255.255.255 will not check any of the bit values in the IP address.
- F. A loopback interface can be any number from 1-255.

QUESTION NO: 2

You want the text “Unauthorized access prohibited!” to be displayed before the login prompt every time someone tries to initiate a Telnet session to a router, as shown in the example below:

```
Router#telnet 192.168.15.1
Trying 192.168.15.1 ... Open
```

Unauthorized access prohibited!

User Access Verification

Password:

Which command can be used to configure this message?

- A. **login banner x Unauthorized access prohibited! X**
- B. **banner exec y Unauthorized access prohibited! Y**
- C. **banner motd x Unauthorized access prohibited! X**
- D. **vtv motd "Unauthorized access prohibited!"**

Answer: C

Explanation:

The message text that is displayed when users log into the router is called the “message of the day” banner, and it can be changed with the “banner motd” command as shown in answer choice C.

QUESTION NO: 3

Exhibit:



Processor board ID JADU5U/6EF6
 M80 processor (revision 0) (part 19)
 Bridge software
 X.25 software, Version 3.0.0
 1 FastEthernet/IEEE 802.3 interface(s)
 2 Low-speed serial(synch/asynch) network interface(s)
 32K bytes of non-volatile configuration memory.
 16384K bytes of processor board System flash(Read/Write)

 Configuration register is 0x2142

You need to troubleshoot a Cisco router at the Toronto office of TestKing.com. The router loses its configuration each time it is rebooted. You study the output displayed in the exhibit.

What is the cause of the problem?

- A. The configuration register is misconfigured
- B. NVRAM failed POST
- C. There is insufficient flash memory
- D. There is insufficient RAM for the IOSD image
- E. There is insufficient NVRAM

Answer: A

Explanation:

The configuration register value of 0x2142 is used to bypass the saved NVRAM router configuration and is normally only used for password recovery procedures. The correct configuration register value is typically 0x2102. The following table displays some of the common values and their meanings:

Configuration Register Setting	Router Behavior
0x102	<ul style="list-style-type: none"> • Ignores break • 9600 console baud
0x1202	<ul style="list-style-type: none"> • 1200 baud rate
0x2101	<ul style="list-style-type: none"> • Boots into bootstrap • Ignores break • Boots into ROM if initial boot fails • 9600 console baud rate
0x2102	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails • 9600 console baud rate default value for most platforms
0x2120	<ul style="list-style-type: none"> • Boots into ROMmon • 19200 console speed
0x2122	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails • 19200 console baud rate
0x2124	<ul style="list-style-type: none"> • NetBoot • Ignores break • Boots into ROM if initial boot fails • 19200 console speed
0x2142	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails • 9600 console baud rate • Ignores the contents of Non-Volatile RAM (NVRAM) (ignores configuration)
0x2902	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails • 4800 console baud rate
0x2922	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails • 38400 console baud rate
0x3122	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails

	<ul style="list-style-type: none"> • 57600 console baud rate
0x3902	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails • 2400 console baud rate
0x3922	<ul style="list-style-type: none"> • Ignores break • Boots into ROM if initial boot fails • 115200 console baud rate

QUESTION NO: 4

From the Remote27 router, you attempt to telnet to a router named TESTKING1 as shown below:

```
Remote27#
Remote27#telnet TESTKING1
Trying TESTKING1 (10.0.0.1)... Open
```

```
Password required, but none set
[Connection to access1 closed by foreign host]
Remote27#
```

You are unable to connect to the TESTKING1 router. Which of the following command sequences will correct this problem?

- A. TESTKING1(config)# line console 0
TESTKING1(config-line)# password cisco
- B. Remote27(config)# line console 0
Remote27(config-line)# login
Remote27(config-line)# password cisco
- C. TESTKING1(config)# line vty 0 4
TESTKING1(config-line)# login
TESTKING1(config-line)# password cisco
- D. Remote27(config)# line vty 0 4
Remote27(config-line)# login
Remote27(config-line)# password cisco
- E. TESTKING1(config)# enable password cisco
- F. Remote27(config)# enable password cisco

Answer: C

Explanation:

The following describes the correct configuration guidelines for setting up telnet access to a router:

Background Information

If you try to telnet to a router that does not have a Telnet password configured, you will get the following error message:

```
Router-1#telnet 10.3.3.1
```

```
Trying 10.3.3.1 ... Open
```

```
Password required, but none set
```

```
[Connection to 10.3.3.1 closed by foreign host]
```

Configure

In this section, you are presented with the information to configure a Telnet password.

Configurations

This document uses this configuration:

- Router-2

In order to set up the router to allow Telnet access, use the **line vty** command. This command allows for the configuration of Virtual Terminal (VTY) lines for remote console access. You can configure the router to accept one or more Telnet sessions. It is strongly suggested that you configure password checking with the **login** and **password** line configuration commands. The example below configures the router to accept five sessions, with the password "letmein":

Router-2
<pre>Router-2(config)#line vty 0 4 Router-2(config-line)#login % Login disabled on line 66, until 'password' is set % Login disabled on line 67, until 'password' is set % Login disabled on line 68, until 'password' is set % Login disabled on line 69, until 'password' is set % Login disabled on line 70, until 'password' is set Router-2(config-line)#password letmein</pre>

Verify

To verify that the router is correctly configured for Telnet, issue the **show running-config** command.

```
Router-2#show running-config
Building configuration...
hostname Router-2
.
.
line vty 0 4
```

```

password letmein
login
.
.
!
end

```

You should now be able to telnet to the router.

```

Router-1#telnet
10.3.3.1
Trying
10.3.3.1 ... Open
User
Access Verification
Password:
letmein
Router-2#

```

Reference:

http://www.cisco.com/en/US/products/sw/iosswrel/ps1831/products_configuration_exampl09186a0080202614.shtml

QUESTION NO: 5

After making some network changes you power off and then power on your Cisco router. What sequence of events occurs when a router is powered up?

- A. Perform POST, locate configuration statements, apply configuration statements, locate Cisco IOS software, and load Cisco IOS software.
- B. Locate Cisco IOS software, load Cisco IOS software, locate configuration statements, apply configuration statements, and perform POST.
- C. Test software routines, POST, load configuration files, load Cisco IOS software, test Cisco IOS software.
- D. POST, locate Cisco IOS software, load the Cisco IOS software, locate configuration statements, and apply configuration statements.
- E. Load and test IOS, load configuration files, test software routines, POST.

Answer: D

Explanation:

Upon initial start up, Cisco routers perform the following steps in order:

1. The router performs a power-on self-test (POST) to discover and verify the hardware.
2. The router loads and runs bootstrap code from ROM.
3. The router finds the IOS or other software and loads it.

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4. The router finds the configuration file and loads it into running config.

QUESTION NO: 6

You are trying to connect directly into an existing Cisco router. You want to telnet to the local Cisco router using TCP/IP but cannot create a session.

What should you do to resolve the problem?

- A. Use a straight-through cable to connect your computer's COM port to the router's console port.
- B. Use a crossover cable to connect your computer's COM port to the router's console port.
- C. Use a straight-through cable to connect your computer's COM port to the router's Ethernet port.
- D. Use a crossover cable to connect your computer's Ethernet port to the router's Ethernet port.
- E. Use a rollover cable to connect your computer's Ethernet port to the router's Ethernet port.
- F. Use a straight-through cable to connect your computer's Ethernet port to the router's Ethernet port.

Answer: D

Explanation:

In order to connect directly to a router via telnet, you must connect to the router via one of the LAN ports. When connecting directly to the Ethernet port with a PC without the use of a switch or hub, a crossover cable must be used.

Incorrect Answers:

A, B, C. In order to telnet directly into the router via a TCP/IP connection, the COM port of the PC can not be used. The COM port is used for direct terminal emulation programs such as hyperterminal.

E. Rollover cables are used for console connections into the router, not for TCP/IP connections.

F. Straight through cables are used for connections into a switch or hub from the PC. It will not work for direct Ethernet connections into the router.

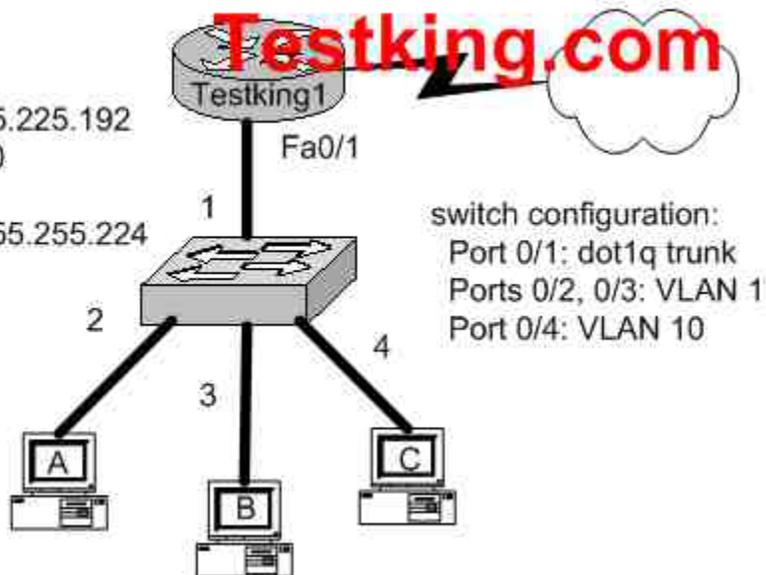
Perform an initial configuration on a switch (3 questions)

QUESTION NO: 1

Study the exhibit below:

Router configuration:

```
interface fastethernet 0/1.1
 encapsulation dot1q 1
 ip addr 192.1.1.65 255.255.225.192
interface fastethernet 0/1.10
 encapsulation dot1q 10
 ip addr 192.1.1.129 255.255.255.224
```



switch configuration:
 Port 0/1: dot1q trunk
 Ports 0/2, 0/3: VLAN 1
 Port 0/4: VLAN 10

Which IOS commands should you enter if you wanted to link the router TestKing1 with switch port 1? (Select three answer choices)

- A. Switch(config)# **interface fastethernet 0/1**
- B. Switch(config-if)# **switchport mode access**
- C. Switch(config-if)# **switchport mode trunk**
- D. Switch(config-if)# **switchport access vlan 1**
- E. Switch(config-if)# **switchport trunk encapsulation isl**
- F. Switch(config-if)# **switchport trunk encapsulation dot1q**

Answer: A, C, F

Explanation:

Before you can begin, you have to get into the interface. Answer choice A is the only command in the selection that puts the IOS into interface mode. Once in the interface you have to set it to trunk mode, so choice C is correct. The switch port needs encapsulation. Answer choice E give you the choice of ISL and choice F gives you dot1q. Since the diagram suggests that the router is using 802.1Q, you must also use dot1q.

Incorrect Answers:

B, D. We wish to set up a trunk over this connection, not set up a single VLAN.

E. Both ends of the trunk must use the same trunk encapsulation type. Since the diagram shows that the router is set to 802.1Q, the switch must be set up similarly.

QUESTION NO: 2

Which interface commands would you enter on a Catalyst 2900 switch, if your goal was to bring all VLAN traffic to another directly connected switch? (Select the two valid responses)

- G. Switch(config-if)# **vlan all**
- H. Switch(config-if)# **switchport trunk encapsulation dot1q**
- I. Switch(config-if)# **switchport access vlan all**
- J. Switch(config-if)# **switchport mode trunk**
- K. Switch(config-if)# **switchport access vlan 303**

Answer: C, D

Explanation:

In order to pass all VLAN traffic from one switch to another, a trunk is needed. In order to configure a trunk on a 2900 series switch, only these two commands are required.

Incorrect Answers:

- A. This is an invalid command.
- B. This command does not need to be entered, as the trunk encapsulation for the Catalyst 2900 by default is dot1q
- E. This will only accomplish setting up a single VLAN, numbered 303.

QUESTION NO: 3

As a TestKing trainee you are required to set the default gateway on a Cisco switch to the IP address of 192.168.1.115.

Which IOS command should you use?

- A. TestKSwitch(config)# **ip route-default 192.168.1.115**
- B. TestKSwitch(config)# **ip default-gateway 192.168.1.115**
- C. TestKSwitch(config)# **ip route 192.168.1.115 0.0.0.0**
- D. TestKSwitch(config)# **ip default-network 192.168.1.115**

Answer: B

Explanation:

Use the “ip default-gateway” command to enter the IP address of the next-hop router interface that is directly connected to the switch where a default gateway is being configured. The default gateway receives IP packets with unresolved destination IP addresses from the switch.

Once the default gateway is configured, the switch has connectivity to the remote networks with which a host needs to communicate.

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Implement access lists (14 questions)

QUESTION NO: 1

You are securing a network for TestKing and want to apply an ACL (access control list) to an interface of a router. Which one of the following commands would you use?

- A. permit access-list 101 out
- B. ip access-group 101 out
- C. apply access-list 101 out
- D. access-class 101 out
- E. ip access-list e0 out

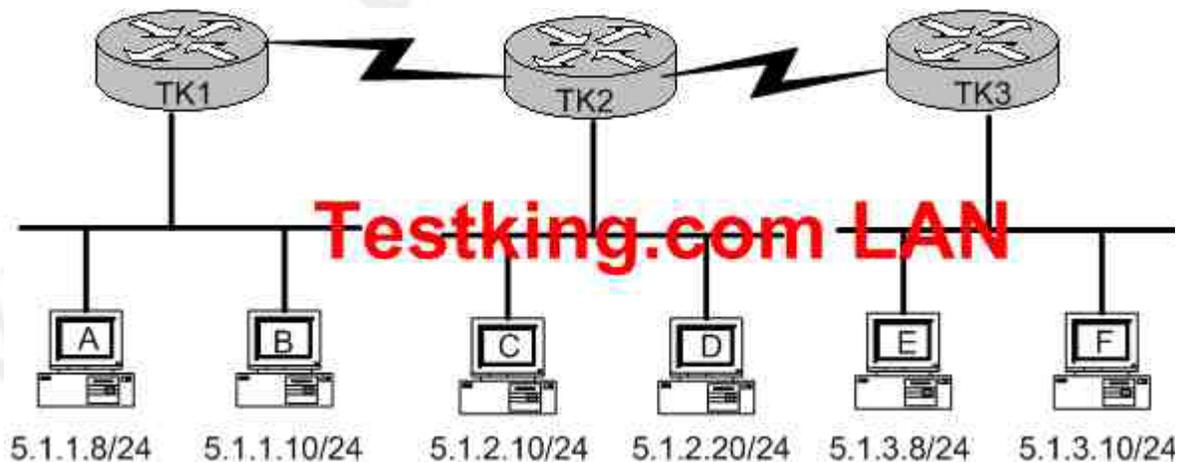
Answer: B

Explanation:

To enable an ACL on an interface and define the direction of packets to which the ACL is applied, the **ip access-group** command is used. In this example, the access list is applied to packets going out of the interface. Packets coming in on the interface are not checked against access list 101.

QUESTION NO: 2

Study the exhibit below:



You're the systems administrator at Testing, and you create the following access control lists.

```
access-list 101 deny tcp 5.1.1.10 0.0.0.0 5.1.3.0 0.0.0.255 eq telnet
access-list 101 permit any any
```

You then enter the command “ip access-group 101 in” to apply access control list 101 to router TK1s e0 interface.

Which of the following Telnet sessions will be blocked as a result of your access lists? (Select all that apply)

- A. Telnet sessions from host A to host 5.1.1.10
- B. Telnet sessions from host A to host 5.1.3.10
- C. Telnet sessions from host B to host 5.1.2.10
- D. Telnet sessions from host B to host 5.1.3.8
- E. Telnet sessions from host C to host 5.1.3.10
- F. Telnet sessions from host F to host 5.1.1.10

Answer: D, F

Explanation:

All the telnet sessions from host B to network 5.1.3.0/24 will be denied. In addition, all telnet traffic to host B from the 5.1.3.0/24 network will not work, because the return telnet traffic will be denied.

QUESTION NO: 3

Which of the following statements regarding the use of multiple access lists are valid when configuring a single interface on a Cisco router?

- A. Application of up to three access lists per protocol to a single interface.
- B. No more than two access lists per interface.
- C. One access list may be configured per direction for each Layer 3 protocol configured on an interface.
- D. The maximum number allowed varies due to RAM availability in the router.
- E. An infinite number of access lists that can be applied to an interface, from most specific to most general.
- F. Cisco IOS allows only one access list to an interface.

Answer: C

Explanation:

For each interface, one access list for each protocol (IP, IPX, etc) can be applied in the inbound direction, and one for the outbound direction.

Incorrect Answers:

B. It is true that no more than two access lists can be applied per interface (inbound and outbound). However, this applies per layer 3 protocol, so it is possible to configure more than 2 access lists per interface.

QUESTION NO: 4

On the serial interface of a router, an inbound access list is configured to deny all traffic from UDP and TCP ports 21, 23, and 25. All other traffic is permitted. Based on this information, which types of traffic will be allowed through this interface? (Choose all that apply)

- A. SMTP
- B. DNS
- C. FTP
- D. Telnet
- E. HTTP
- F. POP3

Answer: B, E, F

Explanation:

Since all traffic that is not using the three ports specified is permitted, the correct answers are B, E and F. (DNS port 53, HTTP port 80, POP3 port 110).

Incorrect Answers:

- A. SMTP uses port 25, which is prohibited.
- C. FTP uses port 21, which is prohibited.
- D. Telnet uses port 23, which is prohibited.

QUESTION NO: 5

The following access list below was applied outbound on the E0 interface connected to the 192.169.1.8/29 LAN:

```
access-list 135 deny tcp 192.169.1.8 0.0.0.7 eq 20 any
access-list 135 deny tcp 192.169.1.8 0.0.0.7 eq 21 any
```

How will the above access lists affect traffic?

- A. FTP traffic from 192.169.1.22 will be denied.
- B. No traffic, except for FTP traffic will be allowed to exit E0.
- C. FTP traffic from 192.169.1.9 to any host will be denied.
- D. All traffic exiting E0 will be denied.
- E. All FTP traffic to network 192.169.1.9/29 will be denied.

Answer: D

Explanation

When an access list is created, an implicit deny all entry is created at the end. Therefore, each access list created needs to have at least one permit statement, otherwise it will have the effect of prohibiting all traffic. If the intent in this example was to block only certain hosts from being able to FTP, then the following line should have been included at the end of the access list:

```
Router(config)#access-list 135 permit ip any any
```

QUESTION NO: 6

Study the information and the relevant configuration file below for the Testking Branch router.

```
Hostname: Branch
PH# 123-6000, 123-6001
SPID1: 32055512360001
SPID2: 32055512360002
```

```
isdn switch-type basic-ni1
username Remote password cisco
interface bri0
ip address 10.1.1.1 255.255.255.0
encapsulation ppp
ppp authentication chap
isdn spid1 32055512360001
isdn spid2 32055512360002
dialer map ip 10.1.1.2 name Remote 1238001
dialer-list 1 protocol ip permit
```

What additional command must be executed on the Branch router before interesting traffic will initiate an ISDN call?

- A. (config-if)# dialer-group 1
- B. (config-if)# dialer-list 1
- C. (config-if)# dialer map 1
- D. (config-if)# dialer-route 1

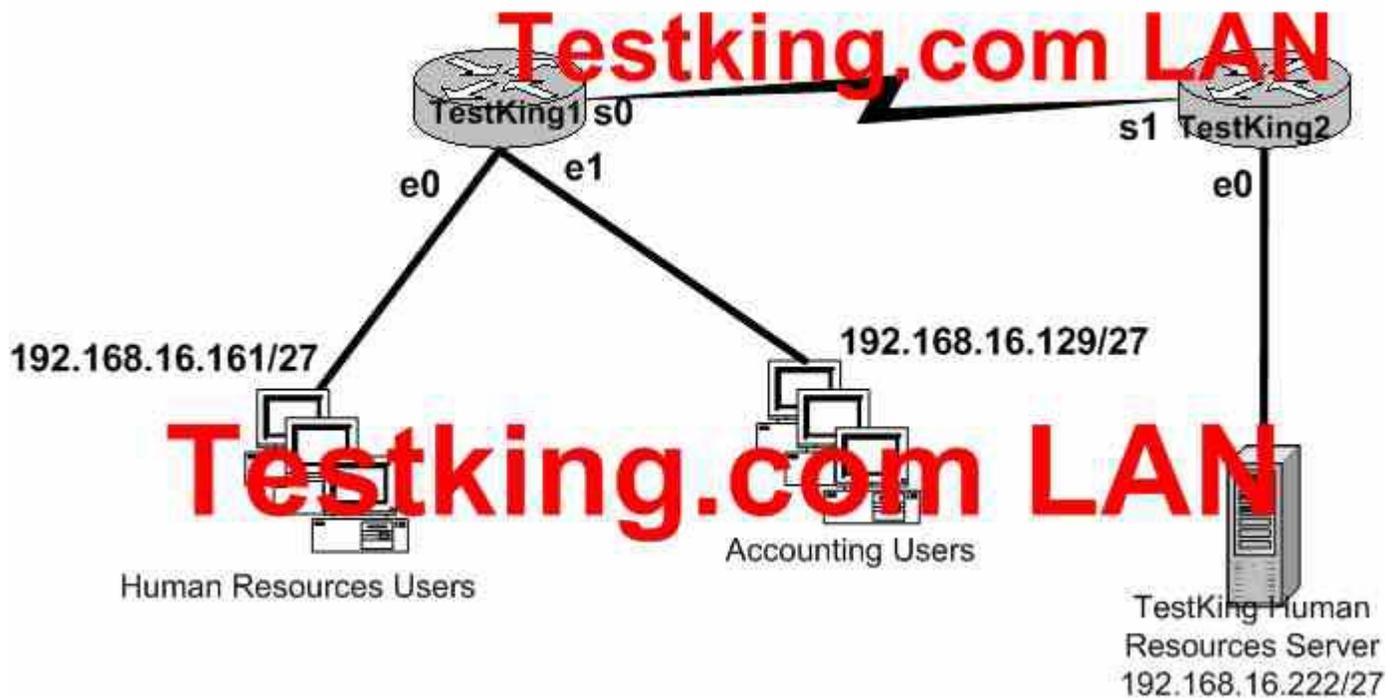
Answer: A

Explanation:

The "dialer-group #" command tells the access-list (used with the dialer-list # command), which interface to activate when it finds interesting traffic. The numbers at end of each command must match.

QUESTION NO: 7

Study the following network diagram displaying the Testking network:



With the goal of preventing the accounting department from gaining access to the HR server, the following access list is created:

```
access-list 19 deny 192.168.16.128 0.0.0.31
access-list 19 permit any
```

All other traffic is to be permitted through the network. On which interface and in what direction should the access list be applied?

- A. TestKing1 S0, out.
- B. TestKing1 E1, in.
- C. TestKing1 E1, out.
- D. TestKing2 S1, in.
- E. TestKing2 E0, out.
- F. TestKing2 E0, in.

Answer: E

Explanation:

Since this is a standard access list it should be placed near the destination. Standard access lists only match against the source IP address, so placing this access list anywhere else will prevent traffic from the Accounting department to other areas of the network.

QUESTION NO: 8

Which of the following commands would successfully implement an access list on a routers virtual terminal line? (Select only one answer choice)

- A. RouterTK(config-line)# **access-class 10 in**
- B. RouterTK(config-if)# **ip access-class 23 out**
- C. RouterTK(config-line)# **access-list 150 in**
- D. RouterTK(config-if)# **ip access-list 128 out**
- E. RouterTK(config-line)# **access-group 15 out**
- F. RouterTK(config-if)# **ip access-group 110in**

Answer: A

Explanation:

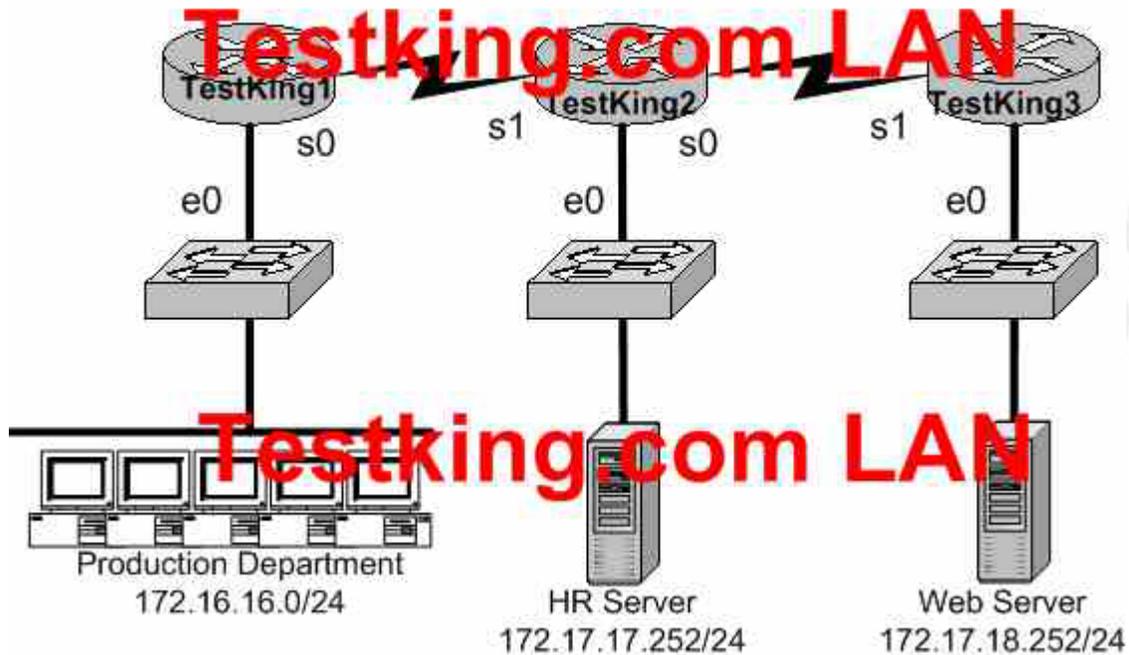
To configure VTY you must be in the config-line mode. Virtual terminal sessions use VTY lines 0-4, and VTY access lists use the access-class command.

Incorrect Answers:

- B. This is placed in the wrong configuration mode
- C, D, E, F. The correct syntax for VTY lines is the access-class command, not the access-group or access-list commands.

QUESTION NO: 9

The Testking network is displayed below:



You want to apply an access list to the e0 interface on the TestKing1 router, with the goal of halting HTTPS traffic from the Production Department from reaching the HR server via the TestKing2 router. Which of the following access lists would you use?

- A. Permit ip any any
Deny tcp 172.16.16.0 0.0.0.255 172.17.17.252 0.0.0.0 eq 443
- B. Permit ip any any
Deny tcp 172.17.17.252 0.0.0.0 172.16.16.0 0.0.0.255 eq 443
- C. Deny tcp 172.17.17.252 0.0.0.0 172.16.16.0 0.0.0.255 eq 443
Permit ip any any
- D. Deny tcp 172.16.16.0 0.0.0.255 172.17.17.252 0.0.0.0 eq 443
Permit ip any any

Answer: D

Explanation:

This access problem is very simple, it tells you where to put the access list, all you have to do is to select the right one. You have to deny all HTTP traffic (TCP port 80) from crossing router 1's e0 while, allowing everything else. This is accomplished in answer D.

Incorrect Answers:

A. The order of the statements are reversed. Since all traffic checked against an access list is performed in order from the top down, all traffic will match the first statement and be permitted.

B, C. Answers B & C are incorrect because the source addresses are incorrect.

QUESTION NO: 10

**What are some general guidelines regarding the placement of access control lists?
(Select two answer choices)**

- A. You should place standard ACLS as close as possible to the source of traffic to be denied.
- B. You should place extended ACLS as close as possible to the source of traffic to be denied.
- C. You should place standard ACLS as close as possible to the destination of traffic to be denied.
- D. You should place extended ACLS should be places as close as possible to the destination of traffic to be denied.

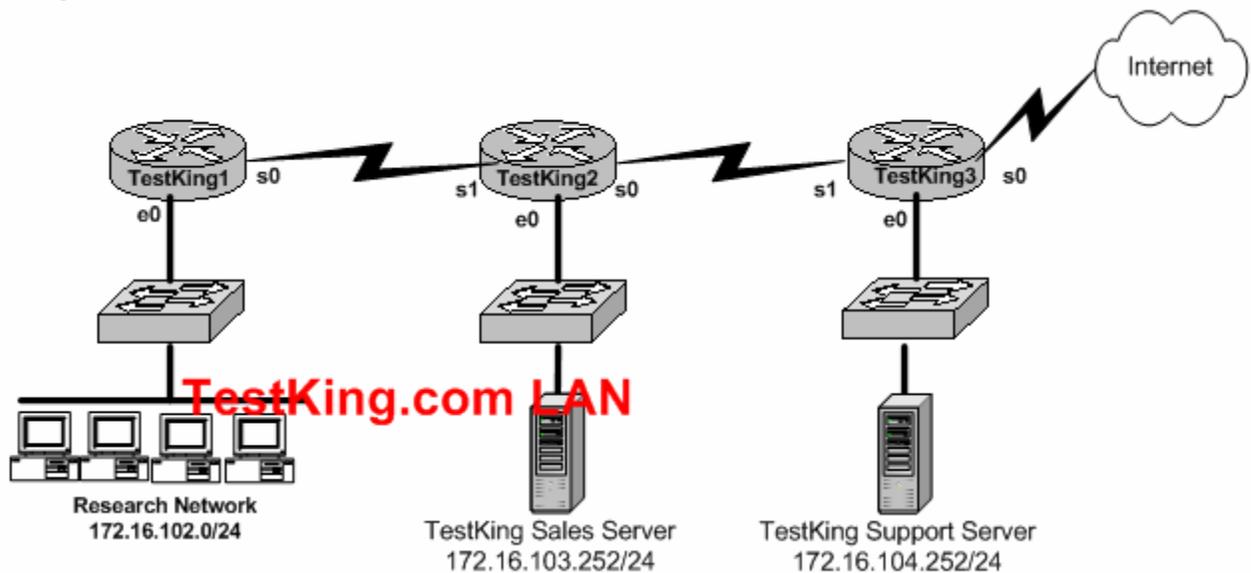
Answer: B, C

Explanation:

The question you have to ask yourself is: Do you want the access list before the routing decision, or after the routing decision? If an access list is extended, then it would restrict a lot of traffic, so it would be better to have such a list at the source so it could filter out the traffic before the router has to go through the trouble of sending it off. If an access list is standard, then it would be more efficiently placed closer to the destination.

QUESTION NO: 11

Study the exhibit below:



You are a network security consultant and you've been contracted to prevent users on the Research Network and general Internet surfers from accessing the TestKing Support server. However, you must allow access to all the other TestKing users. So you create an access control list called `research_network` which contains the following lines:

```
deny 172.16.102.0 0.0.0.255 172.16.104.255 0.0.0.0
permit 172.16.0.0 0.0.255.255 172.16.104.252 0.0.0.0
```

Which of the following command sequences can satisfy your goals?

- A. TestKing1(config)# **interface e0**
TestKing1(config-if)# **ip access-group research_network in**
- B. TestKing2(config)# **interface s1**
TestKing2(config-if)# **ip access-group research_network in**
- C. TestKing3(config)# **interface s1**
TestKing3(config-if)# **ip access-group research_network in**
- D. TestKing1(config)# **interface s0**
TestKing1(config-if)# **ip access-group research_network out**
- E. TestKing2(config)# **interface s0**
TestKing2(config-if)# **ip access-group research_network out**
- F. TestKing3(config)# **interface e0**
TestKing3(config-if)# **ip access-group research_network out**

Answer: F

Explanation:

To enable the ACL on an interface and define the direction of packets to which the ACL is applied, the `ip access-group` command is used.

When referring to a router, these terms have the following meanings.

- **Out** - Traffic that has already been through the router and is leaving the interface; the source would be where it's been (on the other side of the router) and the destination is where it's going.
- **In** - Traffic that is arriving on the interface and which will go through the router; the source would be where it's been and the destination is where it's going (on the other side of the router).

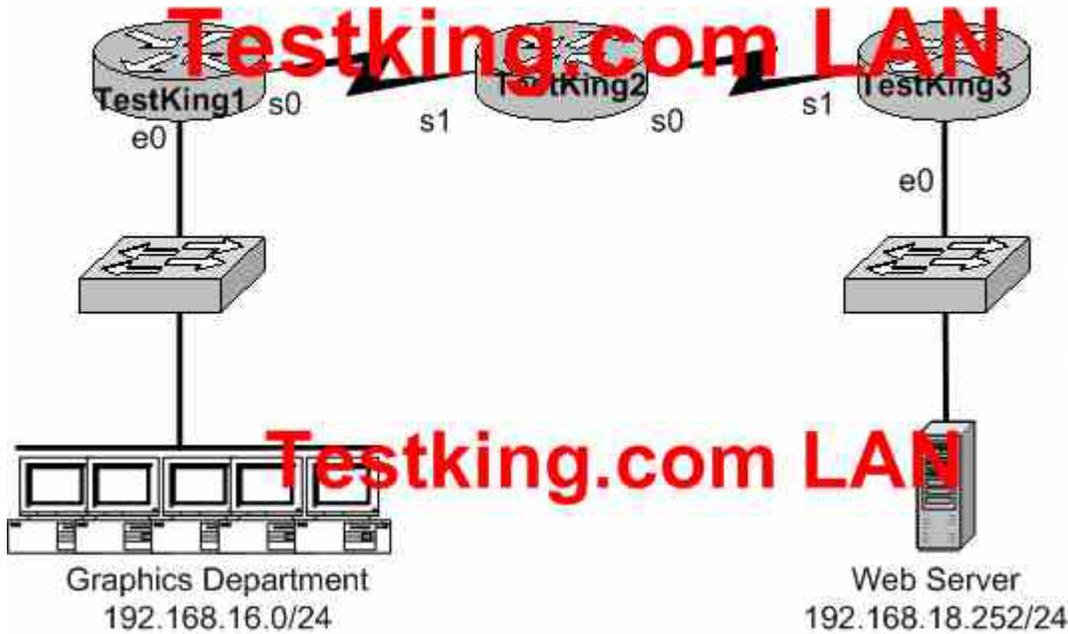
Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 433

QUESTION NO: 12

A portion of the Testking network is shown below:

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In order to prevent the Web Server from receiving telnet traffic from the Graphics Dept. users, an access is created denying this traffic. On which router, which interface and in which direction should you place the access list for maximum efficiency? (Select all that apply)

- A. TestKing1 Router
- B. TestKing3 Router
- C. serial 0
- D. Ethernet 0
- E. in
- F. out

Answer: A, D, E

Explanation:

For maximum efficiency, the access list should be placed closest to the source of the traffic that you want to deny. The access list should be an inbound access list, on the e0 interface, on router TestKing1.

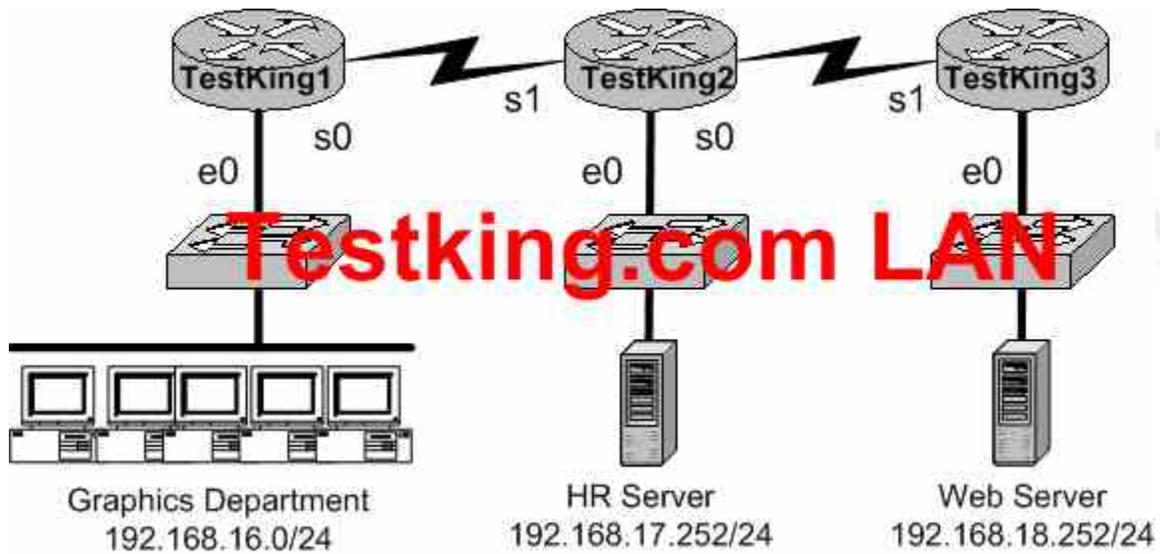
Incorrect Answers:

B, C, F. Placing the access list anywhere else would mean that the traffic would be permitted through the network, at least partially, before being dropped. This would result in inefficiency.

QUESTION NO: 13

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The Testking network consists of Cisco routers and switches as shown below:



Your goal is to prevent Telnet traffic originating from the Graphics Department to reach the HR server. However, you want to allow Telnet traffic to other destinations. To accomplish this, you configure the following access control list:

```
access-list 101 deny tcp any any eq 23
permit ip any any
```

On which router, in what direction, and which interface, should the access list be placed to most efficiently implement the above list? (Select three options)

- A. TestKing1
- B. TestKing2
- C. out
- D. in
- E. serial 0
- F. ethernet 0

Answer: B, C, F

Access list should be placed as shown below:

- B TestKing2
- C out
- F Ethernet 0 interface

This answer combination will allow telnet traffic to other destinations.

Incorrect Answer:

A, D, F this will deny all telnet traffic. We wish to only deny telnet traffic to the HR server.

QUESTION NO: 14

You are the administrator of the TestKing network which is composed of three routers connected together via a WAN as shown in the diagram. Your assignment is to configure and apply an access control list that will block telnet access to the TestKing1 router without inhibiting all other traffic. The access list won't need more than 3 statements and it should be applied to the TestKing3 routers. The three routers are already connected and configured as follows:

- The routers are named: TestKing1, TestKing2, and TestKing3 respectively.
- All three of them are using RIP as the routing protocol.
- The serial 0 interfaces are providing clocking.
- The default subnet mask is used on every interface.
- The IP addresses and passwords are listed below.

TestKing1

E0 192.168.1.1

S0 192.168.118.1

Secret password: testking

TestKing2

E0 192.168.121.1

S0 192.168.5.1

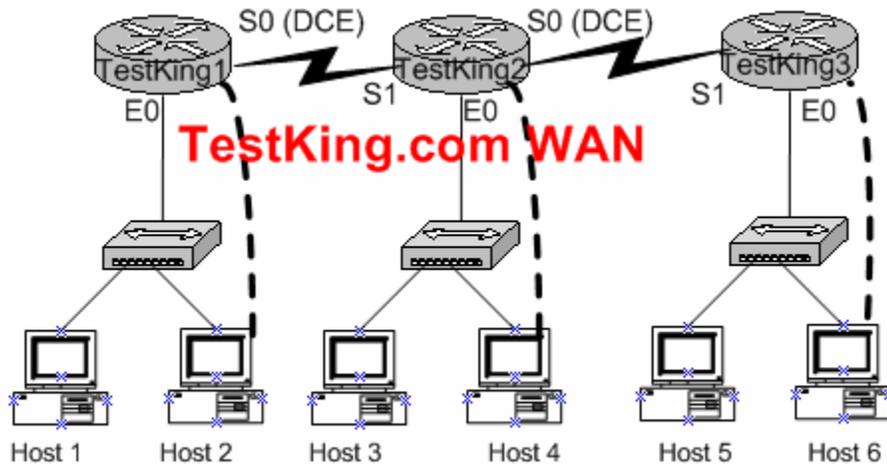
S1 192.168.118.2

Secret password: testking

TestKing3

E0 192.168.134.1

S1 192.168.5.2



To configure the router click on the host icon that is connected to a router by a serial console cable.

Answer:

```
TestKing3>enable
:password
TestKing3#show access-lists (** redundant **)
TestKing3#config t
.Enter configuration commands, one per line. End with END
TestKing3(config)#access-list 101 deny tcp any 192.168.134.1 0.0.0.0 eq 23
TestKing3(config)#access-list 101 deny tcp any 192.168.5.2 0.0.0.0 eq 23
TestKing3(config)#access-list 101 permit ip any any
TestKing3(config)#interface Ethernet 0
TestKing3(config-if)#ip access-group 101 in
TestKing3(config-if)#exit
TestKing3(config)#interface serial 0
TestKing3(config-if)#ip access-group 101 in
TestKing3(config-if)#<CTRL-Z
..
TestKing3#copy running-config startup-config
```

Explanation:

You should deny access to telnet to the testking1 router and the access list should be applied in testking3 router (if the wording is correct) this mean that testking1 and testking2 they won't be affected that all only testking3 LAN interface of testking3 will be restricted and that access list is not necessary to be applied to the serial 1 interface because to the Ethernet0 in the testking3 will be enough.

Implement Simple WAN protocols (18 questions)

QUESTION NO: 1

When configuring Frame Relay using point-to-point subinterfaces, which of the following should you configure? (Select all that apply)

- A. The local DLCI on each subinterface of the Frame Relay.
- B. The Frame Relay encapsulation on the physical interface.
- C. An IP address on the physical interface.
- D. At most 10 sub-interfaces, numbered 0-9.

Answer: A, B

Explanation:

When configuring frame relay using point to point sub-interfaces, each sub-interface appears as a separate point to point link with a DLCI assigned to each one. The encapsulation needs to be applied only to the physical interface.

Incorrect Answers:

- C. Frame Relay does not require IP addresses on physical interfaces. The IP addresses should be placed on each point to point sub-interface.
- D. The number of sub-interfaces that can be configured on a router is limited only by the number of IDB blocks available. There are normally enough IDB blocks to configure hundreds, or even thousands, of logical interfaces.

QUESTION NO: 2

You are in the midst of configuring a router for a Frame Relay network. What could you do to prevent split horizon problems? (Select all that apply)

- A. Configure a separate sub-interface for each PVC. Assign a unique DLCI and subnet to each sub-interface.
- B. Configure each Frame Relay circuit as a point-to-point line to support multicast and broadcast traffic.
- C. Configure one sub-interface to disperse into multiple PVC connections to multiple remote router interfaces.
- D. Configure as many as possible sub-interfaces on the same subnet.
- E. Use the “no ip split-horizons” command on the physical interface.

Answer: A, E

Explanation:

The best solution is to configure subinterfaces for each virtual connection, because the individual virtual circuits can be maintained and split horizon can remain on. Routing

update information that is received through one subinterface can be propagated to other subinterfaces, because each sub-interface is treated as a completely separate interface. Configuring Frame Relay subinterfaces ensures that a single physical interface is treated as multiple virtual interfaces. This capability allows you to overcome split horizon rules so packets received on one virtual interface can be forwarded to another virtual interface, even if they are configured on the same physical interface. Another alternative to using sub-interfaces is to simply disable the split horizon mechanism as shown in choice E.

Reference: http://www.cisco.com/warp/public/116/fr_faq.html

QUESTION NO: 3

A new frame-relay network is being implemented and inverse ARP does not appear to be operating correctly. Which alternative command can be used to provide connectivity?

- A. frame-relay arp
- B. frame-relay map
- C. frame-relay interface-dlci
- D. frame-relay lmi-type
- E. frame-relay pvc

Answer: C

Explanation:

A sample configuration is provided below for reference:

```
interface serial0
encapsulation frame-relay
!
interface serial 0.3 point-to-point
ip address 140.1.3.4 255.255.255.0
frame-relay interface-dlci 51
!
interface Ethernet 0
ip address 140.1.14.4 255.255.255.0
```

Again, defaults abound in this configuration, but some defaults are different than when you're configuring on the main interface, as in the preceding example. The LMI type is auto-sense, and Cisco encapsulation is used, which is just like the fully-meshed example. However, Inverse ARP is disabled on each point-to-point subinterface by default. Inverse ARP is not needed with point-to-point subinterfaces.

Two new commands create the configuration required with point-to-point subinterfaces. First, the interface serial 0.1 point-to-point command creates logical subinterface number 1 under physical interface Serial0. The frame-relay interface-dlci subinterface subcommand then tells the router which single DLCI is associated with that subinterface.

QUESTION NO: 4

Which of the following Frame-Relay encapsulation commands would you use, if you had to connect your Cisco router to a non-Cisco router?

- A. TestKRouter(config-if)# Encapsulation frame-relay dot1q
- B. TestKRouter(config-if)# Encapsulation frame-relay aal5snap
- C. TestKRouter(config-if)# Encapsulation frame-relay ietf
- D. TestKRouter(config-if)# Encapsulation frame-relay isl
- E. None of the above

Answer: C

Explanation:

In general, the IETF Frame Relay encapsulation should be used when connecting a Cisco router to non-Cisco equipment across a Frame Relay network. The IETF Frame Relay encapsulation allows interoperability between equipment from multiple vendors.

Both Cisco and IETF encapsulations for Frame Relay can be configured on a per-virtual-circuit (VC) basis. This gives greater flexibility when configuring Frame Relay in a multi-vendor environment. A user can specify the Frame Relay encapsulation types to be used on different virtual circuits configured under the same physical interface.

Incorrect Answers:

A, D. 802.1Q and ISL are trunking encapsulation types and have nothing to do with frame relay.

B. AAL 5 SNAP is an ATM encapsulation and is not related to frame relay.

QUESTION NO: 5

The Testking Network is using ISDN to provide connectivity between TestKing1 and TestKing2 as shown below:

:



Assuming that the ISDN switch doesn't require SPIDs, which of the following commands would you implement to bring up the ISDN connection and provide connectivity between the two routers? (Select three answer choices)

- A. Router(config-if)# encapsulation HDLC

- B. Router(config)# **dialer-list 1 protocol ip permit**
- C. Router(config)# **isdn switch-type type**
- D. Router(config)# **dialer map ip address name connection number**
- E. Router(config-if)# **dialer-group 1**
- F. Router(config-if)# **ip address address subnet mask**

Answer: B, E, F

Explanation:

The dialer group number enables dialer-list on this interface. The dialer-list is to be defined in global configuration mode as shown in B. Finally, the interfaces should be configured with the proper IP address and subnet mask.

Incorrect Answers:

- A. ISDN BRI interfaces should be configured with PPP encapsulation.
- C. This is not always required, as the default switch type may be sufficient. In addition, if no SPIDs are required, then there is a good chance that the ISDN switch-type does not need to be explicitly defined.
- D. This command is using the incorrect syntax.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 310+337

QUESTION NO: 6

You are about to configure PPP on the interface of a Cisco router. Which authentication methods could you use? (Select two answer choices)

- A. SSL
- B. SLIP
- C. PAP
- D. LAPB
- E. CHAP
- F. VNP

Answer: C, E

Explanation:

Password Authentication Protocol (PAP) and Challenge Handshake Authentication Protocol (CHAP) authenticate the endpoints on either end of a point-to-point serial link. Chap is the preferred method today because the identifying codes flowing over the link are created using a MD5 one-way hash, which is more secure than the clear-text passwords sent by PAP.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 314

QUESTION NO: 7

Which of the following can LCP successfully negotiate during the establishment of a PPP connection? (Select three answer choices)

- A. Q.931
- B. IPCP
- C. multilink
- D. CHAP
- E. callback

Answer: B, C, D

Explanation:

The NCP phase is used for establishing and configuring different network-layer protocols. The most common layer 3 protocol negotiated is IP. The routers exchange IP Control Protocol (IPCP) messages negotiating options specific to the protocol. Point-to-Point Protocol (PPP) currently supports two authentication protocols: Password Authentication Protocol (PAP) and Challenge Handshake Authentication Protocol (CHAP). Both are specified in RFC 1334 and are supported on synchronous and asynchronous interfaces.)

(Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco press, ISBN 1-58720-083-X) Page 310+311 by ESMNDC.org)

QUESTION NO: 8

Your goal is to illustrate the five necessary steps of configuring dial-on-demand routing (DDR) on an ISDN BRI. Place the parameters on the right to the proper slot on the left. (Note: not all the parameters will be used)

Place here	Select from these	
Place 1st parameter here	unicast	<next-hop-address>
Place 2nd parameter here	dial string	dialer
Place 3rd parameter here	map	group
Place 4th parameter here	dialer-list	<protocol>
Place 5th parameter here		

Answer:

- Place 1st** - next hop address
- Place 2nd** - Dialer-list
- Place 3rd** - protocol
- Place 4th** - Dialer-String
- Place 5th** - group

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 342

QUESTION NO: 9

You have just obtained a modular Cisco router with 2 serial connections and a BRI/U interface. What other physical piece of hardware is required in order to establish an ISDN connection?

- A. Nothing. The router is already suitable.
- B. A BRI WAN interface in the router.
- C. An external NT1 to terminate the local loop.
- D. A TA/NT1 device on the router.

Answer: A

Explanation:

For routers with an integrated BRI/U interface no other device needs to be installed; the line supplied by the telephone company is simply plugged directly into the router's BRI interface. This is true for modern router interfaces. Legacy ISDN connections required the use of additional hardware, such as an NT1 device in order to provide the correct ISDN signaling between the router and the carrier's ISDN network.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 331

QUESTION NO: 10

In a lab, two routers are connected directly together using serial interfaces in a back-to-back configuration. No external DCE devices are being used. What additional command is needed to bring this link up?

- A. serial up
- B. clockrate

- C. clock rate
- D. dce rate
- E. dte rate

Answer: C

Explanation:

The clock rate command (two words), is used to provide clocking on a line where no DCE device is located. Clocking must be provided by one end of this link. Normally in a point to point HDLC or PPP connection the clock rate is supplied by the network provider.

Incorrect Answers:

- A. This is an invalid command
- B. This command will not work. The clock rate command must use two words.
- D, E. These are invalid commands.

QUESTION NO: 11

An ISDN link can be encapsulated using either PPP or HDLC. What are the advantages of using PPP? (Select two answer choices)

- A. PPP is easier to configure and maintain than HDLC.
- B. PPP is consistently implemented among different equipment vendors.
- C. PPP will run faster and more efficiently than HDLC on circuit-switched ISDN links.
- D. PPP authentication will prevent unauthorized callers from establishing an ISDN circuit.
- E. PPP can be routed across public facilities, while HDLC is not routable in circuit-switched networks.
- F. PPP supports asynchronous communication.

Answer: B, D

Explanation: PPP has numerous advantages over HDLC. Unlike HDLC which is Cisco proprietary, PPP was designed for multi-protocol interoperability. Secondly, PPP supports authentication, using either PAP or CHAP. Finally, PPP supports error correction and the use of bonded multilink circuits.

Incorrect Answers:

- A. The default encapsulation is HDLC. PPP must be explicitly configured and there are many more options available with it, so it is more complicated than HDLC.
- C. HDLC is slightly more efficient than PPP.
- E. Neither PPP nor HDLC work in public circuit switched environments.
- F. Although this is true, it would not be considered an advantage on an ISDN link, as ISDN signaling is not asynchronous.

Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 308-310

QUESTION NO: 12

A new frame relay connection is being brought up. Which of the following are frame relay LMI type options that can be configured on this new link? (Select all that apply.)

- A. EIA/TIA
- B. Q.932
- C. Q.933A
- D. IEEE
- E. Cisco
- F. Annex D

Answer: C, E, F

Explanation:

There are three options for frame relay LMI types. The default is Cisco, which is proprietary to Cisco routers. The second option is ANSI, which is also known as Annex D. The final option is the ITU standard, which is known as Annex A or Q.933A.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 382

QUESTION NO: 13

You are troubleshooting a frame relay connection and wish to view the LMI traffic stats. Which command should you issue?

- A. Show interface lmi
- B. Show frame-relay lmi
- C. Show interface frame-relay
- D. Debug frame-relay interface.

Answer: B

Explanation:

To view Frame-Relay LMI statistics, enter the command “show frame-relay lmi” This will view various statistics on the link, including the LMI status enquiries that were sent and received on the interface.

QUESTION NO: 14

You have a router that's connected to a Frame Relay WAN link using a serial DTE interface. What determines the interface clock rate?

- A. It is determined by the CSU/DSU.
- B. It is determined by the far end device.
- C. It is specified in the **clock rate** command.
- D. It is determined by the Layer 1 bit stream timing.

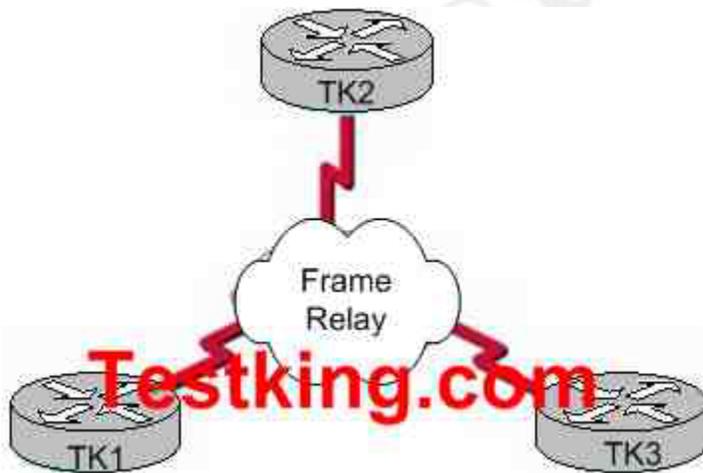
Answer: B

Explanation:

Because the question mentioned that the Frame Relay WAN link is using a Serial DTE interface so the other side which is Far End Router should determine and provide the Clock rate. The clock rate is always supplied by the DCE side.

QUESTION NO: 15

The Testking network consists of 3 frame relay sites as shown in the diagram below:



Which encapsulation type is appropriate to use in this design if the routers are all from different vendors?

- A. ietf
- B. cisco
- C. ansi
- D. q953a

E. ieee

Answer: A

Explanation:

Cisco routers use the Cisco frame relay encapsulation type for all frame relay interfaces. This is perfectly acceptable in all routers within the network are Cisco routers, but problems can arise for frame relay networks when a router from a different vendor is used. To prevent these problems, the industry standard IETF frame relay encapsulation should be used. To configure this, use the “encapsulation frame-relay ietf” interface command.

QUESTION NO: 16

Which statements are true about EIGRP successor routes? (Choose two)

- A. A successor route is used by EIGRP to forward traffic to a 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.
- F. Successors are not used in EIGRP.

Answer: B, D

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 than 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 NO: 17

The Testking network is planning to utilize both the IGRP and EIGRP routing protocols in their network as shown below:



Router TK3 is using IGRP, while router TK1 is using EIGRP. TestKing plans to add new routers and run EIGRP on them, but TestKing does not want to configure redistribution.

Which AS numbering scheme should TestKing implement?

- A. IGRP AS number 40; EIGRP AS number 41
- B. IGRP AS number 41; EIGRP AS number 40
- C. IGRP AS number 22; EIGRP AS number 22
- D. IGRP AS number 0; EIGRP AS number 0
- E. IGRP AS number 1; EIGRP AS number 255

Answer: C

Explanation:

EIGRP and IGRP will redistribute routes automatically, as long as the autonomous system numbers are the same for each protocol. With automatic redistribution, all networks shown in the network above will be reachable, with no additional configuration changes needed on the TK2 router.

Incorrect Answers:

- A, B, E. The AS numbers should be the same for both EIGRP and IGRP
- D. EIGRP and IGRP both require an AS number greater than 0.

QUESTION NO: 18

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A network administrator needs to configure a router for a Frame Relay connection to a non-Cisco router.

Which of the following commands will prepare the WAN interface for this connection?

- A. Router(config-if)# encapsulation frame-relay q933a
- B. Router(config-if)# encapsulation frame-relay ansi
- C. Router(config-if)# encapsulation frame-relay ietf
- D. Router(config-if)# encapsulation frame-relay isl
- E. None of the above

Answer: C

Explanation:

The IETF Frame Relay encapsulation should be used when connecting a Cisco router to non-Cisco equipment across a Frame Relay network. The IETF Frame Relay encapsulation allows interoperability between equipment from multiple vendors.

Both Cisco and IETF encapsulations for Frame Relay can be configured on a per-virtual-circuit (VC) basis. This gives greater flexibility when configuring Frame Relay in a multi-vendor environment. A user can specify the Frame Relay encapsulation types to be used on different virtual circuits configured under the same physical interface.

Incorrect Answers:

- A, B. These are frame relay LMI types and are not used as encapsulation types.
- D. ISL is a trunking encapsulation type and has nothing to do with frame relay.

Part III: TROUBLESHOOTING (75 questions)

Utilize the OSI model as a guide for systematic network troubleshooting (5 questions)

QUESTION NO: 1

You are logged into a router and with to view the layer 3 information about your neighboring Cisco routers. What IOS command gives layer 3 information for of the directly connected router interfaces?

- A. show ip links
- B. show cdp neighbor
- C. show cdp neighbor detail
- D. show ip clients
- E. show ip route
- F. None of the above

Answer: C

Explanation:

To display detailed information about neighboring devices discovered using Cisco Discovery Protocol (CDP), use the **show cdp neighbors** privileged EXEC command.

Detail - (Optional) Displays detailed information about a neighbor (or neighbors) including network address, enabled protocols, hold time, and software version.

Incorrect Answers:

A, D. These are invalid commands.

B. The “show cdp neighbor” command, without the “detail” keyword will not display the additional layer 3 protocol information.

E. This will show all routes from all other routers within the domain. We wish to see information from just the direct interface neighbors.

QUESTION NO: 2

While troubleshooting a connectivity problem on the network, you issue the ping command from your PC command prompt, but the output shows “request times out.”

At which OSI layer is this problem associated with?

- A. The data link layer
- B. The application layer

- C. The access layer
- D. The session layer
- E. The network layer

Answer: E

Explanation:

TCP/IP includes ICMP, a protocol designed to help manage and control the operation of a TCP/IP network. The ICMP protocol provides a wide variety of information about a network's health and operational status. Control message is the most descriptive part of a name. ICMP helps control and manage IP's work and therefore is considered part of TCP/IP's network layer.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) page 277.

QUESTION NO: 3

You download a file from an FTP site on the Internet. What is the highest layer in the OSI model used in this FTP operation?

- A. Application
- B. Presentation
- C. Session
- D. Transport
- E. Internet
- F. Data Link
- G. Physical

Answer: A

Explanation:

Layer 7 is the application layer, which is the highest layer in the OSI model. This layer describes the use of end user applications, such as opening movie files (avi, mpeg, etc) used Microsoft Office applications, using WWW browsers, using Telnet, and using FTP.

QUESTION NO: 4

A host computer has been correctly configured with a static IP address, but the default gateway is incorrectly set. Which layer of the OSI model will be first affected by this configuration error?

- A. Layer 1

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

Answer: C

Explanation : IP Addressing and IP routing resides on the OSI Network layer, which is layer 3.

QUESTION NO: 5

Which layer of the OSI reference model is responsible for ensuring reliable end-to-end delivery of data?

- A. Application
- B. Presentation
- C. Session
- D. Transport
- E. Network
- F. Data-Link

Answer: D

Explanation:

A key function of the transport layer is to provide *connection services* for the protocols and applications that run at the levels above it. These can be categorized as either connection-oriented services or connectionless services. Some protocol suites, such as TCP/IP, provide both a connection-oriented and a connectionless transport layer protocol, to suit the needs of different applications.

The transport layer is also the place in the layer stack where functions are normally included to add features to end-to-end data transport. Where network layer protocols are normally concerned with just “best effort” communications, where delivery is not guaranteed. Transport layer protocols are given intelligence in the form of algorithms that ensure that reliable and efficient communication between devices takes place. This encompasses several related jobs, including lost transmission detection and handling, and managing the rate at which data is sent to ensure that the receiving device is not overwhelmed.

Transmission quality, meaning ensuring that transmissions are received as sent, is so important that some networking references define the transport layer on the basis of reliability and flow-control functions. However, not all transport layer protocols provide these services. Just as a protocol suite may have a connection-oriented and a connectionless transport layer protocol, it may also have one that provides reliability and

data management services, and one that does not. Again, this is the case with TCP/IP: there is one main transport layer protocol; TCP, that includes reliability and flow control features, and a second, UDP, that doesn't.

Perform LAN and VLAN troubleshooting (13 questions)

QUESTION NO: 1

There are 2 switches in the Testking LAN, with no routers. Ports 1, 2 & 3 are assigned to VLAN 1 in switch 1 and 2 and ports 4, 5 & 6 are assigned to VLAN 2 in both switches. These two switches are connected together via a trunked link. Which of the conditions below would verify trunk and VLAN operation? (Select all valid answers)

- A. Host 1 on VLAN 1 can ping Host 2 on VLAN 1
- B. Host 1 on VLAN 1 can ping Host 4 on VLAN 2
- C. Host 1 on VLAN 1 can not ping Host 2 on VLAN 1
- D. Host 4 on VLAN 2 can not ping Host 1 on VLAN 1
- E. Host 4 on VLAN 2 can ping Host 2 on VLAN 2

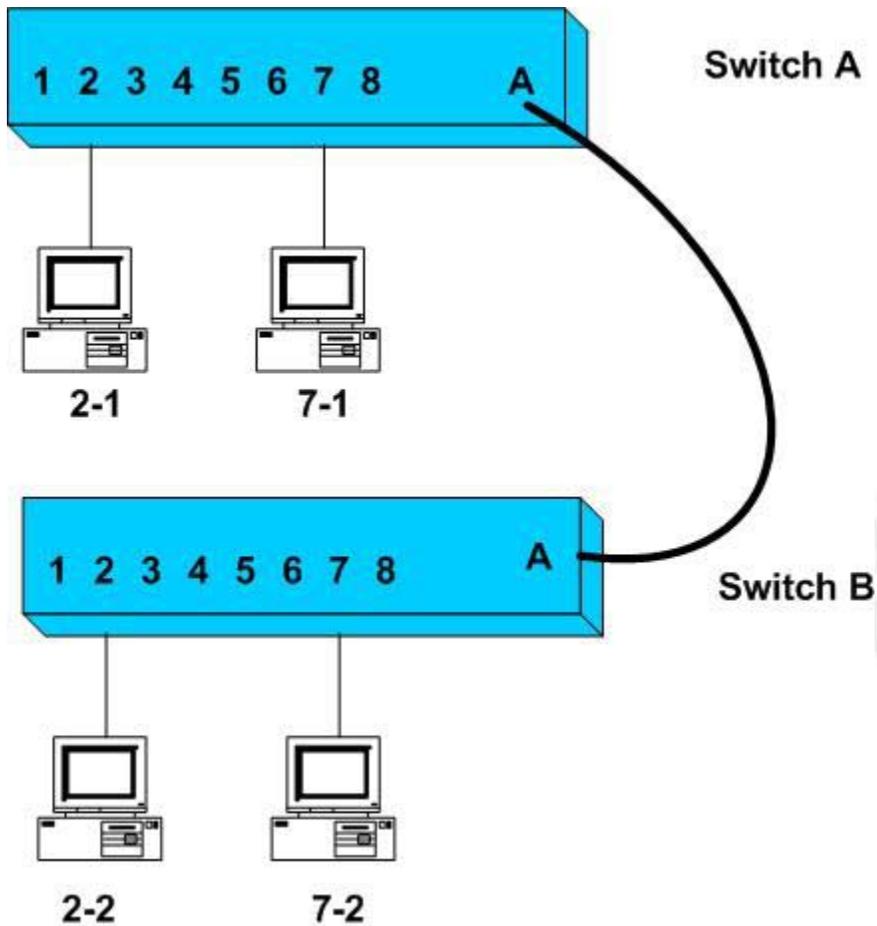
Answer: A, D, E

Explanation:

If there is no router present, only hosts in the same VLAN will be able to ping each other. In order for any host on one VLAN to communicate with a host on another VLAN, the traffic must pass through a router. Host within the same VLAN will be able to ping each other, even though they reside on different switches, as long as the switches have a trunk connection configured between them.

QUESTION NO: 2

Study the exhibit below, which displays 2 Testking switches in the LAN:



You are a network analyst on a network which contains two VLAN's as portrayed in the exhibit.

- Ports 1 through 4 on each switch are assigned to VLAN1
- Ports 5 through 8 on each switch are assigned to VLAN2.
- An ISL trunk link connects the two switches.

Based on this information, which of the following will be true? (Select all that apply)

- A. Host 2-1 can ping Host 2-2
- B. Host 2-1 can ping Host 7-2
- C. Host 2-1 can not ping Host 2-2
- D. Host 7-1 can not ping Host 2-2
- E. Host 7-1 can ping Host 7-2

Answer: A, D, E.

Explanation:

Without any routing taking place, hosts in one VLAN will only be able to reach other hosts in the same VLAN.

- A. Host 2-1 and Host 2-2 are both in VLAN1 and a ping should be successful.
- D. Host 7-1 is in VLAN3 while Host 2-2 is in VLAN1. A ping between those hosts should fail.
- E. Host 7-1 and Host 7-2 are both in VLAN1 and a ping should be successful.

Incorrect Answers:

- B. Host 2-1 and Host 7-2 are in different VLANs and a ping should fail.
- C. Host 2-1 and Host 2-2 are both in VLAN1 and a ping should be successful.

Reference: Steve McQuerry. *Interconnecting Cisco Network Devices*. (Cisco Press: 2000) pages 184 – 198 and 124.

QUESTION NO: 3

You are a senior network administrator at TestKing and your trusty junior administrator tells you that he failed his task of adding VLAN 50 to a Catalyst switch in the network.

You enter in the 'show vtp status' command and get this output:

TK2# show vtp status

```
VTP Version                :2
Configuration Revision     :7
Maximum VLANs supported local :68
Number of existing VLANs   :8
VTP Operating Mode         :Client
VTP Domain Name            :corp
VTP Pruning Mode           :Disabled
VTP V2 Mode                :Disabled
VTP Traps Generation       :Disabled
MD5 digest                 :0x22 0xF3 0x1A
Configuration last modified by 172.18.22.15 at 5-28-03 1t:53:20
```

What commands must be issued on this switch to add VLAN 50 to the database? (Choose two.)

Which commands would you enter to add VLAN 50 to the database on this switch? (Select two)

- A. TK2(config-if)# **switchport access vlan 50**
- B. TK2(vlan)# **vtp server**
- C. TK2(config)# **config-revision 20**
- D. TK2(config)# **vlan 50 name Tech**

- E. TK2(vlan)# **vlan 50**
 F. TK2(vlan)# **switchport trunk vlan 50**

Answer: B, E

Explanation:

VTP operates in one of three modes:

- Server mode
- Client mode
- Transparent mode

For VTP to exchange information, some switches act as servers, and some act as clients. VTP servers can create, modify, and delete VLANs and other configuration parameters for the entire VTP domain; this information, in turn, is propagated to the VTP clients and servers in that same domain. VTP servers save VLAN configurations in the Catalyst NVRAM, whereas in clients, the VLAN configuration is not stored at all. A VTP client cannot create, change or delete VLANs, nor can it save VLAN configurations in non-volatile memory.

switchport mode {access dynamic {auto desirable} trunk}	Interface subcommand that configured the Interface for trunking.
---	--

QUESTION NO: 4

Study the Exhibit below carefully:

```
London#show vtp
VTP Version:                2
Configuration Revision:     0
Maximum VLANs supported locally: 64
Number of existing VLANs:   5
VTP Operating Mode:         Client
VTP Domain Name:            London
VTP Pruning Mode:           Disabled
VTP V2 Mode:                 Disabled
VTP Traps Generation:       Disabled
```

Based on the information given above, what is the VTP function of this particular switch?

- A. Learn and save VTP configuration in the running configuration.
- B. Create and change VLANs.
- C. Passes information about VTP configuration.
- D. VTP is disabled on this device.

E. VTP is not saved to NVRAM.

Answer: C

Explanation:

From the output this switch is operating merely as VTP client, so it basically does as the VTP server says, and passes on information about VTP configuration to the next switch in line.

Incorrect Answers:

- A. This is incorrect because the function is redundant.
- B. This incorrect because the switch must be in server or transparent mode to create and change VLANs.
- D. This is incorrect because if VTP would be disabled, it wouldn't appear on the command output.
- E. If this were true, the VTP configuration information would not be displayed after being powered on.

QUESTION NO: 5

Which of the following IOS commands could you use to troubleshoot a router connectivity problem on an IP network? (Select all valid answers)

- A. show ip route
- B. ipconfig
- C. tracert
- D. show interfaces
- E. traceroute
- F. ping
- G. All of the above

Answer: A, D, E, F

Explanation:

- A. The show ip route command displays the IP route table.
- D. The show interfaces EXEC command to display statistics for all interfaces configured on the router or access server.
- E. Traceroute is a valid router command, used to trace the path to a destination, and provide the latency associated with each hop.
- F. The ping command tests connectivity to a remote node.

Incorrect Answers:

- B, C. These are commands used on PC hosts. They are invalid router commands.

QUESTION NO: 6

A new Catalyst switch is connected to an existing switch using a crossover cable. As a result of this, what would the switch port link lights display?

- A. The switch port link lights will be off on both switches indicating the ports are not connected.
- B. The switch port link light will be off on one switch indicating that STP has disabled the port.
- C. The switch port link lights will flash amber indicating an error.
- D. The switch port link lights will be green indicating normal operation.

Answer: D

Explanation:

To connect one Cisco switch to another Cisco switch, the crossover cable is the proper cable to use. So if you were to use one, the lights would be green indicating that all is well. If you were to connect a switch to a router, a server, or a PC host then a straight through cable should be used.

- Connect a Category 3, 4, or 5 **crossover** cable to any 10/100 port on the switch and to a 10BaseT port on the target hub or switch.
- Connect a Category 5 **crossover** cable to any 10/100 port on the switch and to a 100BaseTX port on the target hub or switch.

Reference:http://www.cisco.com/en/US/products/hw/switches/ps211/products_quick_start09186a00800ea827.html

QUESTION NO: 7

What command verifies connectivity between two hosts by sending and receiving ICMP echo messages?

- A. ping
- B. tracert
- C. netstat
- D. show cdp neighbors detail
- E. show ip route
- F. traceroute

Answer: A

Explanation:

Packet Internet Groper (PING) uses ICMP echo requests and replies to verify network connectivity. It is most commonly used to verify connectivity to another device and to monitor the operational status of a device.

QUESTION NO: 8

You are working as a network technician at TestKing University, when you get a call from the Engineering Faculty. They're complaining that they're receiving obsolete information from the Business Faculty's network traffic broadcasts. What can you do to contain the Business Faculty's broadcast while still keeping it connected to the internet and the enterprise services of the University? (Select all valid answer choices)

- A. Use half and full-duplex Ethernet on the Engineering Department LAN
- B. Establish a VTP domain to minimize the obsolete traffic
- C. Change the switch IP address of the switch
- D. Create separate VLANs and subnets for the two departments and route between the two
- E. Provide greater bandwidth to the Engineering Department LAN
- F. Place the business department on a separate subnet and route between networks

Answer: D, F

Explanation:

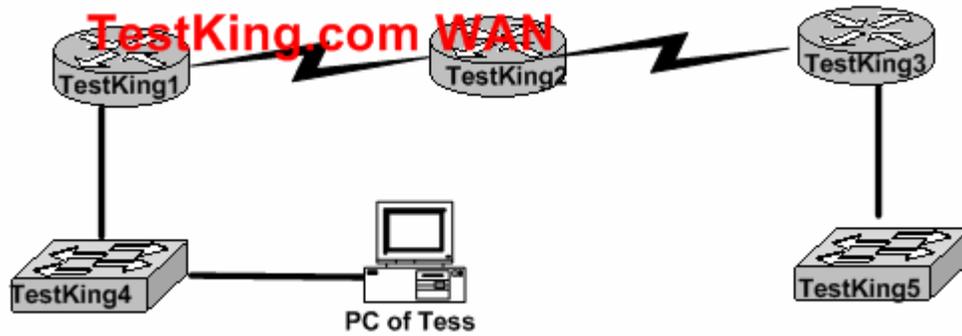
In order to prevent the broadcast and link level multicast traffic separated between the departments, they need to be isolated at layer two. This can be accomplished in two ways. The first is to create separate VLANs and place each department into a different one. The second method would be to separate the two departments into two completely different networks, and route between them.

Incorrect Answers:

- A. Mixing the use of half and full duplex will make no difference to the number of broadcasts sent.
- B. Trunking is only useful in networks that already contain VLANs.
- C. This will make no difference, as all users will still be contained within the same IP subnet.
- E. The amount of bandwidth involved will not have any impact on the amount of broadcasts that are sent and received.

QUESTION NO: 9

Study the following exhibit:



You are unable to log into the TestKing5 switch, as you have forgotten its IP address and you are too far away to log into it via the console port. You are unsure what the IP address of TestKing 5 is and need to get this information.

How can you find the IP address of switch TestKing5?

- A. Issue the **show ip route** command on Router TestKing1.
- B. Issue the **show cdp neighbors detail** command on Router TestKing2.
- C. Issue the **show arp** command on Router TestKing3.
- D. Issue the **show cdp neighbors detail** command on Router TestKing3.
- E. Issue the **show arp** command on Router TestKing1.
- F. Issue the **show ip route** command on Router TestKing2.

Answer: D

Explanation:

To display detailed information about neighboring devices discovered using Cisco Discovery Protocol (CDP), use the **show cdp neighbors** privileged EXEC command.

Detail - (Optional) Displays detailed information about a neighbor (or neighbors) including network address, enabled protocols, hold time, and software version.

QUESTION NO: 10

Study the exhibit below:

London# show vtp status		Madrid# show vtp status	
VTP Version	: 2	VTP Version	: 2
Configuration Revision	: 0	Configuration Revision	: 0
Maximum VLANs supported locally	: 64	Maximum VLANs supported locally	: 64
Number of existing VLANs	: 5	Number of existing VLANs	: 5
VTP Operating Mode	: Server	VTP Operating Mode	: Server
VTP Domain Name	: London	VTP Domain Name	: Madrid
VTP Pruning Mode	: Disabled	VTP Pruning Mode	: Disable
VTP V2 Mode	: Disabled	VTP V2 Mode	: Disable
VTP Traps Generation	: Disabled	VTP Traps Generation	: Disable

The London switch and Madrid switch have both been configured for VTP, but they aren't sharing any VTP messages. Based on the above output, what do you suspect is the cause of this problem?

- A. VTP V2 mode is not in operation.
- B. VTP pruning mode is disabled.
- C. The VTP domain name is configured incorrectly.
- D. The VTP operating mode is not configured.
- E. The VTP version is configured incorrectly.

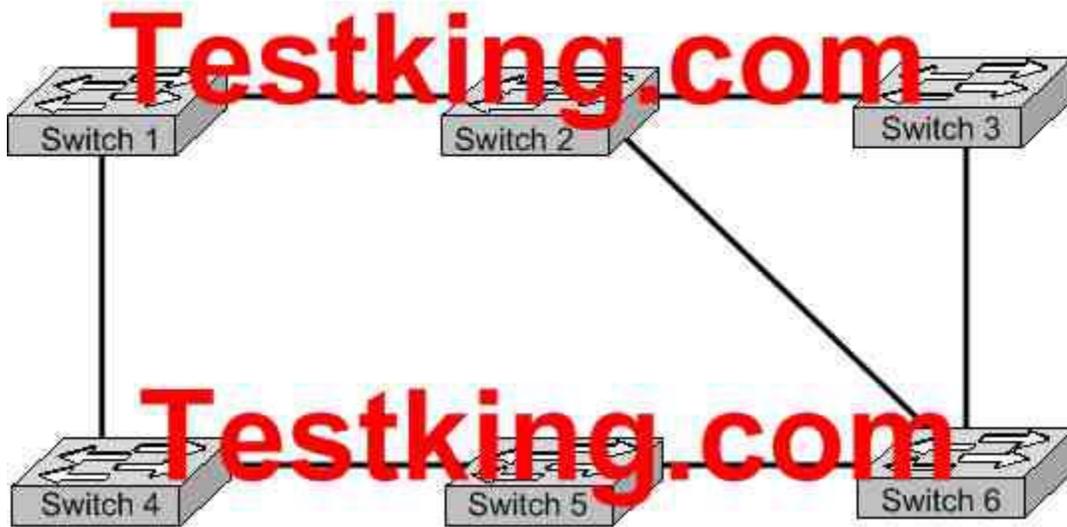
Answer: C

Explanation:

In order for VTP information to be shared between switches, they must be in the same VTP domain. Based on the output above, the switches appear to belong in completely separate domains, as their VTP domains are different, and they are both VTP servers.

QUESTION NO: 11

The Testking switched LAN is displayed in the exhibit below:



The switches are connected together as shown above, creating a loop. What is the type of loop that is caused in this setup, and what is the name of the protocol that prevents this from becoming a problem?

- A. routing loops, hold down timers
- B. switching loops, split horizon
- C. routing loops, split horizon
- D. switching loops, VTP
- E. routing loops, STP
- F. switching loops, STP

Answer: F

Explanation:

The Spanning-Tree Protocol (STP) prevents loops from being formed when switches or bridges are interconnected via multiple paths. Spanning-Tree Protocol implements the 802.1D IEEE algorithm by exchanging BPDU messages with other switches to detect loops, and then removes the loop by shutting down selected bridge interfaces. This algorithm guarantees that there is one and only one active path between two network devices.

Incorrect Answers:

A, C, E. Switches operate at layer two, and only bridging or switching loops can be created.

B. Split Horizons are used to prevent routing loops in distance vector protocols.

D. VTP is the VLAN Trunking Protocol, which alone has no mechanism to prevent loops in the network from becoming an issue. The VTP process relies on the STP for loop detection and prevention.

QUESTION NO: 12

After connecting a PC to an available port on a switch, you find that the PC can not access any of the resources on the LAN. No other PC's connected to the switch appear to be having any issues. What is the most likely cause for this problem?

- A. The router lacks a routing table entry for the new host
- B. The host switch port is assigned to the incorrect VLAN
- C. The host MAC address is incorrectly configured
- D. A STP instance for the new host has not been initialized
- E. The switch does not have the MAC address hard coded in the CAM table.

Answer: B

Explanation:

Virtual LANs break up broadcast domains in a layer-two switched internetwork. If a host is in a different VLAN then the network services it needs to use, the packets must go through a router. If routing does not take place, the PC will be unable to communicate with any other devices not in the same VLAN. Answer B is the best answer for this question.

Incorrect Answers:

- A. The PC is unable to communicate with other LAN users. No router needs to even be installed for this to work.
- C, E. The MAC address of the PC does not need to be entered manually into the switch. The switch will dynamically learn of the MAC address of the PC.
- D. The STP algorithm does not need to have any end host information added in order for it to work.

QUESTION NO: 13

You are attempting to troubleshoot some problems within your local network. Which of the following are router IOS commands that can be used to troubleshoot LAN connectivity problems? (Choose all that apply)

- A. **ping**
- B. **tracert**
- C. **ipconfig**
- D. **show ip route**
- E. **winipcfg**
- F. **show interfaces**
- G. **All of the above**

Answer: A, D, F

Explanation:

All three of these are valid Cisco IOS commands that can be used to verify and troubleshoot connectivity issues on a LAN or WAN.

Incorrect Answers:

B. "Tracert" is not a valid Cisco IOS command. This command can be used while at the command prompt window of a PC, but the corresponding Cisco command is "tracert".

C, E. These are commands that can be useful in troubleshooting connectivity problems with an individual PC, but they are not valid commands within a Cisco router.

Troubleshoot routing protocols (21 questions)

QUESTION NO: 1

Which one of the following privileged EXEC mode IOS show commands will display the state of the OSPF DR/BDR (designated router / backup designated router) election process?

- A. TK1# show ip ospf interface
- B. TK1# show ip ospf priority
- C. TK1# show ospf neighbor detail
- D. TK1# show ospf processes
- E. TK1# show ospf neighbor state

Answer: A

Explanation:

This command will display the router ID of both the DR and the BDR on the network segment that the particular interface is connected to.

Example:

```
Router1#show ip ospf interface ethernet 0
Ethernet0 is up, line protocol is up
  Internet Address 10.10.10.1/24, Area 0
    Process ID 1, Router ID 192.168.45.1, Network Type BROADCAST,
Cost: 10
  Transmit Delay is 1 sec, State BDR, Priority 1
  Designated Router (ID) 172.16.10.1, Interface address
10.10.10.2
  Backup Designated router (ID) 192.168.45.1, Interface address
10.10.10.1
  Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5
    Hello due in 00:00:06
  Index 1/1, flood queue length 0
  Next 0x0(0)/0x0(0)
  Last flood scan length is 2, maximum is 2
  Last flood scan time is 0 msec, maximum is 4 msec
  Neighbor Count is 1, Adjacent neighbor count is 1
  Adjacent with neighbor 172.16.10.1 (Designated Router)
  Suppress hello for 0 neighbor(s)
```

QUESTION NO: 2

After logging into a router, you issue the “show ip route” command as shown below:

```
RouterTestKing# Show ip route
```

```
<some output text omitted>
```

```
Gateway of last resort is not set.
```

```

1 172.16.0.0[110/84632] via 192.168.6.3,00:00:13, FastEthernet0/0
R 192.168.3.0 [120/3] via 192.168.2.2,00:00:09, Serial0/0
C 192.168.2.0 is directly connected, Serial0/0
C 192.168.6.0 is directly connected, FastEthernet0/0

```

Based on the information above, what does the expression [120/3] represent in the second line of the routing table?

- A. 120 is the bandwidth allocation and 3 is the routing process number.
- B. 120 is the administrative distance and 3 is the metric for that route.
- C. The number 120 is the value of the update timer and 3 is the number of updates received.
- D. The number 120 is the UDP port for forwarding traffic and 3 is the number of bridges.

Answer: B

Explanation:

To decide which route to use, IOS uses a concept called Administrative Distance. Administrative distance is a number that denotes how believable an entire routing protocol is on a single router. The lower the number, the better, or more believable the routing protocol.

Route Type	Administrative Distance
• Connected	0
• EIGRP	90
• IGRP	100
• OSPF	110
• RIP	120

For RIP, the metric is the hop count, so in this case the route is 3 hops away.

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 177

QUESTION NO: 3

While trying to diagnose a routing problem in the network, you issue RIP debugging as displayed below:

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RtrA#debug ip rip

Rip protocol debugging is on

RtrA#

1d05h: RIP: sending v1 update to 255.255.255.255 via FastEthernet0/0 (172.16.1.1)

1d05h: RIP: build update entries

1d05h: network 10.0.0.0 metric 1

1d05h: network 192.168.1.0 metric 2

1d05h: RIP: sending v1 update to 255.255.255.255 via Serial0/0 (10.0.8.1)

1d05h: RIP: build update entries

1d05h: network 172.16.0.0 metric 1

RtrA#

1d05h: RIP: received v1 update from 10.0.15.2 on Serial0/0

1d05h: 192.168.1.0 in 1 hops

1d05h: 192.168.0 in 16 hops (inaccessible)

Based on the output of the above exhibit, which two of the following statements are true? (Select two answer choices)

- A. A ping to 10.0.15.2 will be successful.
- B. RtrA has three interfaces that will take part in the RIP process.
- C. There are at least two routers participating in the RIP process.
- D. A ping to 192.168.168.2 will be successful.

Answer: A, C**Explanation:**

By virtue of RIP receiving an update from 10.0.15.2 on Serial0/0, we know that there has to be another router in the picture, so C is a correct choice. Since the router received an update from the neighbor address, we know that there's a connection. Therefore, a ping can be successful, making answer choice A correct as well.

Incorrect Answers:

- B. This is incorrect because there isn't conclusive evidence to support this.
- D. This is incorrect because from the exhibit above the router is inaccessible, therefore the success of a ping would be unknown.

QUESTION NO: 4

On your OSPF network, routers TK1 and TK2 belong to the same Ethernet network. However, they are unable to establish an adjacency over this link. While troubleshooting this problem, you issue the "show ip ospf interface Ethernet 0" command on each router. The output from these commands is displayed below:

TK1: Ethernet is up, line protocol is up
Internet address 192.168.1.2/24, Area 0

Process ID 1, Router ID 192.168.31.33, Network Type BROADCAST, Cost: 10
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 192.168.31.33, Interface address 192.168.1.2
No backup designated router on this network
Time intervals configured, Hello 5, Dead 20, Wait 20, Retransmit 5

TK2: Ethernet0 is up, line protocol is up
Internet address 192.168.1.1/24, Area 0
Process ID 2, Router ID 192.168.31.11, Network Type BROADCAST, Cost: 10
Transmit Delay is 1 sec, State DR, Priority 1
Designated Router (ID) 192.168.31.11, Interface address 192.168.1.1
No backup designated router on this network
Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5

What is the underlying cause of the routers failing to become adjacent?

- A. The OSPF area is misconfigured.
- B. The priority on TK2 should be set lower.
- C. The cost on TK2 should be set lower.
- D. The hello and dead timers are misconfigured.
- E. You need to add a backup designated router to the network.
- F. The OSPF process ID numbers do not match.

Answer: D

Explanation:

OSPF routers must have the same hello intervals and the same dead intervals to exchange information. By default, the dead interval is four times the value of the hello interval. This means that a router has four chances to send a hello packet before being declared dead.

On broadcast OSPF networks, the default hello interval is 10 seconds and the default dead interval is 40 seconds. On nonbroadcast networks, the default hello interval is 30 seconds and the default dead interval is 120 seconds. These default values result in efficient OSPF operation and seldom need to be modified. As shown in the output, the hello timer on router TK1 was changed to 5 seconds, with the dead timer being set to 20 seconds.

Incorrect Answers:

- A. Both routers are configured to be in area 0.
- B. In this example the adjacency should come up regardless of which one was the DR/BRD. Therefore, setting the priority on one router will not solve this problem.
- C. This will not solve the adjacency issue.
- E. Only the DR is absolutely required on the Ethernet subnet, not the BDR.
- F. Unlike other protocols, the routing process ID's do not necessarily need to match in OSPF for routing to work.

QUESTION NO: 5

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A new router, named TK1, is being installed. You wish to add this router to your existing OSPF network. In doing so, you configure the following:

```
TK1(config)# router ospf 1
TK1(config-router)# network 10.10.10.0 255.255.255.0 area 0
```

After making this change, you notice that the networks attached to TK1 are not being learned by the other OSPF routers. What could be the cause of this?

- A. The AS is not correctly configured
- B. The network subnet mask is incorrectly configured
- C. The network wildcard mask is configured incorrectly
- D. The network number is not correctly configured
- E. The process id is configured incorrectly
- F. None of the above

Answer: C

Explanation:

The network command specifies the IP address (10.10.10.0) followed by the wildcard mask (not the subnet mask) and the area that is to be associated with the OSPF address range (in this case, area 0). The wildcard mask indicates in binary how much of the IP address must be matched with 0s indicating that the bits must match and 1 indicating that they may vary. Thus 0.0.0.255 or 00000000.00000000.00000000.11111111 indicates that any bit in the last octet can vary while all bits in the first 3 octets must match the network address (in other words, 10.10.10.xx)

QUESTION NO: 6

Which one of the following EIGRP commands can check the IP addresses of the adjacent neighbors, as well as verifying the EIGRP retransmit intervals and queue counts?

- A. TK1#show ip eigrp adjacency
- B. TK1#show ip eigrp topology
- C. TK1#show ip eigrp interfaces
- D. TK1#show ip eigrp neighbors
- E. None of the above

Answer: D

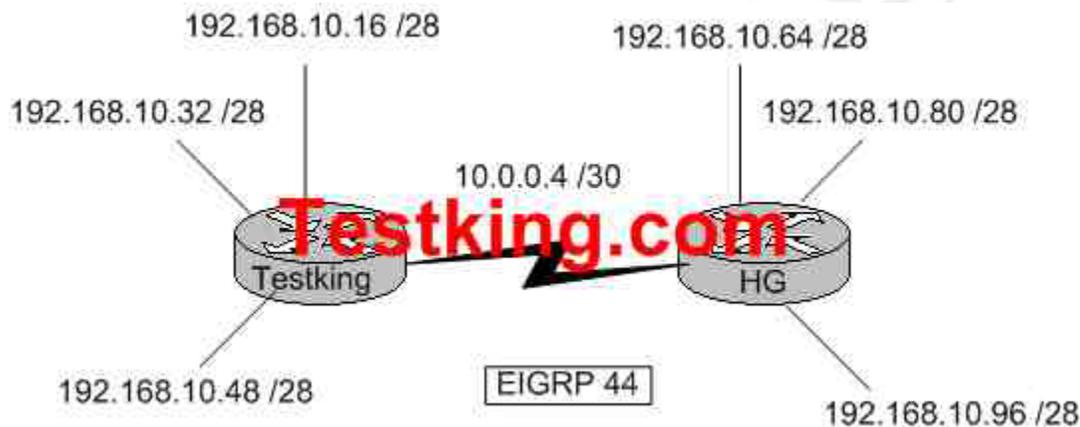
Explanation:

The topology database contains information from all of the LSA packets that have been received for an area. The topology database is updated by the LSAs. Each router within the area has exactly the same topology database. All routers must have the same vision of the networks; otherwise, confusion, routing loops, and loss of connectivity will result. **Note:** The topology database is the router's view of the network within the area. It includes every OSPF router within the area and all the connected networks. This database is indeed a routing table, but a routing table for which no path decisions have been made; it is at present a topology database.

Reference: "CCNP BSCI Exam Certification Guide Third Edition" by Clare Gough, CCIE No. 2893, Page 197.

QUESTION NO: 7

The Testking network consists of two routers as shown below:



Both routers Testking and HG are configured for EIGRP. Unfortunately, users on the Testking networks are unable to reach users on the HG networks. Which command could you enter on Testking to correct this problem?

- A. Testking(config-router)# version 2
- B. Testking(config-router)# no auto-summary
- C. Testking(config-router)# redistribute eigrp 44
- D. Testking(config-router)# EIGRP log-neighbor-changes
- E. Testking(config-router)# default-information originate

Answer: B

Explanation:

By default, EIGRP will auto-summarize IP information at the network boundaries. In this example, the 192.168.10.0 network is subnetted into 6 separate networks. Therefore, each router will only advertise the 192.168.10.0/24 network to each other by default. To

disable this function and transmit sub-prefix routing information across classful network boundaries, auto summarization must be disabled.

Incorrect Answers:

- A. There is only one version of EIGRP.
- C. Based on the diagram, each router is already configured for EIGRP 44.
- D. This will have no impact on the routes.
- E. This will generate a default route, which will be advertised to the other router. However, a default route is not needed, as the individual subnets need to be advertised, not a default route.

QUESTION NO: 8

While troubleshooting a routing problem in your network, you utilize RIP debugging as shown below:

```

RtrA#debug ip rip
RIP protocol debugging is on
RtrA#
1d05h: RIP: sending v1 update to 255.255.255.255 via FastEthernet0/0 (172.16.1.1)
1d05h: RIP: build update entries
1d05h: network 10.0.0.0 metric 1
1d05h: network 192.168.1.0 metric 2
1d05h: RIP: sending v1 update to 255.255.255.255 via Serial0/0 (10.0.8.1)
1d05h: RIP: build update entries
1d05h: network 172.16.0.0 metric 1
RtrA#
1d05h: RIP: received v1 update from 10.0.15.2 on Serial0/0
1d05h:   192.168.1.0 in 1 hops
1d05h:   192.168.168.0 in 16 hops (inaccessible)

```

Based on the information provided, which of the following are true? (Select two answer choices)

- A. This router was configured with the commands:
RtrA(config)#**router rip**
RtrA(config-router)# **network 172.16.0.0**
RtrA(config-router)# **network 10.0.0.0**
- B. This router was configured with the commands:
RtrA(config)# **router rip**
RtrA(config-router)# **network 192.168.1.0**
RtrA(config-router)# **network 10.0.0.0**
RtrA(config-router)# **network 192.168.168.0**
- C. This router was configured with the commands:
RtrA(config)# **router rip**
RtrA(config-router)# **version 2**
RtrA(config-router)# **network 172.16.0.0**

RtrA(config-router)# **network 10.0.0.0**

- D. Split horizon was disabled on this router.
- E. Network 192.168.168.0 will be displayed in the routing table.
- F. Network 192.168.1.0 will be displayed in the routing table.

Answer: A, F

Explanation:

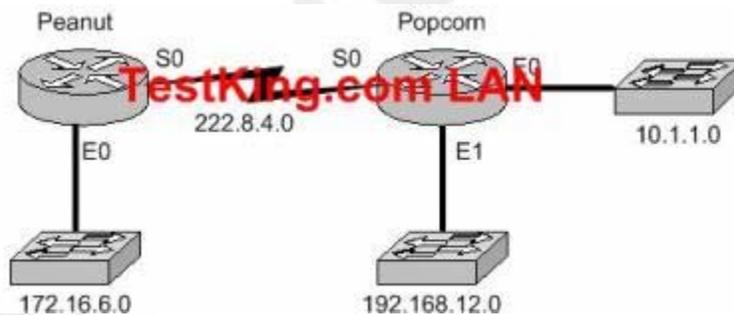
Based on the information provided, this RIP network is routing the 192.168.1.0, 172.16.0.0, and 10.0.0.0 networks. However, the 10.0.0.0 and 172.16.0.0 networks show that they are being advertised to the other router with a metric of 1, meaning that it is directly connected. Therefore, choice A is correct. Also, the 192.168.1.0 network was received on the serial 0/0 interface with a valid metric of 1 so this route will indeed be installed into the routing table.

Incorrect Answers:

- B. The 192.168.0.0 networks are being received from other routers, so this particular one will not have this locally configured.
- C. The output shows that RIP version 1 is being used, not RIP version 2.
- D. There is no information to support this.
- E. This network shows a metric of 16, which is the maximum number of hops for RIP so it is deemed inaccessible.

QUESTION NO: 9

The Testking network consists of two routers, Peanut and Popcorn, as shown in the display below:



While troubleshooting a routing problem, you issue the “show ip protocols” command:

```
Popcorn# show ip protocols
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 13 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is
  Incoming update filter list for all interfaces is
```

```

Redistribution: rip
Default version control: send version 1, receive any version
Interface Send      Recv Triggered RIP  Key-chain
Ethernet0 1 12
Ethernet1 1 12
Serial 1 12
Routing for Networks:
 222.8.4.0
 10.1.1.0
Routing Information Sources:
 Gateway  Distance Last Update
 222.8.4.1 120          00:00:04

```

The Peanut router is able to successfully ping the Serial 0 and Ethernet 0 interface of the Popcorn router, but a ping issued to the Ethernet 1 interface fails. Based on the above output, what are the potential causes of this problem? (Select two answer choices)

- A. The Popcorn router is not forwarding RIP updates.
- B. The Popcorn router did not include network 192.168.12.0 in its routing configuration.
- C. The Ethernet1 interface of the Popcorn router is shutdown.
- D. The clockrate is not present in the configuration of one of the routers.
- E. The Serial interface of the Popcorn router is not operating.

Answer: B, C

Explanation:

If the Popcorn router did not include the 192.168.12.0 network in the RIP configuration, then this network would not be advertised to the Peanut router, which would make it unreachable. Similarly, if the interface were administratively shut down, the Peanut router would not have a route to this network.

Incorrect Answers:

A, C, E. If any of these were true, then all of the Ethernet networks connected to the Popcorn router would be unreachable to the Peanut router, and not just Ethernet 1.

QUESTION NO: 10

While troubleshooting network connectivity problems, the following two show commands were issued as shown below:

```

Test_King#show ip protocol
Routing Protocol is "rip"
  Sending updates every 30 seconds, next due in 4 seconds
  Invalid after 180 seconds, hold down 180, flushed after 240
  Outgoing update filter list for all interfaces is not set
  Incoming update filter list for all interfaces is not set

```

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```

Redistribution rip
Default version control: send version 1, receive any version
Interface      Send Recv Triggered RIP Key-chain
Serial0/0      1 1 2
Serial0/1      1 1 2
Automatic network summarization is in effect
Maximum path: 4
Routing for Networks:
 10.0.0.0
Routing Information Sources:
 Gateway      Distance  Last Update
 10.168.11.14  120    00:00:22
Distance: (default is 120)

```

```

Testking#show ip interfaces brief
Interface      IP-Address      OK?  Method Status
FastEthernet0/0 192.168.18.1    YES  manual up
Serial0/0       10.168.11.15    YES  manual up
FastEthernet0/1 unassigned      YES  NVRAM
administratively down
Serial0/1       192.168.11.21  YES  manual up

```

Based on the output of the above exhibit, which two of the following statements are correct? (Select two answer choices)

- A. Router Testking will get routing updates on the Serial0/1 interface.
- B. Router Testking will issue routing updates out the Serial0/0 interface.
- C. Router Testking makes use of a link-state routing protocol.
- D. Router Testking will get routing updates on the Serial0/0 interface.
- E. Router Testking will issue routing updates out the FastEthernet0/0 interface.

Answer: B, D

Explanation:

Based on the information given, routing updates are being sent and received only from the directly connected neighbor with IP address 10.168.11.14. The locally connected interface in this case is Serial 0/0, as shown by the fact that this interface is using IP address 10.168.11.15, so it is on the same network.

Incorrect Answers:

- A, E. Only interface Serial 0/0 appears to be passing routing information.
- C. The only protocol that is being used here is RIP, which is a distance vector protocol.

QUESTION NO: 11

Regarding the extended ping command; which of the statements below are true? (Select all valid answer choices)

- A. The extended ping command is supported from user EXEC mode.
- B. The extended ping command is available from privileged EXEC mode.
- C. With the extended ping command you can specify the TCP and UDP port to be pinged.
- D. With the extended ping command you can specify the timeout value.
- E. With the extended ping command you can specify the datagram size.

Answer: B, D, E

Explanation:

The extended **ping** command works only at the privileged EXEC command line. Some of the extended ping command values include the datagram size and timeout value as shown:

Datagram size [100]: Size of the ping packet (in bytes). Default: 100 bytes.

Timeout in seconds [2]: Timeout interval. Default: 2 (seconds). The ping is declared successful only if the ECHO REPLY packet is received before this time interval.

Incorrect Answers:

- A. Regular pings are available in both user and privileged mode, but not extended pings.
- C. Ports can not be specified.

QUESTION NO: 12

After executing the “show host” command, which of the information below would you see? (Select two answer choices.)

- A. The IP addresses of workstations allowed gain access to the router via an access list
- B. Permanent name-to-address mappings created using the **ip host** command.
- C. Temporary and permanent DNS entries.
- D. The names of the routers created using the **hostname** command.
- E. The length of time of users logged into the router, as well as the duration

Answer: B, D

Explanation:

The “show host” command lists all host names and corresponding IP addresses, as configured in the router.

Incorrect Answers:

- A, C. These are invalid.
- E. This is the result of the “show users” command, not the “show ip hosts” command.

QUESTION NO: 13

When you use the ping command to send ICMP messages across a network, what's the most common request/reply pair you'll see? (Select one answer choice)

- A. Echo request and Echo reply
- B. ICMP hold and ICMP send
- C. ICMP request and ICMP reply
- D. Echo off and Echo on
- E. None of the above

Answer: A

Explanation:

The ICMP protocol uses Echo request and Echo reply with the Ping command. The PING utility is the most commonly used message to verify connectivity to a remote device within the network.

QUESTION NO: 14

Three networks lie behind serial 0/0 interface of the Testking router: 172.16.10.0, 172.16.20.0, and 172.16.30.0. Unfortunately, users are unable to reach the 172.16.20.0 network. To troubleshoot the problem, you issue the “debug ip rip” and “show ip route” commands as shown below:

```
<some output text is omitted>

testking1# debug ip rip

1d00h: RIP:received v1 update from 172.16.100.2 on Serial0/0
1d00h: 172.16.10.0 in 1 hops
1d00h: 172.16.20.0 in 1 hops
1d00h: 172.16.30.0 in 1 hops

testking1# show ip route

Gateway of last resort is not set

 172.16.0.0/24 is subnetted, 8 subnets
C   172.16.150.0 is directly connected, FastEthernet0/0
C   172.16.220.0 is directly connected, Loopback2
C   172.16.210.0 is directly connected, Loopback1
C   172.16.200.0 is directly connected, Loopback0
R   172.16.30.0 [120/1] via 172.16.100.2, 00:00:07, Serial0/0
S   172.16.20.0 [1/0] via 172.16.150.15
R   172.16.10.0 [120/1] via 172.16.100.2, 00:00:07, Serial0/0
C   172.16.100.0 is directly connected, Serial0/0
```

What could be the underlying cause of the problem?

- A. The 172.16.20.0 network is not located in testking1's routing table.

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- B. There is no gateway of last resort on testking1.
- C. The static route for 172.16.20.0 is incorrect.
- D. The testking1 router is not receiving 172.16.20.0 updates.
- E. None of the above

Answer: C

Explanation:

The static route of 172.16.20.0 is incorrect. The “show ip route” shows that the network is connected via 172.16.150.15 instead of 172.16.100.2.

Incorrect Answers:

- A. The network is displayed in the table. The problem is that the route shows up as an incorrect static route, instead of a RIP route.
- B. Although the default route is not set, this does not explain why the 172.16.20.0 route is inaccessible.
- D. The RIP debugging shows that the route is indeed being learned via RIP. The problem is that a static route was configured, and the static route has a lower administrative distance than the RIP route. Therefore, the incorrect static route is installed into the routing table, rather than the correct RIP route.

QUESTION NO: 15

You are a network administrator at TestKing, Inc. and you’re getting complaints that users on the TestKing2 Ethernet network can’t access the TestKing1 site. To troubleshoot this, you begin by looking at the Testking1 and Testking2 router configurations as shown below:

```
TestKing1# Show running-config
<some output text omitted>

interface serial0/0
 ip address 10.0.1.1 255.255.255.0
 encapsulation frame-relay
 !
router igrp 1
network 10.0.0.0

TestKing2# show running-config
<some output text omitted>

interface fastethernet0/0
 ip address 10.10.2.1 255.255.255.0

interface serial0/0
 ip address 10.10.1.2 255.255.255.0
 encapsulation frame-relay
 !
router igrp 2
network 10.0.0.0
```

Based on the above output, what is the underlying cause of this problem?

- A. Link state routing protocol is missing.
- B. Incorrectly configured IP addresses
- C. IGRP is incorrectly configured.
- D. Frame relay is not configured.
- E. None of the above

Answer: C

Explanation:

router igrp

To configure the Interior Gateway Routing Protocol (IGRP) routing process, use the **router igrp** global configuration command. To shut down an IGRP routing process, use the **no** form of this command.

router igrp autonomous-system

autonomous-system- Autonomous system number that identifies the routes to the other IGRP routers. It is also used to tag the routing information. The autonomous system must match for all IGRP routers in the network. The problem in this case is that Testking1 is using IGRP 1, while Testking2 is using IGRP 2.

QUESTION NO: 16

You are a network technician at TestKing, Inc. You are currently troubleshooting a routing issue on the Testking1 router. You issue the show ip route command. The output from the command is displayed in the following exhibit:

```
testking1#show ip route
Codes: C - connected, S - static, I - IGRP, R- RIP, M - mobile, B -
BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inner
area
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, * -
Candidate default
       U - per-user static route

Gateway of last resort is not set

R    192.168.8.0/24 [120/1] via 192.168.2.2, 00:00:10, Serial0
C    192.168.9.0/24 is directly connected, Serial1
R    192.168.10.0/24 [120/7] via 192.168.9.1, 00:00:02, Serial1
R    192.168.11.0/24 [120/7] via 192.168.9.1, 00:00:03, Serial1
C    192.168.1.0/24 is directly connected, Ethernet0
C    192.168.2.0/24 is directly connected, Serial0
R    192.168.3.0/24 [120/1] via 192.168.2.2, 00:00:10, Serial0
```

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```

R 192.168.4.0/24 [120/15] via 192.168.2.2, 00:00:10, Serial0
R 192.168.5.0/24 [120/15] via 192.168.2.2, 00:00:10, Serial0
R 192.168.6.0/24 [120/15] via 192.168.2.2, 00:00:10, Serial0
R 192.168.7.0/24 [120/1] via 192.168.2.2, 00:00:10, Serial0

```

Which one of the following routes WILL NOT be entered into its neighboring routers routing table?

- A. R 192.168.11.0/24 [120/7] via 192.168.9.1, 00:00:03, Serial1
- B. C 192.168.1.0/24 is directly connected, Ethernet0
- C. R 192.168.8.0/24 [120/1] via 192.168.2.2, 00:00:10, Serial0
- D. R 192.168.5.0/24 [120/15] via 192.168.2.2, 00:00:10, Serial0
- E. None of the above

Answer: D

Explanation:

RIP has the maximum hop count of 15. This route already has a hop count of 15 and adding one would make it unreachable (see below). This route will be discarded.

```

R 202.30.5.0/24 [120/15] via 202.30.2.2, 00:00:10, Serial0

```

QUESTION NO: 17

The Testking network consists of two routers connected via a point to point serial connection as shown below:



Users on TestKing1 are unable to connect to the TestKing2 network. Based on the configurations shown above, what could be the cause of this?

- A. The Maximum Transmission Unit size is too large.
- B. No loopback is set.
- C. The subnet mask is incorrect
- D. The encapsulation does not match at each end.
- E. There is an incorrect IP address.

F. There is an incompatible bandwidth statement between routers.

Answer: E

Explanation:

The IP addresses are both on different subnets but are connected on Serial link. For the connection to work, the two interfaces must belong to the same IP subnet.

Incorrect Answers:

- A. The MTU is set at 1500 on each end, which is acceptable.
- B. Loopbacks are not required for this serial connection to function.
- C. The masks match, but the IP addresses do not.
- D. Based on the diagram above, both serial interfaces are set to HDLC encapsulation, which is the default encapsulation for serial interfaces.
- F. Although this is true, the bandwidth statements do not need to be set the same in order for this connection to work. The bandwidth statement is used by certain routing protocols, such as OSPF and EIGRP, but they have no impact on the actual function of the serial line.

QUESTION NO: 18

The following routes exist in the Testking router:

- A. R 12.18.8.0/24 [120/1] via 12.18.2., 00:00:10, Serial0
- B. R 12.18.11.0/24 [120/7] via 12.18.9.1, 00:00:03, Serial1
- C. C 12.18.1.0/24 is directly connected, Ethernet0
- D. R 12.18.5.0/24 [120/15] via 12.18.2.2, 00:00:10, Serial0

Based on the above information, which route will not be entered into the routing table of a neighboring router?

Answer: D

Explanation:

The number values inside of the brackets indicate the administrative distance and metric of the route. In this case the [120/15] means that the route has an AD of 120, which is the default for RIP, and a metric of 15. Since hop counts are used as the metric for RIP, it means that this route was learned by RIP and it is 15 hops away. When this route is advertised to a neighbor an additional hop is added, meaning that it will be advertised with a metric of 16. Since a RIP route with a metric of 16 is considered unreachable, it will not be added to the routing table of the neighbor router.

QUESTION NO: 19

The routing table of the Corp router is displayed below:

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```

Corp#show ip route
...
Gateway of last resort is not set
C 192.168.13.0/24 is directly connected, Serial0/1
C 192.168.14.0/24 is directly connected, FastEthernet0/0
C 192.168.15.0/24 is directly connected, Serial0/0.102
C 192.168.20.0/24 is directly connected, Serial0/0.117
R 192.168.16.0/24 [120/1] via 192.168.15.2, 00:00:05, Serial0/0.102
R 192.168.17.0/24 [120/1] via 192.168.15.2, 00:00:05, Serial0/0.102
R 192.168.30.0/24 [120/2] via 192.168.20.2, 00:00:25, Serial0/0.117
R 192.168.19.0/24 [120/1] via 192.168.20.2, 00:00:25, Serial0/0.117
R 192.168.21.0/24 [120/3] via 192.168.20.2, 00:00:25, Serial0/0.117
R 192.168.214.0/24 [120/1] via 192.168.14.2, 00:00:22, FastEthernet0/0

```

The Corp router receives an IP packet with a source IP address of 192.168.214.20 and a destination address of 192.168.22.3. Based on the information above, what will the router do with this packet?

- A. It will encapsulate the packet as Frame Relay and forward it out interface Serial 0/0.117.
- B. It will discard the packet and send an ICMP Destination Unreachable message out interface FastEthernet 0/0.
- C. It will forward the packet out interface Serial 0/1 and send an ICMP Echo Reply message out interface serial 0/0.102.
- D. It will change the IP packet to an ARP frame and forward it out FastEthernet 0/0.
- E. It will forward the packet out the default route.
- F. None of the above.

Answer: B

Explanation:

The destination IP address of 192.168.22.3 is not in the routing table of the Corp router. Since there is no default route set, as shown by the “gateway of last resort is not set” statement, the packet will be dropped by the router and an ICMP Destination Unreachable message will be sent back to the source, which is Fast Ethernet 0/0 in this case.

QUESTION NO: 20

You try to add a new router into the established Testking OSPF network. The networks attached to the new router do not appear in the routing tables of the other OSPF routers.

The new router was configured for OSPF in the following way:

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```
Router(config)# router ospf 99
Router(config-if)# network 10.0.0.0 255.0.0.0 area 0
```

Based on this information, what is the most likely problem?

- A. The process id is configured improperly.
- B. The OSPF area is configured improperly.
- C. The network wildcard mask is configured improperly.
- D. The network number is configured improperly.
- E. The AS is configured improperly.
- F. The network subnet mask is configured improperly.
- G. All of the above are likely problems.

Answer: C

Explanation:

When configuring OSPF, the mask used for the network statement is a wildcard mask similar to an access list. In this specific example, the correct syntax would have been “network 10.0.0.0 0.0.0.255 area 0.”

Incorrect Answers:

- A. Here the process ID is 99, which is valid.
- B. Area 0 is the backbone area, so configuring the network to be in area 0 should be acceptable.
- D. This is not the problem, assuming that all 10.X.X.X networks are to be configured for OSPF.
- E. The AS number, as called the process ID in OSPF is 99.
- F. OSPF uses wildcard masks, not the usual subnet masks

QUESTION NO: 21

Which command will display all the EGRIP feasible successor routes known to a router?

- A. Router# **show ip eigrp routes ***
- B. Router# **show ip eigrp summary**
- C. Router# **show ip eigrp topology**
- D. Router# **show ip eigrp adjacencies**
- E. Router# **show ip eigrp neighbors detail**

Answer: C

Explanation:

The “show ip eigrp topology” command is used to display the entries in the EIGRP topology table. The topology table contains the feasible successors for each route, along

with the feasible distance, each feasible successor's advertised distance to the route, and the locally calculated distance and cost to the destination.

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Troubleshoot IP addressing and host configuration (13 questions)

QUESTION NO: 1

While logged into a router, you wish to see the RIP routing updates in real time as they are sent and received. Which command would you issue to see these updates?

- A. Show ip protocols
- B. Show ip route rip
- C. Debug ip rip
- D. Debug ip updates
- E. Debug ip transactions

Answer: C

Explanation:

The command debug ip rip will display routing updates as they are sent and received by a router.

Incorrect Answers:

- A. This command will show the routing protocols that the router is using, but it will not show anything in real time. All show commands take a snapshot of what the router is doing at that given time.
- B. This will provide all of the routes that have been learned by the router via RIP, but it will not show the updates in real time.
- D, E. These are invalid commands.

QUESTION NO: 2

You are configuring a brand new router for the first time. In doing so, you log into the router via a console cable and then copy and paste the configuration from a notepad document. After this, the configuration appears as follows:

```

hostname TestKingA
!
!
interface Ethernet0
 ip address 192.168.10.9 255.255.255.248
!
interface Serial0
 ip address 172.16.25.1 255.255.255.0
 clockrate 56000
!
interface Serial1
 ip address 10.1.1.1 255.255.255.0
!
router rip
 network 192.168.10.0
!
line con 0
 password testking
 login
line aux 0
line vty 0 4
 password testking
 login
!end

```

Host 192.168.10.10/29 can't ping the Ethernet interface of the router after the router is installed into the network. Why? (Select only one answer choice)

- A. The new configuration must be saved to the NVRAM before the changes can be effected.
- B. The subnet mask on the router results is miscommunication.
- C. The Ethernet network does not feature in the routing table due to incomplete RIP configuration.
- D. The copied configuration did not overwrite the shutdown command on the Ethernet interface.
- E. The router needs to be rebooted before the changes are effected.

Answer: D

Explanation:

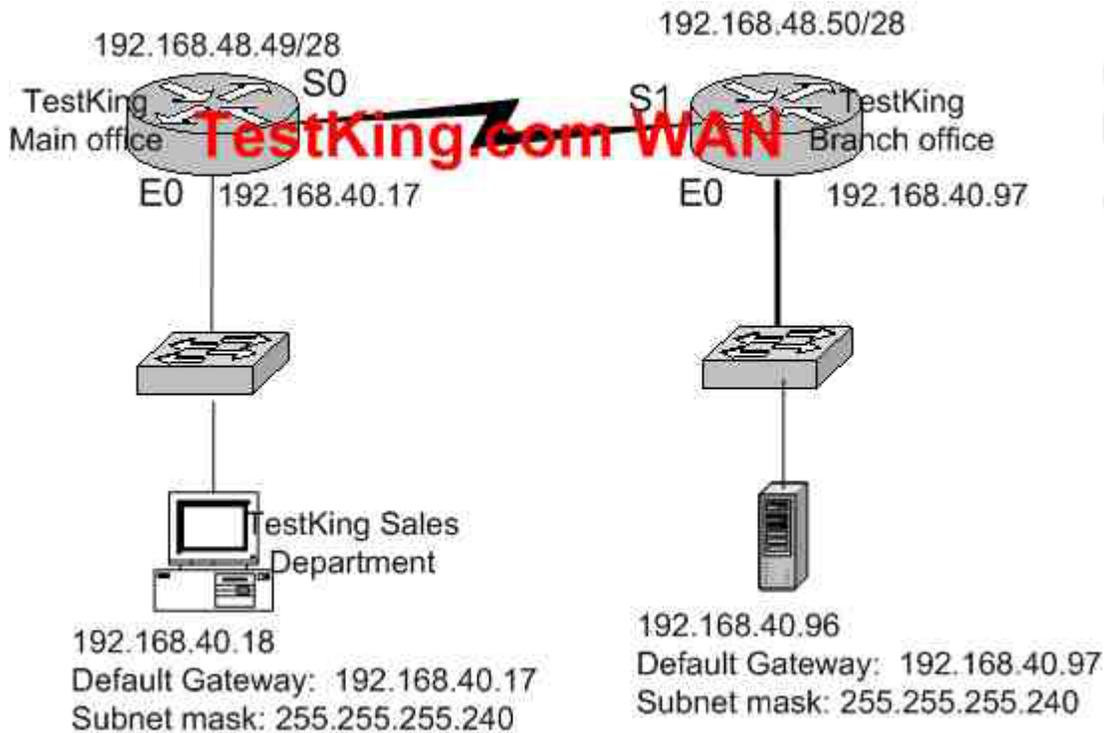
Default configuration of any interface is always shutdown and always needs the command "no shutdown" in the interface command mode in order to enable the interface.

Reference:

CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 379

QUESTION NO: 3

The TestKing HQ and branch office locations are set up as shown in the diagram below:



Hosts from the sales department are unable to access the new branch office server that was recently installed. Based on the exhibit above, what is the underlying cause of this problem?

- A. The default gateway in the sales department is inaccurate.
- B. The serial 0 interface on the Main Office router and the serial 1 interface on the Branch Office router are not compatible.
- C. The subnet mask of the workstations in the sales department is inaccurate.
- D. The host address of the server at the Branch Office is invalid.
- E. The default gateway of the server at the Branch Office is inaccurate.
- F. None of the above

Answer: D

Explanation: The host address is incorrectly a network address.

Incorrect Answers:

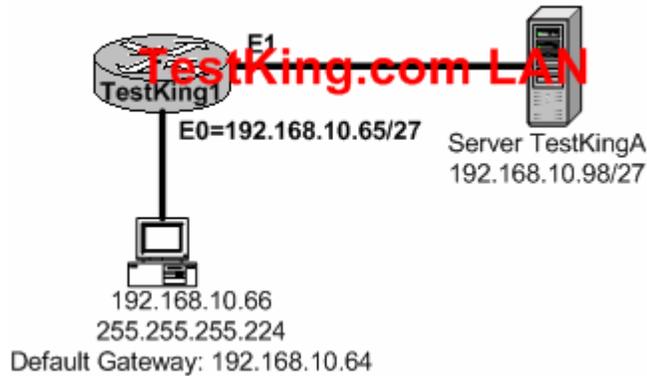
- A. The default gateway in the sales department is correct.
- B. This is no problem here.

- C. The subnet mask is correct.
- E. The default gateway in the branch office is correct.

Reference: Steve McQuerry, “Interconnecting Cisco Network Devices” (Cisco Press: 2000) pages 233 – 234.

QUESTION NO: 4

The new Testking location is displayed below:



A new PC is installed on the LAN of the Testking1 router as shown above. This PC is unable to connect to the TestKingA server located on the Ethernet 1 network. What is the cause of this?

- A. IP address of the Ethernet 0 router interface is wrong
- B. Server is using an invalid IP address
- C. Workstation default gateway is set incorrectly
- D. Workstation subnet mask is incorrect
- E. Workstation IP address is invalid

Answer: C

Explanation:

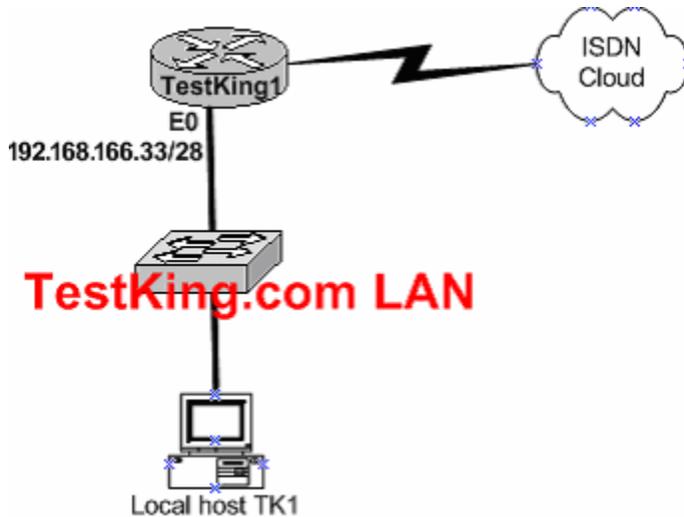
The default gateway of the host (192.168.10.64) is wrong. 192.168.10.64 is the network address of the host's network in this question. The default gateway should be the address of the local interface of the router. In this case: 192.168.10.65.

Incorrect Answers:

- A: The IP address of the Ethernet0 interface is valid.
- B: The IP address of the server is valid.
- D: The network uses a 27 bit subnet mask which equates to 255.255.255.224.
- E: The IP host address 192.168.10.66 is a valid host address on the subnet.

QUESTION NO: 5

A new LAN is being implemented on the TestKing1 network as shown below:



The local host TK1 can't access any of the resources on the other networks. The configuration of TK1 is as follows:

```
host address: .....192.168.166.45
subnet mask: .....255.255.255.240
default gateway: ..192.168.166.32
```

What is the underlying cause of this problem?

- A. The default gateway is a network address.
- B. The default gateway is on a different subnet address as the host.
- C. The IP address of the host is on a different subnet.
- D. The host subnet mask is incompatible to the subnet mask of the attached router interface.

Answer: A

Explanation:

The range of the subnet used in this question is 192.168.166.32 to 192.168.166.47. 192.168.166.32 is the network address and 192.168.166.47 is the broadcast. This leaves the usable host address range of 192.168.166.33 to 192.168.166.46.

The default gateway for the host should be 192.168.166.33.

Incorrect Answers:

- B: The default gateway is on the same network but it is a network address.
- C: The host address is correct.

D: The subnet mask 255.255.255.240 uses 28 bits and is therefore correct.

QUESTION NO: 6

You're working at TestKing as a network administrator when your MCSE assistant calls you for help. He has attempted to configure Router TK1 and incorrectly configured the router interface with a subnet broadcast address. You have to correct this by first removing the incorrect IP address and then re-entering the first usable IP address of the same subnet.

How will you do this?

- A. TK1 (config-if) # no ip address 190.160.45.31 255.255.255.240
TK1 (config-if) # ip address 190.160.45.17 255.255.255.240
- B. TK1 (config-if) # no ip address 190.160.45.23 255.255.255.252
TK1 (config-if) # ip address 190.160.4.21 255.255.255.252
- C. TK1 (config-if) # no ip address 190.160.45.23 255.255.255.240
TK1 (config-if) # ip address 190.160.45.20 255.255.255.240
- D. TK1 (config-if) # clear ip address 190.160.45.23
255.255.255.0
TK1 (config-if) # no address 190.160.45.17 255.255.255.0
- E. TK1 (config-if) # no ip address 190.160.45.15 255.255.255.252
TK1 (config-if) # ip address 190.160.45.9 255.255.255.252

Answer: A

Explanation:

To set a primary or secondary IP address for an interface, use the **ip address** interface configuration command. To remove an IP address or disable IP processing, use the **no** form of this command.

Current Host Range = 190. 160. 45. 17 to 190. 160. 45. 30

Incorrect Answers:

B, C, E. These are all invalid IP address combinations, given that the broadcast address and the first usable IP address combinations do not match.

D. The "clear" command is invalid. To erase a configuration statement, simply add the keyword "no" to the beginning of the configuration statement.

QUESTION NO: 7

Part of the configuration files for routers testking1 and testking2 are displayed below:

```
hostname testking1
```

```
hostname testking2
```

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```

!                               !
username testking2 password king  username testking1 password king
!                               !
interface serial 0              interface serial 0
ip address 12.3.6.2 255.255.0.0  ip address 12.3.6.3 255.255.0.0

encapsulation ppp                encapsulation ppp
clockrate 56000                  ppp authentication chap

```

If you were to enter the “show interface serial 0” command on router testking1, which of the following will be displayed? (Choose two)

- A. Serial 0 is down, line protocol is down
- B. Serial 0 is up, line protocol is up
- C. Open: IPCP, CDPCP
- D. LCP closed
- E. LCP open

Answer: B, E

Explanation:

Even though CHAP is only configured on one end of the link, the physical serial interfaces will be up, line protocol up since the encapsulations match with PPP on each end, and the clock rate is set on the DCE end. LCP will be open, since the username and password statements are correctly configured for the PPP CHAP authentication.

QUESTION NO: 8

While troubleshooting a connectivity issue from a PC you obtain the following information:

Local PC IP address: 190.0.3.35/24
 Default Gateway: 190.0.3.1
 Remote Server: 190.0.5.250/24

You then conduct the following tests from the local PC:

Ping 127.0.0.1 - Unsuccessful
 Ping 190.0.3.35 - Successful
 Ping 190.0.3.1 - Unsuccessful
 Ping 190.0.5.250 - Unsuccessful

What is the underlying cause of this problem?

- A. TCP/IP not correctly installed
- B. Local physical layer problem

- C. NIC not functioning
- D. Remote physical layer problem

Answer: A

Explanation:

Every Windows based PC uses the 127.0.0.1 as the local loopback IP address. Every PC will respond to this local IP address if the TCP/IP stack is correctly installed and running on the machine. If you cannot ping the loopback address of 127.0.0.1, then something is wrong with the TCP/IP protocol stack.

QUESTION NO: 9

While troubleshooting connectivity issues, you log into a remote router. From there, you wish to see the layer 1 and layer 2 status of the interface. Which of the following IOS commands would you issue to check the current IP addressing, as well as the layer 1 and layer 2 status of an interface? (Select three answer choices)

- A. TK1# **show version**
- B. TK1# **show protocols**
- C. TK1# **show interfaces**
- D. TK1# **show controllers**
- E. TK1# **show ip interface**
- F. TK1# **show startup-config**

Answer: C, D, E

Explanation:

show interfaces is used to see the IP addresses and layer 2 information configured on the interfaces.

show controllers is used to see the layer 1 statistics. It tells about the V.35 cables whether they are physically attached or not.

show ip interfaces is used to see the IP addresses configured on the interfaces.

Incorrect Answers:

A. This will show IOS information and hardware information on the router, but will not show any individual interface information.

B. This will show the layer 3 and layer 4 protocols running on the interface, but it will not provide any information on layer one or two.

F. This will only show the information pertaining to the configuration file that is saved in NVRAM.

QUESTION NO: 10

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A local chain of bike shops wants to centralize their business administration and connect their three computer networks together. To do this, the network was set up with 3 routers, which were configured as shown below:

- The routers are named: TestKing1, TestKing2, and TestKing3, respectively.
- They are all using RIP as the routing protocol
- The serial 0 interfaces are responsible for clocking
- The password for all three routers is "testking"
- All three routers are using their default subnet mask.
- The IP addresses are as listed below.

You need to figure out what's causing the miscommunication and make whatever changes are necessary to establish connectivity between the three shops. Click on the correct part of the network below, and make the necessary changes in the configuration.

TestKing1

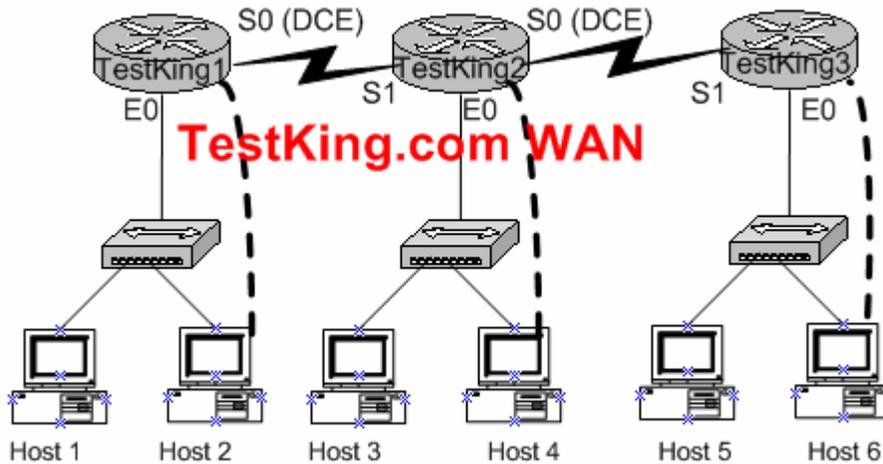
```
E0 192.168.27.1
E1 192.168.29.1
S0 192.168.31.1
Secret password: testking
```

TestKing2

```
E0 192.168.35.1
S0 192.168.33.1
S1 192.168.31.2
Secret password: testking
```

TestKing3

```
E0 192.168.37.1
S1 192.168.33.2
Secret password: testking
```



To configure the router you need to click on the host icon that is connected to the router by a serial cable.

Answer:

Click on Host 2:

Router TestKing1:

```

TestKing1> enable
Password: testking
TestKing1 # config terminal
TestKing1 (config) # interface ethernet 0
TestKing1 (config-if) # ip address 192.168.27.1 255.255.255.0
TestKing1 (config-if) # no shutdown
TestKing1 (config-if) # exit
TestKing1 (config) # interface ethernet 1
TestKing1 (config-if) # ip address 192.168.29.1 255.255.255.0
TestKing1 (config-if) # no shutdown
TestKing1 (config-if) # exit
TestKing1 (config) # interface serial 0
TestKing1 (config-if) # ip address 192.168.31.1 255.255.255.0
TestKing3 (config-if) # clock rate 64000
TestKing1 (config-if) # no shutdown
TestKing1 (config-if) # exit
TestKing1 (config) # router rip
TestKing1 (config-router) # network 192.168.27.0
TestKing1 (config-router) # network 192.168.29.0
TestKing1 (config-router) # network 192.168-31.0
TestKing1 (config-router) # Ctrl-Z
TestKing1 # copy running-config startup-config

```

Click on Host 4**Router TestKing2:**

```

TestKing2> enable
Password: testking
TestKing2 # config t
TestKing2 (config) # interface ethernet 0
TestKing2 (config-if) # ip address 192.168.35.1 255.255.255.0
TestKing2 (config-if) # no shutdown
TestKing2 (config-if) # exit
TestKing2 (config) # interface serial 0
TestKing2 (config-if) # ip address 192.168.33.1 255.255.255.0
TestKing2 (config-if) # clock rate 64000
TestKing2 (config-if) # no shutdown
TestKing2 (config-if) # exit
TestKing2 (config) # interface serial 1
TestKing2 (config-if) # ip address 192.168.31.2 255.255.255.0
TestKing2 (config-if) # no shutdown
TestKing2 (config-if) # exit
TestKing2 (config) # router rip
TestKing2 (config-router) # network 192.168.35.0
TestKing2 (config-router) # network 192.168.33.0
TestKing2 (config-router) # network 192.168.31.0
TestKing2 (config-router) # Ctrl-Z
TestKing2 # copy running-config startup-config

```

Router TestKing3:**Click on Host6**

```

TestKing3> enable
Password: testking
TestKing3 # config t
TestKing3 (config) # interface ethernet 0
TestKing3 (config-if) # ip address 192.168.37.1 255.255.255.0
TestKing3 (config-if) # no shutdown
TestKing3 (config-if) # exit
TestKing3 (config) # interface serial 1
TestKing3 (config-if) # ip address 192.168.33.2 255.255.255.0
TestKing3 (config-if) # no shutdown
TestKing3 (config-if) # exit
TestKing3 (config) # router rip
TestKing3 (config-router) # network 192.168.33.0
TestKing3 (config-router) # network 192.168.37.0
TestKing3 (config-router) # Ctrl-Z
TestKing3 # copy running-config startup-config

```

QUESTION NO: 11

The TestKing.com network has three different sites with one router at each site. The routers are named TestKing1, TestKing2, and TestKing3. An assistant technician has configured all the routers, but no connectivity exists between the routers. Your task is to identify all error(s) and make the necessary adjustment(s) to establish network connectivity.

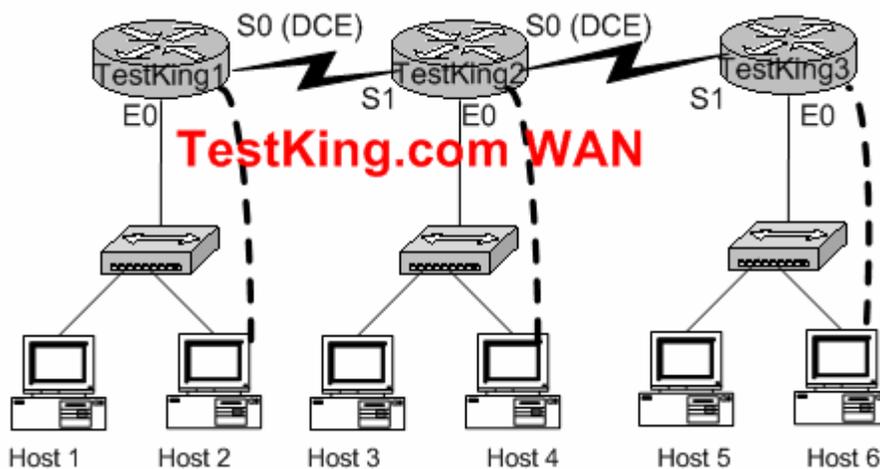
The routers have been configured with the following configuration:

- They are named TestKing1, TestKing2, and TestKing3.
- RIP is the routing protocol
- Clocking is provided on the serial 0 interface.
- The password on each router is "testking"
- The subnet mask on all interfaces is the default subnet mask.
- The IP addresses are listed in the chart below.

TestKing1
 E0 192.168.3.1
 S0 192.168.5.1

TestKing2
 E0 192.168.8.1
 S0 192.168.11.1
 S1 192.168.5.2

TestKing3
 E0 192.168.13.2
 S1 192.168.11.2



To configure the router click on a host icon that is connected to the router by a serial console cable.

Answer:

Note: The following solutions are complete. It might not be necessary to configure everything.

Click on Host 2:

Router TestKing1:

```
TestKing1> enable
Password: testking
TestKing1 # config terminal
TestKing1 (config) # interface ethernet 0
TestKing1 (config-if) # ip address 192.168.3.1 255.255.255.0
TestKing1 (config-if) # no shutdown
TestKing1 (config-if) # exit
TestKing1 (config) # interface serial 0
TestKing1 (config-if) # ip address 192.168.5.1 255.255.255.0
TestKing1 (config-if) # clock rate 64000
TestKing1 (config-if) # no shutdown
TestKing1 (config-if) # exit
TestKing1 (config) # router rip
TestKing1 (config-router) # network 192.168.3.0
TestKing1 (config-router) # network 192.168.5.0
TestKing1 (config-router) # Ctrl-Z
TestKing1 # copy running-config startup-config
```

Click on Host 4

Router TestKing2:

```
TestKing2> enable
Password: testking
TestKing2 # config t
TestKing2 (config) # interface ethernet 0
TestKing2 (config-if) # ip address 192.168.8.1 255.255.255.0
TestKing2 (config-if) # no shutdown
TestKing2 (config-if) # exit
TestKing2 (config) # interface serial 0
TestKing2 (config-if) # ip address 192.168.11.1 255.255.255.0
TestKing2 (config-if) # clock rate 64000
TestKing2 (config-if) # no shutdown
TestKing2 (config-if) # exit
```

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```

TestKing2 (config) # interface serial 1
TestKing2 (config-if) # ip address 192.168.5.2 255.255.255.0
TestKing2 (config-if) # no shutdown
TestKing2 (config-if) # exit
TestKing2 (config) # router rip
TestKing2 (config-router) # network 192.168.8.0
TestKing2 (config-router) # network 192.168.11.0
TestKing2 (config-router) # network 192.168.5.0
TestKing2 (config-router) # Ctrl-Z
TestKing2 # copy running-config startup-config

```

Router TestKing3:

Click on Host F

```

TestKing3> enable
Password: testking
TestKing3 # config t
TestKing3 (config) # interface ethernet 0
TestKing3 (config-if) # ip address 192.168.13.2 255.255.255.0
TestKing3 (config-if) # no shutdown
TestKing3 (config-if) # exit
TestKing3 (config) # interface serial 1
TestKing3 (config-if) # ip address 192.168.11.2 255.255.255.0
TestKing3 (config-if) # clock rate 64000
TestKing3 (config-if) # no shutdown
TestKing3 (config-if) # exit
TestKing3 (config) # router rip
TestKing3 (config-router) # network 192.168.13.0
TestKing3 (config-router) # network 192.168.11.0
TestKing3 (config-router) # Ctrl-Z
TestKing3 # copy running-config startup-config

```

QUESTION NO: 12

Your task is to troubleshoot some issues with the existing Testking network. The previous network administrator tried to build a network by connecting three routers together, but the routing tables aren't being updated properly.

- There are three routers named TestKing1, TestKing2, and TestKing3 respectively.
- TestKing2 and TestKing3 are configured perfectly and completely operational.

- The entire networks falls within a single OSPF area

Your goal is to locate and fix this router configuration problem.

Current configuration:

TestKing1

E0: 192.168.33.1/24

S0: 192.168.100.5/30

Secret Password: testking

TestKing2

E0: 192.168.34.1/24

S0: 192.168.100.10/30

S1: 192.168.100.6/30

Secret Password: testking

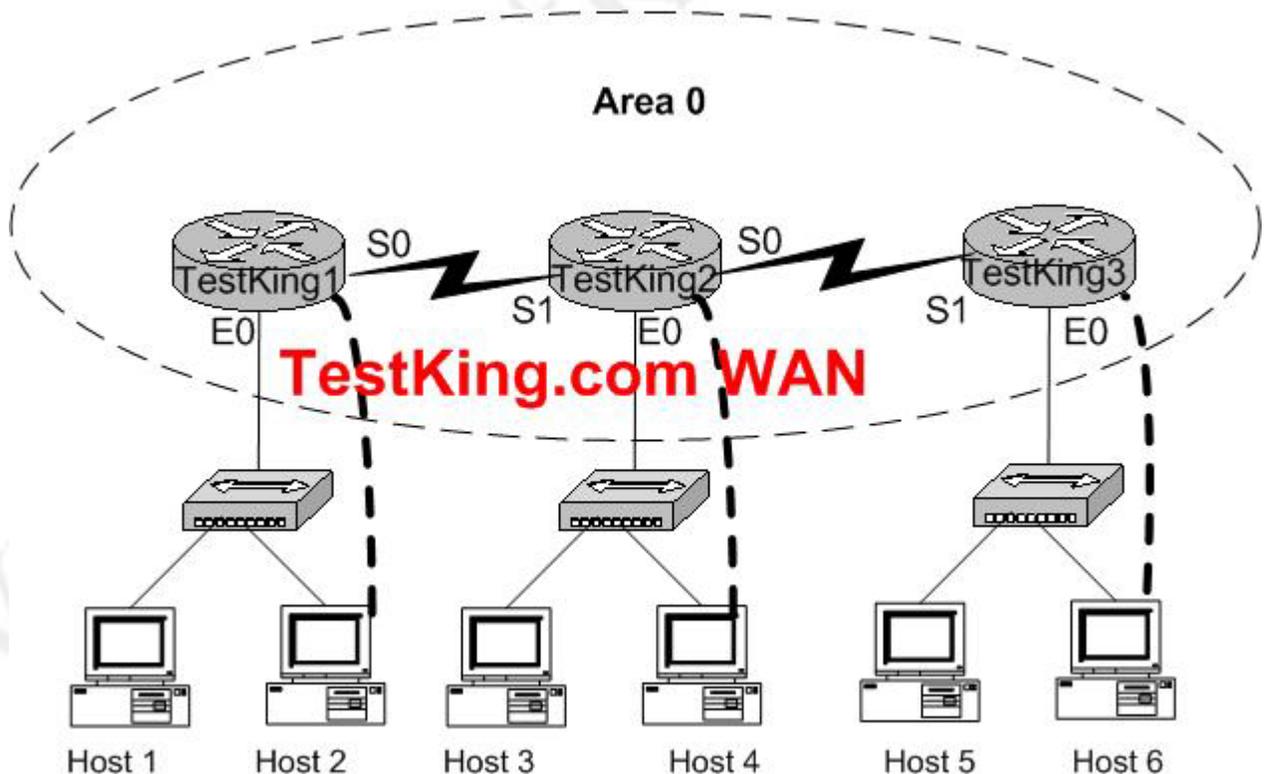
TestKing3

E0: 192.168.35.1/24

S1: 192.168.100.9/30

Secret Password: testking

Click on the picture of host connected to a router by a serial console cable.



Answer:

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```

TestKing1#config t
TestKing1(config)#no router ospf 2
TestKing1(config)#^Z
TestKing1#show ip ospf
TestKing1#config t
TestKing1(config)#router ospf 2
TestKing1(config)#network 192.168.33.0 0.0.0.255 area 0
TestKing1(config)#network 192.168.100.4 0.0.0.3 area 0
TestKing1(config)#^Z
TestKing1#show ip route
TestKing1#copy running startup

```

QUESTION NO: 13

The Testking network consists of three routers as shown in the diagram below. All three routers are connected serially, and all links are up and running properly. The Testking network is using OSPF as the routing protocol, and all routers are contained in area 0.

Recently, some router configuration changes were made, and some routing issues have occurred as a result. The router information and configurations are shown below:

- The three routers: TestKing1, TestKing2, and TestKing3 are connected by their serially and their links are good.
- The routing protocol is OSPF
- There's only one OSPF area (area 0)

Locate the configuration problem and reconfigure it correctly:

These are the current configurations:

```

TestKing1
E0: 192.168.3.1/24
S0: 172.16.10.5/30
Secret password: testking

```

```

TestKing2
E0: 192.168.4.1/24
S0: 172.16.10.10/30
S1: 172.16.10.6/30
Secret password: testking

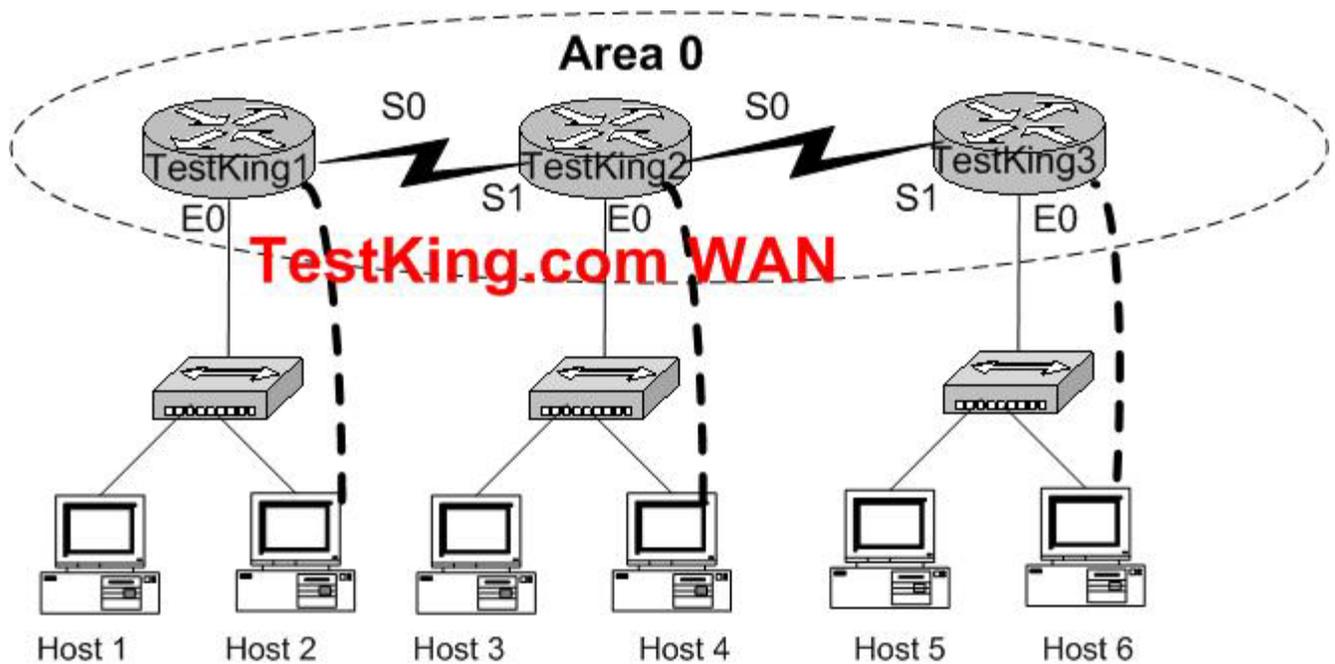
```

```

TestKing3
E0: 192.168.5.1/24

```

S1: 172.16.10.9/30
 Secret password: testking



Answer:

```
TestKing2#config
TestKing2(config)#no router ospf 2
TestKing2(config)#router ospf 2
TestKing2(config-router)#network 192.168.4.0 0.0.0.255 area 0
TestKing2(config-router)#network 172.16.10.8 0.0.0.3 area 0
TestKing2(config-router)#network 172.16.10.4 0.0.0.3 area 0
TestKing2(config-router)#Ctrl-Z
TestKing2#copy running start
```

Troubleshoot a device as part of a working network (11 questions)

QUESTION NO: 1

The Testking router is running RIP as the routing protocol, and the IP routing table is displayed below:

Gateway of last resort is 10.1.2.2 to network 0.0.0.0

```

      10.0.0.0/24 is subnetted, 2 subnets
R       10.1.3.0 [120/1] via 10.1.2.2, 00:00:00, Serial0/0
C       10.1.2.0 is directly connected, Serial0/0
C       10.1.5.0 is directly connected, Serial0/1
C       10.1.6.0 is directly connected, FastEthernet0/0
R*     0.0.0.0/0 [120/1] via 10.1.5.5, 00:00:00, Serial0/1

```

Based on the output above, if an administrator pings host 10.1.8.5 from host 10.1.6.100, how will the router TestkingA process the ICMP packets?

- A. The packets will be discarded.
- B. The packets will be routed out the S0/0 interface.
- C. The packets will be routed out the S0/1 interface.
- D. The packets will be routed out the Fa0/0 interface.
- E. The packets will be routed through the 10.1.2.2 gateway.

Answer: C

Explanation:

Since 10.1.8.5 is not located in the routing table, the default gateway will be used to forward the ICMP packet. The default gateway is learned via RIP, with the next hop IP address of 10.1.5.5. This default gateway router lies on the serial 0/1 interface.

Additional Info:

Gateways of last resort selected using the **ip default-network** command are propagated differently depending on which routing protocol is propagating the default route. For IGRP and EIGRP to propagate the route, the network specified by the **ip default-network** command must be known to IGRP or EIGRP. This means the network must be an IGRP- or EIGRP-derived network in the routing table, or the static route used to generate the route to the network must be redistributed into IGRP or EIGRP, or advertised into these protocols using the **network** command.

RIP advertises a route to 0.0.0.0 if a gateway of last resort is selected using the **ip default-network** command. This network specified in the **ip default-network** command need not be explicitly advertised under RIP. For example, note that the gateway of last resort on this router was learned using the combination of the **ip route** and **ip default-network** commands. If you enable RIP on this router, RIP advertises a route to 0.0.0.0 (although not to the Ethernet0 network because of split-horizon):

```
2513(config)#router rip
2513(config-router)#network 161.44.0.0
2513(config-router)#network 131.108.0.0
2513(config-router)#^Z
2513#
%SYS-5-CONFIG_I: Configured from console by console
2513#debug ip rip
```

```
*Mar 2 07:39:35.504: RIP: sending v1 update to 255.255.255.255 via Ethernet0
(161.44.192.1)
*Mar 2 07:39:35.508: RIP: build update entries
*Mar 2 07:39:35.508: network 131.108.0.0 metric 1
*Mar 2 07:39:35.512: RIP: sending v1 update to 255.255.255.255 via Serial0
(131.108.99.1)
*Mar 2 07:39:35.516: RIP: build update entries
*Mar 2 07:39:35.520: subnet 0.0.0.0 metric 1
*Mar 2 07:39:35.524: network 161.44.0.0 metric 1
```

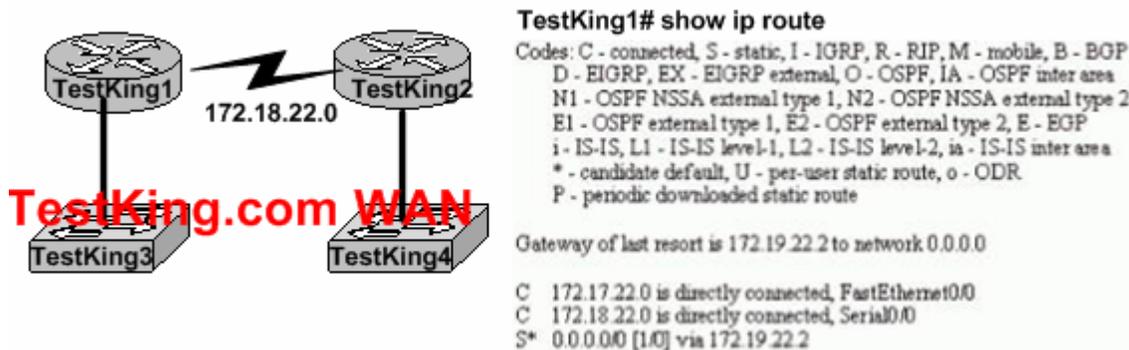
ip route 0.0.0.0 0.0.0.0

Creating a static route to network 0.0.0.0 0.0.0.0 is another way to set the gateway of last resort on a router. As with the **ip default-network** command, using the static route to 0.0.0.0 is not dependent on any routing protocols. However, **ip routing** must be enabled on the router.

In earlier versions of RIP, the default route created using the **ip route 0.0.0.0 0.0.0.0** was automatically advertised by RIP routers. In Cisco IOS Software Release 12.0T and later, RIP does not advertise the default route if the route is not learned via RIP. It may be necessary to redistribute the route into RIP.

QUESTION NO: 2

The topology of the Testking network is displayed below, along with the routing table of the TestKing1 router:



172.17.22.0

172.31.5.0

Changes to the Testking network were made, and now users on the TestKing3 LAN are not able to connect to the TestKing4 LAN. Based on the information above, what could be the reason for this?

- A. The FastEthernet interface is disabled.
- B. The neighbor relationship table is not updated.
- C. A static route is configured incorrectly.
- D. The routing table on TestKing1 is not updated.
- E. IP routing is not enabled.

Answer: C

Explanation:

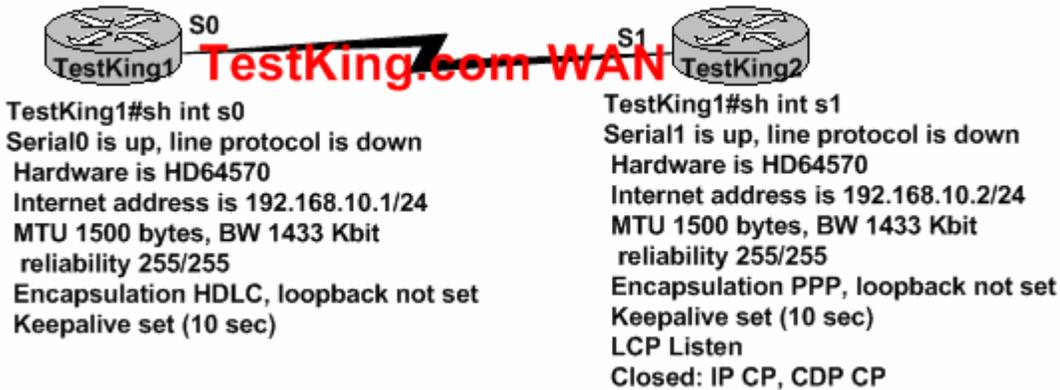
On the bottom line of the command output for 'show ip route' you can see that there is an asterisk by the letter S. The S stands for static route, and the static route is incorrectly configured.

Incorrect Answers:

- A. If this were true, then the users on the LAN would be unable to connect to anything outside of their own network.
- B. It appears that only a single static route is being used on the TestKing1 router. Neighbors do not need to be established for static routes.
- D. The routing table consists of a single static route, which is configured incorrectly. The routing tables do not become updated dynamically when static routes are used.
- E. This is not true, as a static route has been configured.

QUESTION NO: 3

A point to point leased line connecting routers TestKing1 and TestKing2 is installed as shown below:



The two serially connected routers can't communicate. Can you identify the fault on router TestKing2?

- A. Link reliability is insufficient
- B. IPCP is not open
- C. Incorrect subnet mask
- D. Incompatible encapsulation
- E. Bandwidth allocation is too low
- F. Incomplete IP address

Answer: D

Explanation:

HDLC and PPP configuration is straightforward. You just need to be sure to configure the same WAN data-link protocol on each end of the serial link. Otherwise, the routers will misinterpret the incoming frames, because each WAN data-link protocol uses a different frame format. The routers must match at each end of the private leased line link.

Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 310.

QUESTION NO: 4

What kind of message does a PING send out to test connectivity?

- A. ICMP echo request
- B. Information interrupt request
- C. Timestamp reply
- D. Source quench
- E. None of the above

Answer: A

Explanation:

The ping command sends an ICMP echo request packet to the stated destination address. The TCP/IP software at the destination then replies to the ping echo request packet with a similar packet, called the ICMP echo reply.

Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 146

QUESTION NO: 5

The relevant configuration files for the TestKing1 and TestKing2 routers are displayed below:

TestKing1# show running-config

<some output text omitted>

```
enable password cisco
!
hostname TestKing1
username TestKing2 password cisco

!
interface serial 0/0
ip address 10.0.8.1 255.255.248.0
encapsulation ppp
ppp authentication chap
```

TestKing2# show running-config

<some output text omitted>

```
enable password cisco
hostname TestKing2
username TestKing1 password
cisco1

!
interface serial 0/0
ip address 10.0.15.2 255.255.248.0
encapsulation ppp
ppp authentication chap
```

With due consideration to the command outputs, which of the following reasons would you attribute the connectivity problem between the two routers?

- A. The authentication needs to be changed to PAP for both routers.
- B. The serial IP addresses of routers are not on the same subnet.
- C. The username/password combination is incorrectly configured.
- D. The router names are incorrectly configured.

Answer: C

Explanation:

When configuring for CHAP authentication, you must enter the other router's user name and password. In this case on router TestKing2 has entered incorrect router TestKing1's password, which is "cisco1" (it must be "cisco"). As a result CHAP authentication will fail, therefore the connection establishment between the routers will be refused.

Reference:

CCNA Self-Study CCNA ICND
Exam Certification Guide
Chapter 9 page 315
ISBN: 1-58720-083-x

Incorrect Answers:

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- A. Either PAP or CHAP can be used for these routers.
- B. Although this appears to be true at first glance, the subnet mask is 255.255.248.0, and the IP addresses on each side of the link are indeed on the same subnet.
- D. The hostnames are configured correctly, but the passwords do not match.

QUESTION NO: 6

There is a connectivity problem between the serial 0/0 interface of router TK1 and the serial 0/0 interface of TK2. A leased line point to point circuit is installed between these two routers. The output from the “show interface serial 0/0” command is displayed below for each of these routers:

TK1:

```
Serial0/0 is up, line protocol is down
Hardware is HD64570
Internet address is 210.93.105.1/24
MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
  reliability 255/255, txload 1/255, rxload 1/255
Encapsulation HDLC, loopback not set
Keepalive set (10 sec)
```

TK2:

```
Serial0/0 is up, line protocol is down
Hardware is HD64570
Internet address is 210.93.105.2/24
MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
  reliability 255/255, txload 1/255, rxload 1/255
Encapsulation PPP, loopback not set
Keepalive set (10 sec)
```

From your observations of the above exhibit, what is the underlying cause of the problem?

- A. The loopback is not set.
- B. The serial cable is faulty.
- C. The subnet mask is not configured properly.
- D. The IP address is not configured properly.
- E. The Layer 2 frame types are not compatible.

Answer: E**Explanation:**

If you see that the line is up but the protocol is down, as just above, you are experiencing a clocking (keepalive) or framing problem. Check the keepalives on both ends to make sure that they match, that the clock rate is set if needed, and that the encapsulation type is

the same on both ends. This up/down status would be considered a Data Link Layer (Layer 2) problem. In this specific case, one end of the link is set to PPP encapsulation, and the other end is using HDLC, which is the Cisco proprietary method. Both sides of the connection must be using the same protocol.

QUESTION NO: 7

The Testking network consists of the Holyoke and Chicopee locations as shown below:



Users on the Holyoke router cannot get access to the intranet server attached to interface E0 of the Chicopee router. After investigating you discover that the routing table of the Holyoke router shows that an entry for the Chicopee E0 network is missing.

Which of the command lines below will properly configure the Holyoke router to allow the users access to the intranet server's network?

- A. Holyoke(config)# ip host Chicopee 201.73.127.2
- B. Holyoke(config)# ip network 202.18.38.0
- C. Holyoke(config)# ip network 202.18.18.0 255.255.255.0
- D. Holyoke(config)# ip host Chicopee 201.73.127.0 255.255.255.0
- E. Holyoke(config)# ip route 202.18.18.0 255.255.255.0 201.73.127.2
- F. Holyoke(config)# ip route 201.73.127.0 255.255.255.0 202.18.18.0

Answer: E

Explanation:

We need to add a route for the 202.18.18.0/24 network. We can do this with the ip route command. The syntax is: ip route <network> <mask> <gateway>.

QUESTION NO: 8

While logged into a router you manually shut down the serial 0 interface using the “shutdown” interface configuration command. You then issue the “show interface serial 0” command in exec mode. What could you expect the status of the serial 0 interface to be?

- A. Serial 0 is up, line protocol is up
- B. Serial 0 is up, line protocol is down
- C. Serial 0 is down, line protocol is down
- D. Serial 0 is down, line protocol is up
- E. Serial 0 is administratively down, line protocol is down
- F. Serial 0 is administratively down, line protocol is up

Answer: E

Explanation:

To bring down an interface for administrative reasons and, as a side effect, remove the connected router from the routing table, you can use the shutdown interface subcommand. To enable the interface back up, issue the “no shutdown” configuration command.

Incorrect Answers:

- A. This is the status of a fully operational interface.
- B, C. These are the results of line problems or configuration errors.
- D, F. These two interface conditions should never be seen.

QUESTION NO: 9

While troubleshooting a network connectivity issue, you suspect that a router may be missing a route, or may be receiving bad routing information to a destination. What command should you issue to view the route that the router will use to reach a given destination?

- A. ping
- B. trace
- C. show ip route
- D. show interface
- E. show cdp neighbors

Answer: C

Explanation:

To view the IP routing table, issue the “show ip route” command. This can be used to verify a route to a destination.

QUESTION NO: 10

You are the new system administrator at TestKing.com and have just installed a brand new Cisco router to the TestKing network. After configuring the router, you try to ping the directly connected serial port of the neighboring router, which was unsuccessful. You then entered the command, ‘show running-config’ and noticed the phrase ‘shutdown’ describing the serial interface. If you typed in the command ‘show interface s0’ what output would you see?

- A. Serial 0 is up, line protocol is down
- B. Serial 0 is down, line protocol is down
- C. Serial 0 is down, line protocol is up
- D. Serial 0 is administratively down, line protocol is down
- E. Serial 0 is administratively down, line protocol is up
- F. Serial 0 is administratively up, line protocol is down

Answer: D

Explanation:

If an interface is shutdown, it will show "administratively down and line protocol down"

QUESTION NO: 11

Three routers are connected together via serial lines as shown below:



TestKing 1 issues a ping to TestKing2, but the ethernet0 interface on router TestKingC is down. Based on this information, which two of the answer choices below are correct? (Select two answer choices)

- A. TestKingC will make use of ICMP to inform TestKing 1, TestKingA, and TestKingB that Host 2 is unreachable.
- B. TestKingC will send a Destination Unreachable message type.
- C. TestKingC will make use of ICMP to inform TestKing 1 that TestKing 2 is unreachable.
- D. TestKingC will use ICMP to inform TestKingB that TestKing2 is unreachable.
- E. TestKingC will issue a Router Selection message type.
- F. TestKingC will issue a Source Quench message type.

Answer: B, C

Explanation

ICMP is an error-reporting protocol for IP. When datagram delivery error occur, ICMP reports these errors to the sender of the datagram.

When the e0 interface on Testking C goes down, Testking C uses ICMP to send a message back to Testking 1 indicating that the datagram could not be delivered.

ICMP does not correct the encountered network problem.

Testking C will not notify the intermediary devices of the delivery failure. Therefore, Testking C will not send ICMP messages to Testking B. Datagrams contain only source and destination IP addresses, they do not contain information about all the intermediary devices.

The reporting device (Testking C) has only the sender's IP address with which to communicate. Although Testking A and B are not notified directly, they might become aware of the down interface on Testking C. However, disseminating this information to neighbor routers is not the function of ICMP. ICMP reports on the status of the delivered packet to the sender, its function is not to propagate information about network changes.

Troubleshoot an access list (4 questions)

QUESTION NO: 1

On your newly installed router, you apply the access list illustrated below to interface Ethernet 0 on a Cisco router. The interface is connected to the 192.168.1.8/29 LAN.

```
access-list 123 deny tcp 192.168.166.18 0.0.0.7 eq 20 any
access-list 123 deny tcp 192.168.166.18 0.0.0.7 eq 21 any
```

How will the above access lists affect traffic?

- A. All traffic will be allowed to exit E0 except FTP traffic.
- B. FTP traffic from 192.168.166.19 to any host will be denied.
- C. FTP traffic from 192.168.166.22 to any host will be denied.
- D. All traffic exiting E0 will be denied.
- E. All FTP traffic to network 192.168.166.18/29 from any host will be denied.

Answer: D

Explanation:

By default every access list contains an implicit deny statement at the end. Because of this, only an access list that contains at least one permit statement will be useful. In this example there is no permit statement, so it will deny all traffic exiting E0 Interface.

Incorrect Answers:

- A. It will deny everything, including FTP and telnet traffic.
- B, C, E. It will deny all traffic in addition to the condition mentioned in these answers, because there is no permit statement at the end.

QUESTION NO: 2

On a newly installed router, the following access list is added to the HSSI interface for incoming traffic:

```
Access-list 101 permit tcp any 10.18.10.0 0.0.0.255 eq tcp
```

What is the effect of the “any” keyword in the above access list?

- A. check any of the bits in the source address
- B. permit any wildcard mask for the address
- C. accept any source address
- D. check any bit in the destination address
- E. permit 255.255.255.255 0.0.0.0

F. accept any destination

Answer: C

Explanation:

The "any" in this list is the source address to filter. If it is set to any or "0.0.0.0 255.255.255.255", then any source address will be filtered. In the example above, the access list is stating that any TCP traffic from any source going to the 10.18.10.0/24 network will be allowed.

QUESTION NO: 3

Which one of the following commands will display the placement and direction of an IP access control list on the interfaces of a router?

- A. show interface list
- B. show ip route
- C. show ip interface
- D. show ip interface brief
- E. show interface

Answer: C

Explanation:

The command "show ip interface" will include a reference to the access lists enabled on the interface.

QUESTION NO: 4

The relevant portion of the Barrymore router configuration is displayed below:

Barrymore#**show running-config**

<some output text omitted>

```
enable password cisco
!
username Central password 0 cisco
!
interface BRI0/0
 ip address 192.168.0.1 255.255.255.0
 encapsulation ppp
 dialer idle-timeout 180
 dialer map ip 192.168.0.2 name Remote 5552000
```

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```

dialer-group 1
 isdn switch-type basic-ni
 no fair-queue
 ppp authentication chap
!
ip route 192.168.20.0 255.255.255.0 192.168.0.2
!
router rip
 network 192.168.0.0
!
access-list 129 deny tcp 192.168.0.0 0.0.0 255 host
192.168.20.5 eq www
access-list 128 permit ip any any
dialer-list 1 protocol ip list 128

```

In your effort to conserve precious bandwidth, you set up some ACL's to deny internet access to the remote server located at 192.168.20.5. A few minutes after reconfiguring (as shown in the exhibit above) you notice that some web traffic is still going through.

Based on the above output, what do you suspect as to why the traffic still traveling over the ISDN link?

- A. Broadcasts are creating "interesting" traffic.
- B. The access-list is not configured correctly.
- C. The command **ip access-group 129 out** is missing from the bri0/0 interface.
- D. The dialer-group has not been applied to outbound traffic.

Answer: C

Explanation:

In this case the access list is correctly created using access list number 129. The problem is that ACL 129 has not been applied anywhere. We wish to apply this access list to the BRI 0/0 interface, in the outbound direction.

Incorrect Answers:

A, D. In this example, the question does not relate to the ISDN call establishment. It is assumed that the link works correctly and that the interesting traffic is configured correctly. This is simply an access list issue, not an ISDN issue.

B. The access list is indeed configured correctly; it just needs to be applied to the interface.

Perform simple WAN troubleshooting (17 questions)

QUESTION NO: 1

After attempting to telnet into a router, you are denied and you receive the error message “password required, but none set.” What configuration changes will allow telnet access into this router?

- A. `router(config)# line con 0`
`router(config-line)# password welcome`
`router(config-line)# login`
- B. `router(config)# line aux 0 4`
`router(config-line)# password welcome`
`router(config-line)# login`
- C. `router(config)# line vty 0 4`
`router(config-line)# password welcome`
`router(config-line)# login`
- D. `router(config)# line tty 0 4`
`router(config-line)# password welcome`
`router(config-line)# enable login`

Answer: C

Explanation:

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.

Reference:

CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) page 178.

Incorrect Answers:

- A. This will prompt users connecting via a console cable for a password, and then allow access.
- B. This will configure access via the aux port.
- D. Routers do not have TTY access.

QUESTION NO: 2

While attempting to gain access into a router remotely, you issue the telnet command as shown below:

```

Remote27#
Remote27#telnet access1
Trying ACCESS1 (10.0.0.1)... Open

Password required, but none set
Testking.com
[Connection to access1 closed by foreign host]
Remote27#

```

Based on the information above, which set of commands will correct this problem?

- A. ACCESS1(config)# line console 0
ACCESS1(config-line)# password cisco
- B. Remote27(config)# line console 0
Remote27(config-line)# login
Remote27(config-line)# password cisco
- C. Remote27(config)# line vty 0 4
Remote27(config-line)# login
Remote27(config-line)# password cisco
- D. ACCESS1(config)# line vty 0 4
ACCESS1(config-line)# login
ACCESS2(config-line)# password cisco
- E. ACCESS1(config)# enable password cisco
- F. Remote27(config)# enable password cisco

Answer: D

Explanation:

The vty lines on the remote router (the one you are trying to telnet into) needs to be configured to allow access.

Incorrect Answers:

A, B. The connection you need to establish isn't a console session but a virtual terminal session, so answer choices A and B are incorrect.

C. This is the correct syntax, but it is being placed on the wrong router. The access needs to be applied to the remote router, not the local one.

E, F. Answer choices E and F are incorrect because they refer to the enable password, which is different than the virtual terminal line passwords.

QUESTION NO: 3

While troubleshooting a serial line problem, you enable ppp authentication debugging as shown below:

```
#debug ppp authentication
ppp serial1: Send CHAP challenge id=34 to remote
ppp serial1: CHAP challenge from P1R2
ppp serial1: CHAP response received from P1R2
ppp serial1: CHAP response id=34 received from P1R2
ppp serial1: Send CHAP success id=34 to remote
ppp serial1: Remote passed CHAP authentication
ppp serial1: Passed CHAP authentication
ppp serial1: Passed CHAP authentication with remote
```

Based on the command output above, what type of 'handshake' was used for PPP authentication?

- A. one-way
- B. two-way
- C. three-way
- D. four-way
- E. no handshakes required during authentication
- F. None of the above

Answer: C

Explanation:

As shown in the above output, CHAP is the mechanism that is being utilized here. CHAP uses a three-way handshake. After the PPP link is established, the host sends a "challenge" message to the remote node. The remote node responds with a value calculated using a one-way hash function. The host checks the response against its own calculation of the expected hash value. If the hash value match, the authentication is acknowledged; otherwise, the connection is terminated.

QUESTION NO: 4

The Testking Central and Remote offices are configured as shown below:

Central# show running-config

<some output text omitted>

```
interface Serial0/0
ip address 10.0.8.1 255.255.248.0
encapsulation frame-relay
frame-relay map ip 10.0.15.2 200
```

Remote# show running-config

<some output text omitted>

```
interface Serial0/0
ip address 10.0.15.2 255.255.248.0
encapsulation frame-relay
frame-relay map ip 10.0.8.1 100
```

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```
!
router rip
network 10.0.0.0
```

```
!
router rip
network 10.0.0.0
```

The remote router can be successfully pinged from the central office but the remote users can't access the server at the central office.

Based on the output above, what do you suspect is the cause of this problem?

- A. The Frame Relay PVC is down.
- B. The IP addressing on the Central/Remote serial link is incorrect.
- C. RIP routing information is not being forwarded.
- D. Frame Relay inverse-ARP is not properly configured.

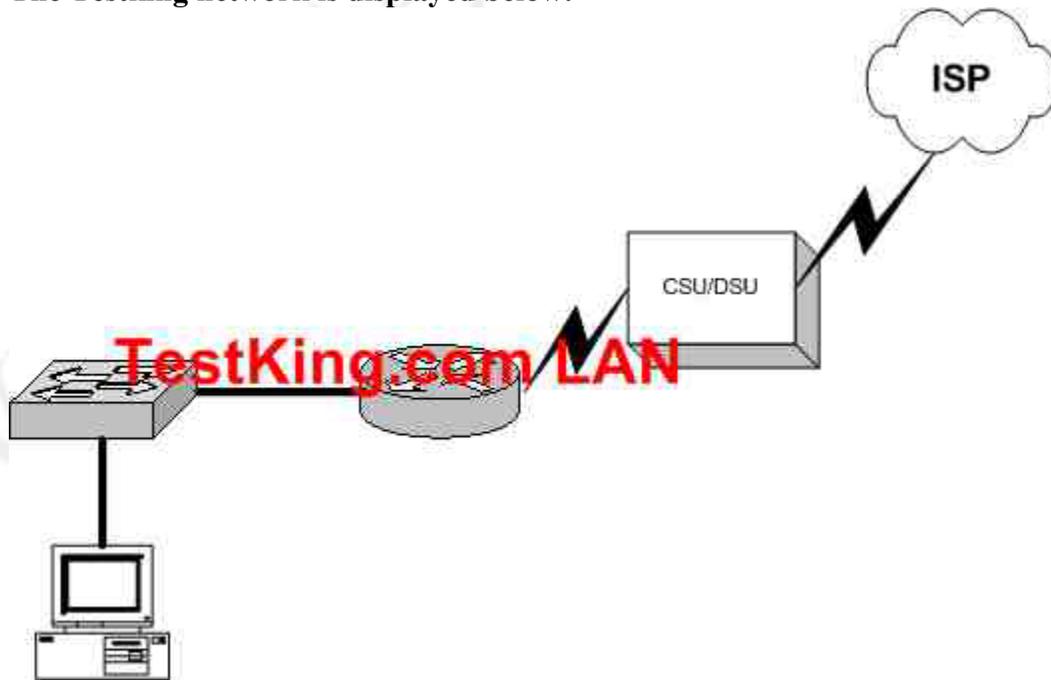
Answer: D

Explanation:

By looking at the output we can see that there are routes and the routing protocol is RIP, so we can eliminate answer choice C. Since the remote server can be pinged, we know that there is a physical connection. (so answer choices A & B can be eliminated). So by process of elimination we can figure out that the Frame Relay inverse-ARP must be the problem.

QUESTION NO: 5

The Testking network is displayed below:



You are brand new to the company, and you are in the process of discovering the Testking network's topology. You have been given a Visio of the network diagram above. Based on this information, what conclusion can you make about the type of Testking Internet connection? (Select all that apply)

- A. They are using DSL
- B. They are using frame relay
- C. ISDN is being used
- D. A dedicated T1 circuit is being used
- E. They are using a wireless ISP
- F. They are using a POTS dial up connection

Answer: B, D

The correct answer should be "Frame Relay" & "Dedicated T1". Both WAN technologies use CSU/DSU. These are the only two choices that could be correct based on the fact that a CSU/DSU is being used.

Incorrect Answers:

- A. DSL uses a modem instead of a CSU/DSU
- C. ISDN uses a terminal adapter/NT
- E, F. CSU/DSU's are not used in wireless and dial up connections.

QUESTION NO: 6

You are trying to bring up a new Testking location onto your existing frame relay network. The new location is using an Adtran router and you are having difficulties getting the site to connect via frame to your Cisco HQ router. What is the most likely cause of the problem?

- A. Mismatched LMI types.
- B. Incompatible encapsulation types.
- C. Mismatching IP addresses.
- D. Incorrect DLCI.
- E. None of the above

Answer: A

Explanation:

Three LMI protocol options are available in Cisco IOS software: Cisco, ITU, and ANSI. Each LMI option is slightly different and therefore is incompatible with the other two. As long as both the DTE and DCE on each end of an access link use the same LMI standard,

LMI works fine. The default LMI type in a Cisco router is Cisco. Since this is proprietary, this LMI type is incompatible with the LMI type used by other vendors.
Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 381.

QUESTION NO: 7

The TestKing1 and TestKing2 routers are connected together as shown below:



Users on the TestKing1 LAN are able to successfully access the resources on the TestKing2 network. However, users on TestKing1 are unable to telnet to the TestKing2 router. What do you suspect are the likely causes of this problem? (Select two answer choices)

- A. PPP authentication configuration problem.
- B. A misconfigured IP address or subnet mask
- C. An access control list
- D. A defective serial cable.
- E. No clock rate on interface s0 on TestKing2
- F. A missing vty password.

Answer: C, F

Explanation:

An ACL or a router configured without a VTY password will prevent users from being able to telnet into a router.

Incorrect Answers:

A, B, D, E. We know that the network is connected together and communicating back and forth because of the two way CHAP authentication happening. In addition, the LAN users are able to get to each other with no problems. Therefore A is incorrect, B is incorrect, D is incorrect, and E is incorrect.

QUESTION NO: 8

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You are an administrator of a network that uses PPP for CHAP authentication over ever WAN link. What command would you enter to display the CHAP authentication as it occurs in real time?

- A. show ppp authentication
- B. debug PAP authentication
- C. debug PPP authentication
- D. show interface serial0
- E. show CHAP authentication

Answer: C

Explanation:

Whenever you're asked to display a process in real time, you must use a debug command as show commands do not display anything in real time. Debug PPP authentication will display the authentication process of a PPP line, including the CHAP process.

Incorrect Answers:

A, D, E. This will not display the output in real time.

B. We wish to see information relating to CHAP, not PAP.

Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 314.

QUESTION NO: 9

You are troubleshooting a WAN connection for TestKing, and on the router you execute the, "debug ppp authentication" command, and view the following output:

```
#debug ppp authentication

PPP Serial1: Send CHAP challenge id=34 t remote
PPP Serial1: CHAP challenge from P1R2
PPP Serial1: CHAP response received form P1R2
PPP Serial1: CHAP response id=34 received from P1R2
PPP Serial1: Send CHAP success id=34 to remote
PPP Serial1: Remote passed CHAP authentication
PPP Serial1: Passed CHAP authentication
PPP Serial1: Passed CHAP authentication with remote
```

What kind of handshake was used for the PPP authentication?

- A. one-way
- B. two-way
- C. three-way
- D. No handshakes required during authentication
- E. None of the above

Answer: C

Explanation:

CHAP uses a one-way hash algorithm, with input to the algorithm being a password and a shared random number. The CHAP challenge states the random number; both routers are preconfigured with the password. The challenged router runs the hash algorithm using the just-learned random number and the secret password and sends the results back to the router that sent the challenge. The router that sent the challenge runs the same algorithm using the random number (sent across the link) and the password (not sent across the link). If the results match, the passwords must match.

QUESTION NO: 10

Study the output script and the network topology exhibit below:

TestKing1# show running-config

<some output text omitted>

```
interface serial0/0
  bandwidth 64
  ip address 172.16.100.2 255.255.0.0
  encapsulation frame-relay
  frame-relay map ip 172.16.100.1 200 broadcast
```



The Router TestKing1 in Hong Kong is connected to the router TestKing2 in Tokyo via a new Frame Relay link. However, TestKing1 is unable to communicate with TestKing2. Based on the above output, what do you suspect as the underlying cause of this problem?

- A. Bandwidth configuration incorrect
- B. IP address not correct
- C. Improper map statement
- D. Improper LMI configuration

Answer: C

Explanation: From looking at the diagram you can see that Hong Kong's DLCI is 100, while Tokyo's DLCI is 200.

The Frame Relay map command is an interface configuration mode command that statically defines a mapping between a network layer address and a DLCI.

Incorrect Answers:

- A. The bandwidth statement is not used by the routers at a physical or data link layer, so this statement will not have any impact on the function of the frame relay circuit.
- B. We do not know what the IP address of the Tokyo side is, so this can not be assumed.
- D. The default LMI type is Cisco, and since both routers in this network appear to be Cisco's, we can assume that this is acceptable.

QUESTION NO: 11

While troubleshooting an issue with your frame relay network, you issue the "show frame pvc" command as shown in the exhibit below:

PVC Statistics for interface Serial0 (Frame Relay DTE)				
	Active	Inactive	Deleted	Static
Local	1	0	0	0
Switched	0	0	0	0
Unused	0	0	0	0

DLCI = 100, DLCI USAGE = LOCAL, PVC STATUS = ACTIVE, INTERFACE = Serial0

input pkts 1300	output pkts 1270	in bytes 22121000
out bytes 21802000	dropped pkts 4	in FECN pkts 147
in BECN pkts 192	out FECN pkts 259	out BECN pkts 214
in DE pkts 0	out DE pkts 0	
out bcast pkts 107	out bcast bytes 19722	
pvc create time 00:25:50, last time pvc status changed 00:25:40		

You're a network administrator at a TestKing branch office, that's connected to the central headquarters by means of Frame Relay. You've been getting complaints that the connection has suddenly become slow, so you make the assumption that there's too much traffic going through the link.

Taking into consideration the above output from the 'show frame relay pvc' command; which command output value is indicating that there's congestion between the local router and the corporate site?

- A. in DE packets 0
- B. last time PVC status changed 00:25:40
- C. in BECN packets 192
- D. DLCI = 100
- E. in FECN packets 147

Answer: C

Explanation:

BECN stands for Backward Explicit Congestion Notification. The BECN tells the transmitting device that the Frame Relay network is congested and that it should "back off" to allow better throughput. BECN and FECN go hand to hand together, but since the question specifically asks for what's indicating congestion between the local router and corporate site, BECN is correct.

QUESTION NO: 12

In order to troubleshoot an issue with the Testking frame relay network, you log into a remote router via a telnet session and issue the command "debug frame-relay lmi". After a long wait, you fail to see any output. What could be the cause of this problem?

- A. The IP addresses are configured incorrectly.
- B. Frame Relay LMI messages not displayed in real time.
- C. The administrator must issue the **enable frame-relay lmi debug** command.
- D. The administrator must issue the **terminal monitor** command.
- E. Debug messages can only be received once through the console port.
- F. The administrator must issue the **show frame-relay lmi vty 0 4** command-

Answer: D

Explanation:

In order to see any debugging output from a remote telnet session, the "terminal monitor" command will need to be issued. By default, the network server sends the output from the **debug** commands to the console terminal. Sending output to a terminal (virtual console) produces less overhead than sending it to the console. Use the privileged EXEC command **terminal monitor** to send output to a terminal.

Reference:<http://www.cisco.com/univercd/cc/td/doc/product/software/ios112/dbook/daple.htm>

QUESTION NO: 13

The configuration of the remote Barrymore router is displayed below:

```
hostname Barrymore
!
enable password gatekeeper
!
isdn switch-type basic-5ess
```

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```

!
!
username Central password cisco
interface BRI0
 ip address 192.168.0.1 255.255.255.0
 encapsulation ppp
 dialer idle-timeout 180
 dialer map ip 192.168.0.2 name Remote 6662000
 dialer-group 1
 no fair-queue
 ppp authentication chap
!
router rip
network 192.168.0.2
!
no ip classless
ip route 192.168.10.0 255.255.0.0 192.168.0.2
ip route 192.168.20.0 255.255.0.0 192.168.0.2
!
dialer-list 1 protocol ip permit

```

The Barrymore router is unable to call the remote site. What is the underlying cause of this problem?

- A. The authentication password is missing from the **dialer map** command.
- B. The switch-type must be configured.
- C. Routing updates are being blocked by the applied dialer-list.
- D. The dialer list only permits one protocol.
- E. The name in the **dialer-map** must match the name in the **username** command.
- F. None of the above

Answer: E

Explanation:

The username in the above exhibit is “Central”, while the dialer-map name is “Remote”. Since the names don’t match the call can’t be completed.

QUESTION NO: 14

You are attempting to troubleshoot a frame relay problem you are having within the Testking network, but you are unsure where to start. You begin by entering the command:

‘Router# show frame-relay

Which three options will you be prompted for? (Select three answers choices)

- A. dlci
- B. clients
- C. pvc
- D. neighbors
- E. lmi
- F. map

Answer: C, E, F

Explanation:

The valid options for, 'show frame-relay' are: show frame-relay map, show frame-relay lmi, & show frame-relay pvc. In the Cisco IOS, if you don't type in a command specific enough, it will prompt you to select an option.

Incorrect Answers:

A, B, D. Show frame-relay dlci, show frame-relay clients, and show frame-relay neighbors are all invalid commands.

QUESTION NO: 15

The relevant portion of two different Testking routers are displayed below:

```

<some output text omitted>
interface serial0/0
ip address 10.0.1.1 255.255.255.0
encapsulation frame-relay
|
router igrp 1
network 10.0.0.0

<some output text omitted>
interface fastethernet0/0
ip address 10.10.1.2 255.255.255.0
|
interface serial0/0
ip address 10.0.1.2 255.255.255.0
encapsulation frame-relay
|
router igrp 2
network 10.0.0.0

```

Users on these two routers are experiencing connectivity problems and are unable to reach each other. After reviewing the command output, what is the most likely cause of the problem?

- A. Incorrect IP addressing.
- B. Frame relay is incorrectly configured.
- C. IGRP is incorrectly configured.
- D. Link state routing protocol is needed.

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E. None of the above.

Answer: C

Explanation:

With IGRP, the process number, or autonomous system number, must match. In this case the router on the left is configured with IGRP 1, while the router on the left is configured with IGRP 2. This is resulting in the routers not exchanging IGRP routing information with each other.

Incorrect Answers:

A. The IP addressing used here will work. Although IGRP does not support VLSM, all networks are configured using a /24 subnet mask.

B. Since both routers are obviously Cisco (IGRP is Cisco proprietary) the frame relay configuration is not the problem. Had one of the routers been non-Cisco, then the keyword “ietf” should be placed at the end of the frame-relay encapsulation command.

D. Link state routing is not required in this network.

QUESTION NO: 16

You have just installed a new web server on the Testking network. You are required to ensure that the web server is accessible from the Internet. The network uses private addressing, so an IP-to-registered address mapping is required.

To do this, you enter the following command:

```
TestKing(config)# ip nat inside source static 192.168.2.1 198.18.1.254
```

You unsuccessfully try to ping the Internet from a PC host on the LAN. During the troubleshooting process, you enter the “show ip nat translations” command but the output is blank.

What is the most likely cause of the problem?

- A. The keyword **overload** is missing from the command.
- B. The NAT pool must be defined first.
- C. An access list must be defined to create static NAT translations.
- D. The interfaces must be configured for NAT.
- E. None of the above

Answer: D

Explanation:

In order to successfully configure a static NAT translation, the interfaces must be configured for NAT, in addition to the global NAT command that was entered. The router interface that lies on the inside part of the network must be defined using the “ip nat inside” command. Similarly, the WAN interface that is being used for the Internet connection must be defined using the “ip nat outside” command.

Incorrect Answers:

A. In order to make an internal server reachable from the Internet, a static one to one NAT entry must be configured for the server. The keyword “overload” is used to configure many to one NAT, or PAT.

B, C. This need not be done in order to create a static NAT entry. These steps are typically done in setting up NAT so that inside LAN users can access the Internet via NAT.

QUESTION NO: 17

TestKing.com is configuring the serial interface of a Cisco router to connect to the router of a new ISP. A full T1 is being used for the Internet connection. After issuing the show interface serial 0/0 command, it is observed that the interface is UP and the line protocol is DOWN.

Which of the following commands could fix this problem?

- A. Border# **copy running-config startup-config**
- B. Border(config)# **no shutdown**
- C. Border(config-if)# **encapsulation ppp**
- D. Border(config-if)# **no cdp enable**
- E. Border(config-if)# **ip routing**

Answer: C

Explanation:

By default, a serial interface on a Cisco router is set for HDLC encapsulation. Many ISP's use PPP encapsulation for the layer 2 protocol since the connection is a point to point type and PPP is an industry standard, while HDLC is Cisco proprietary. Changing the default encapsulation type to PPP could fix this problem.

Incorrect Answers:

- A. This will save the current configuration into NVRAM, but will have no affect with the current state of the serial interface.
- B. If the interface was manually shut down the status would be “administratively down, line protocol down.”
- D. CDP is enabled by default on all interfaces, but whether or not CDP is running would not have any impact on the functionality of the serial interface.
- E. IP routing is enabled by default. Additionally, IP routing does not need to be running on the router in order for the serial interface to work.

Part IV: TECHNOLOGY (128 questions)

Describe network communications using layered models (14 questions)

QUESTION NO: 1

In the “host to host” layer of the DOD model, which of the following is a valid connection oriented protocol?

- A. ARP
- B. RARP
- C. TCP
- D. UDP
- E. IP
- F. ICMP
- G. BootP

Answer: C

Explanation:

Transport Protocol is a connection oriented protocol that resides at the Host to Host layer of the DOD stack and handles connection oriented communication. In the Department of Defense layer, the host to host layer translates to layer 4 of the OSI model.

QUESTION NO: 2

Which of the following protocols operate at the ‘Application layer’ of the OSI model? (Select all valid answers)

- A. TCP
- B. Telnet
- C. FTP
- D. ARP
- E. IP
- F. None of the above

Answer: B, C

Explanation:

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The application layer is the top layer of the OSI model and is used to describe the end user applications that can be used over a network.

Layer Name

Examples

Application (layer 7)
gateways, SNMP

Telnet, HTTP, FTP, WWW browsers, NFS, SMTP

Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 34.

Incorrect Answers:

- A. TCP resides at layer 4.
- D. ARP is a function of the data link layer, which is layer 2.
- E. IP is used at layer 3 (network layer).

QUESTION NO: 3

Which OSI layer is associated with the following: The acknowledgement of transmissions, sequencing, and flow control across a network?

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

Answer: C

Explanation

The Transport layer (Layer 4) defines several functions, including the choice of protocols. The most important Layer 4 functions are error recovery and flow control. The transport layer may provide for retransmission, i.e., error recovery, and may use flow control to prevent unnecessary congestion by attempting to send data at a rate that the network can accommodate, or it might not, depending on the choice of protocols. Multiplexing of incoming data for different flows to applications on the same host is also performed. Reordering of the incoming data stream when packets arrive out of order is included. Examples include: TCP, UDP, and SPX.

QUESTION NO: 4

Which of the protocols below, operates at Layer 2 of the OSI model, and is used to maintain a loop-free network?

- A. RIP
- B. STP
- C. IGRP

- D. CDP
- E. VTP

Answer: B

Explanation:

STP (spanning tree protocol) operates on layer 2 to prevent loops in switches and bridges.

Incorrect Answers:

A, C. RIP and IGRP are routing protocols, which are used at layer 3 to maintain a loop free routed environment.

D. CDP does indeed operate at layer 2, but it does not provide for a loop free topology. CDP is used by Cisco devices to discover information about their neighbors.

E. VTP is the VLAN Trunking Protocol, used to pass VLAN information through switches. It relies on the STP mechanism to provide a loop free network.

QUESTION NO: 5

In the communications industry, what are the features and benefits of using the layered OSI model? (Select the two best answers)

- A. It encourages industry standardization by defining what functions occur at each layer of the model.
- B. It necessitates changes in functionality in one layer to other layers.
- C. It enables equipment efficiency from different vendors to use the same electronic components.
- D. It divides the network communication process into smaller and simpler components, thus aiding component development, design, and troubleshooting.
- E. It supports the evolution of multiple competing standards, and thus enhances business equipment manufacturing opportunities.

Answer: A, D

Explanation:

The OSI (Open System Interconnection) reference model was created as a reference point for communications devices. A layered approach is used to segment the entire telecommunications process into a series of smaller steps.

A is correct because it encourages a level of standardization by encouraging that functions be compared to known layers. D is also correct because it allows engineers to focus on the development, refining, and perfection of simpler components.

QUESTION NO: 6

The TCP/IP network model differs from the more popular OSI model. Which of the layers below belong to the TCP/IP model? (Select all that apply)

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- A. application layer
- B. session layer
- C. transport layer
- D. internet layer
- E. network layer
- F. data link layer
- G. physical layer

Answer: A, C, D

Explanation:

OSI Model	TCP/IP Architecture	TCP/IP Protocols
Application	SNMP, Telnet FTP, TFTP, NTP, NFS, SMTP	SNMP, TELNET, FTP, TFTP, NTP, NFS, SMTO
Presentation		Transport
Session	Internet	TCP, UDP
Transport	Network interface	IP OSPF, RIP, ICMP
Network		Use of lower layer protocol standards
Data Link		
Physical		

TCP/IP's architecture does not use the presentation and session layers. The application layer protocols use the transport layer services directly. The OSI transport layer provides connection-oriented service; in TCP/IP, this service is provided by TCP. TCP/IP also provides connectionless service in the transport layer with UDP.

The Internet layer of TCP/IP corresponds to the network layer of the OSI model. Although OSI network-layer protocols provide connection-oriented (Connection-Model Network Service (CMNS), X.25) or Connectionless Network Service (CLNS), IP provides only connectionless network service. The routing protocols are network layer protocols with an IP protocol number.

Reference: CCNA ICND Exam Certification Guide by Wendell Odem, Page 268.

QUESTION NO: 7

At which layer of the OSI model is the optimal path to a network destination determined at?

- A. Data Link
- B. Session

- C. Physical
- D. Presentation
- E. Network
- F. Transport

Answer: E

Explanation:

The Network layer (Internet layer in the DOD model) provides logical addressing and routing through an internetwork. The network layer is layer 3 of the OSI model.

QUESTION NO: 8

In the OSI model, at which layers do WANs operate at? (Select two answer choices)

- A. Application layer
- B. Presentation layer
- C. Session layer
- D. Transport layer
- E. Network layer
- F. Data link layer
- G. Physical layer

Answer: E, F

Explanation:

Data-Link Protocols for Point-to-Point Leased Lines

The more interesting part of point-to-point WANs relates to the choices of different data link layer protocols and how each protocol behaves differently. 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. Each of these WAN protocols has the following functions in common:

- HDLC and PPP provide for the delivery of data across a single point-to-point serial link.
- HDLC and PPP deliver data on synchronous serial links; PPP also supports asynchronous serial links.

Each synchronous serial data-link protocol uses the concept of *framing*. Each data-link protocol defines the beginning and end of the frame, the information and format of a header and trailer, and the location of the packet between the header and trailer. In other words, synchronous WAN data-link protocols are frame-oriented, just like LAN data-link protocols.

Another example is with TCP/IP, which is the predominant protocol suite used throughout the Internet. With TCP/IP, TCP uses the transport layer while IP lies within the network layer.

QUESTION NO: 9

Which one of the following is the most commonly used layer 2 network device?

- A. Hub
- B. Bridge
- C. Switch
- D. Router
- E. Repeaters
- F. None of the above

Answer: C

Explanation:

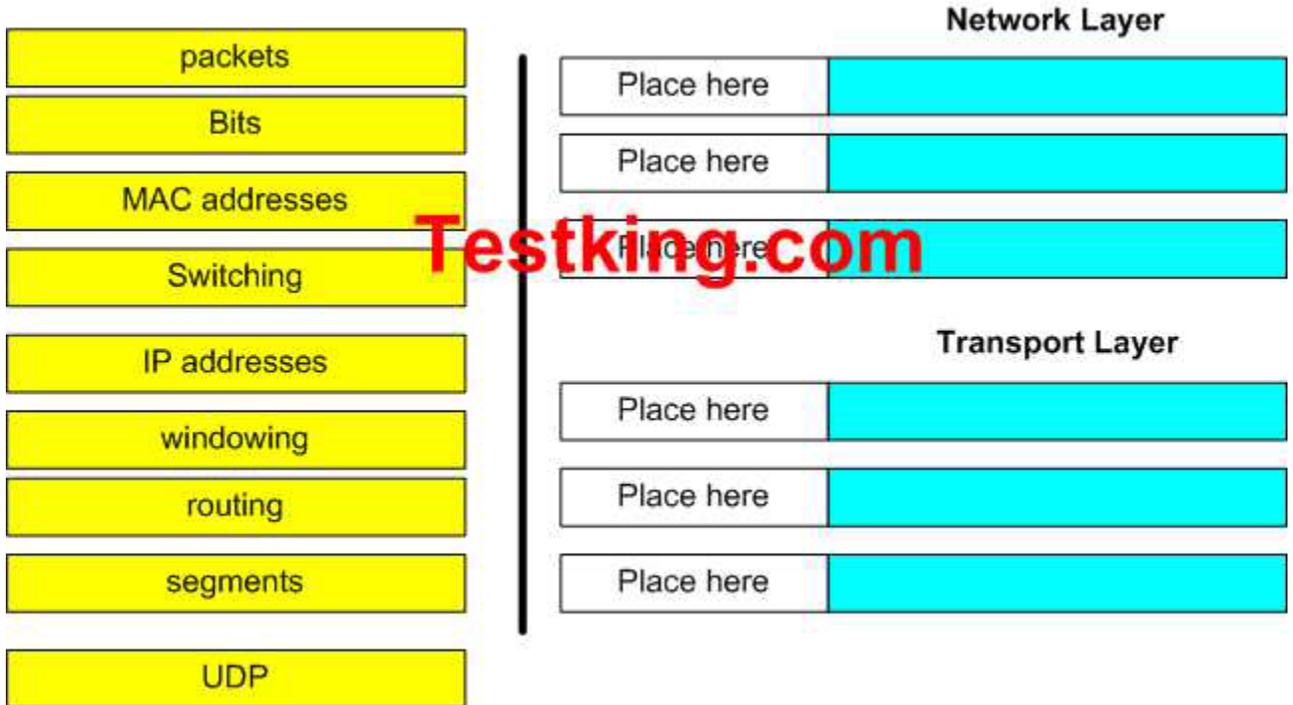
A switch segments the network and uses an ASIC for fast switching. Switches have become the more common of the layer two devices, as they offer more features and benefits than bridges.

Incorrect Answers:

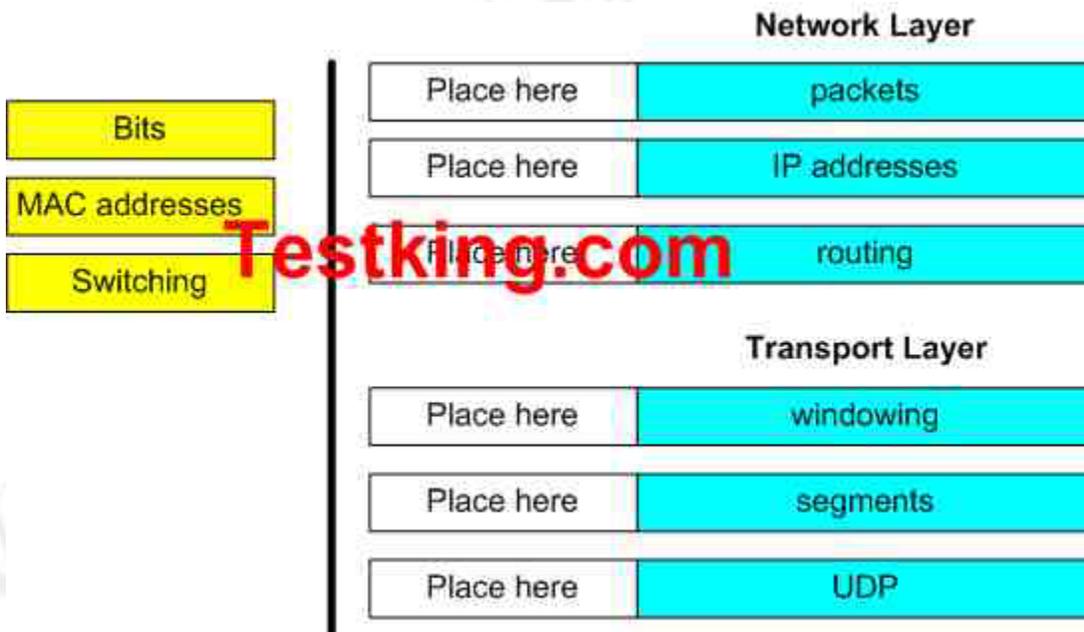
- A, E. Hubs and repeaters operate at layer one.
- B. Bridges have become somewhat obsolete, as switches have become more and more prevalent.
- D. Routers operate at layers 3 and 4.

QUESTION NO: 10

Classify the terms on the left into their proper OSI layer categories on the right. Do this by dragging and dropping the correct terms on the left with the correct answers on the right hand side. Note that not all left side options will be used.



Correct Answer:



QUESTION NO: 11

Which three of the following OSI model layers also belong to the TCP/IP model? (Select three answer choices)

- A. The application layer
- B. The session layer
- C. The data link layer
- D. The transport layer
- E. The network interface layer
- F. The physical layer

Answer: A, D, E

Explanation:

The Application, Transport, and the Network Interface Layers are all part of the TCP/IP layer model. (The application and transport layer are also layers of the OSI model as well.) However, the session layer, the data link layer, and the physical layer are all exclusively part of the OSI model.

QUESTION NO: 12

Which three of the protocols below belong to the application layer? (Select three answer choices)

- A. ARP
- B. HTTPS
- C. SMTP
- D. CDP
- E. TFTP
- F. ICMP

Answer: B, C, E

Explanation:

The application layer is the highest OSI layer, and protocols at this layer are end-user oriented. HTTPS so people can get information on the internet, SMTP so people can manage networks, and TFTP so people can download files.

Incorrect Answers:

A, D, F. ARP, CDP, ICMP are protocols that equipment like routers and switches use to communicate with themselves, and belong to lower levels on the model.

QUESTION NO: 13

Which of the following layers of the TCP/IP model most closely corresponds to the network layer of the OSI model?

- A. Application
- B. Internet
- C. Transport
- D. Network
- E. Data Link

Answer: B

Explanation:

The DOD model consists of the Application/Process, Host to Host, Internet and Network Access layers. The only answer with a DoD model layer (also called the TCP/IP model), is the Internet layer.

QUESTION NO: 14

You have set up an Internet based FTP server, where people can upload and download files. In terms of the OSI model, what is the highest layer used during the FTP sessions.

- A. Application
- B. Presentation
- C. Session
- D. Transport
- E. Internet
- F. Data Link
- G. Physical

Answer: A

Explanation:

The application layer is the highest layer (layer 7) of the OSI model, and is reserved for end user applications. Since FTP is itself an application, layer 7 is the highest layer used.

Incorrect Answers:

B, C, D, E, F, G. In any given FTP session, all of these layers will be used at some point but they are incorrect because the question asked for the highest layer used by FTP.

Describe the Spanning Tree process (10 questions)

QUESTION NO: 1

By default, which of the following factors determines the spanning-tree path cost?

- A. It is the individual link cost based on latency
- B. It is the sum of the costs based on bandwidth
- C. It is the total hop count
- D. It is dynamically determined based on load

Answer: B

Explanation:

“The STP cost is an accumulated total path cost based on the available bandwidth of each of the links.”

Reference: Sybex CCNA Study Guide 4th Edition (Page 323)

Note:

A **path cost** value is given to each port. The cost is typically based on a guideline established as part of 802.1d. According to the original specification, cost is 1,000 Mbps (1 gigabit per second) divided by the bandwidth of the segment connected to the port. Therefore, a 10 Mbps connection would have a cost of (1,000/10) 100.

To compensate for the speed of networks increasing beyond the gigabit range, the standard cost has been slightly modified. The new cost values are:

Bandwidth	STP Cost Value
4 Mbps	250
10 Mbps	100
16 Mbps	62
45 Mbps	39
100 Mbps	19
155 Mbps	14
622 Mbps	6
1 Gbps	4
10 Gbps	2

You should also note that the path cost can be an arbitrary value assigned by the network administrator, instead of one of the standard cost values.

Incorrect Answers:

A, D. The STP process does not take into account the latency or load of a link. STP does not recalculate the link costs dynamically.

C. Hop counts are used by RIP routers to calculate the cost of a route to a destination. The STP process resides at layer 2 of the OSI model, where hop counts are not considered.

QUESTION NO: 2

What is the purpose of the spanning-tree algorithm in a switched LAN?

- A. To provide a monitoring mechanism for networks in switched environments.
- B. To manage VLANs across multiple switches.
- C. To prevent switching loops in networks with redundant switched paths.
- D. To segment a network into multiple collision domains.
- E. To prevent routing loops in networks.

Answer: C

STP is used in LANs with redundant paths or routes to prevent loops in a layer 2 switched or bridged LAN.

Incorrect Answers:

A, B. The primary purpose of STP is to prevent loops, not for monitoring or management of switches or VLANs.

D. VLANs are used to segment a LAN into multiple collision domains, but the STP process alone does not do this.

E. Routers are used to prevent routing loops at layer 3 of the OSI model. STP operates at layer 2.

QUESTION NO: 3

Which two of the following values does STP take into consideration when it elects the root bridge? (Select two answer choices)

- A. The BPDU version number
- B. The access layer bridge setting
- C. The Bridge ID
- D. The spanning-tree update number
- E. The bridge priority
- F. The VLAN number

Answer: C, E

Explanation:

The bridges elect a root bridge based on the bridge IDs in the BPDUs. The root bridge is the bridge with the lowest numeric value for the bridge ID. Because the two part bridge ID starts with the priority value, essentially the bridge with the lowest priority becomes the root. For instance, if one bridge has priority 100, and another bridge has priority 200, the bridge with priority 100 wins, regardless of what MAC address was used to create the bridge ID or each bridge/switch.

Reference: CCNA Self-Study CCNA ICND Exam Certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 39

QUESTION NO: 4

Match the Spanning-Tree Protocol states from the bottom to the slot on the upper left that matches their corresponding function on the right.
(Not all the options are used.)

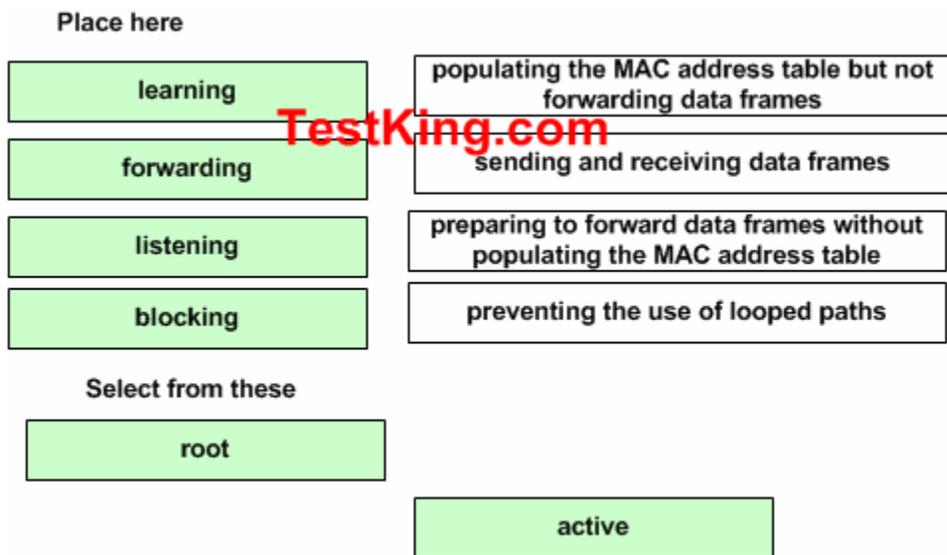
Place here

Place here	populating the MAC address table but not forwarding data frames
Place here	sending and receiving data frames
Place here	preparing to forward data frames without populating the MAC address table
Place here	preventing the use of looped paths

Select from these

root	listening
learning	active
forwarding	blocking

Answer:

**Explanation:**

The various STP states are shown below:

- **Listening** - Listens to incoming Hello messages to ensure that there are no loops, but does not forward traffic or learn MAC addresses on the interface.
- **Learning** –learns MAC addresses and builds a filter table but does not forward frames.
- **Forwarding** – Sends and receives all data on the bridged port.
- **Blocking** – are used to prevent network loops.

Reference: CCNA Study guide Second Edition (Sybex, Todd Lammle) page 82.

QUESTION NO: 5

The spanning tree information from 4 switches on the Testking network is displayed below. Despite their names, all four switches are on the same LAN.

```
Tampa#show spanning-tree
```

```
Spanning tree 1 is executing the IEEE compatible Spanning Tree protocol
```

```
Bridge Identifier has priority 32768, address 0002.fd29.c505
Configured hello time 2, max age 20. forward delay 15
```

```
-----
```

```
Miami#show spanning-tree
```

```
Spanning tree 1 is executing the IEEE compatible Spanning Tree protocol
```

```
Bridge Identifier has priority 16384, address 0002.fd29.c504
Configured hello time 2, max age 20, forward delay 15
```

```
-----  
-----  
London#show spanning-tree
```

```
Spanning tree 1 is executing the IEEE compatible Spanning Tree  
protocol
```

```
  Bridge Identifier has priority 8192, address 0002.fd29.c503  
  Configured hello time 2, maxage 20, forward delay 15  
-----
```

```
-----  
Cairo#show spanning-tree
```

```
Spanning tree 1 is executing the IEEE compatible Spanning Tree  
protocol
```

```
  Bridge Identifier has priority 4096, address 0002.fd29.c502  
  Configured hello time 2, maxage 20, forward delay 15
```

Based on the outputs of the above exhibit, which one of the switches is the spanning tree root bridge?

- A. Miami
- B. London
- C. Tampa
- D. Cairo

Answer: D

Explanation: Cairo is the correct answer because it has the lowest Bridge priority. The default priority value is 32768 (same as Tampa), and the bridge with the lowest priority will become the root bridge.

A **root bridge** is chosen based on the results of the BPDU process between the switches. Initially, every switch considers itself the root bridge. When a switch first powers up on the network, it sends out a BPDU with its own BID as the root BID. When the other switches receive the BPDU, they compare the BID to the one they already have stored as the root BID. If the new root BID has a lower value, they replace the saved one. But if the saved root BID is lower, a BPDU is sent to the new switch with this BID as the root BID. When the new switch receives the BPDU, it realizes that it is not the root bridge and replaces the root BID in its table with the one it just received. The result is that the switch that has the lowest BID is elected by the other switches as the root bridge.

QUESTION NO: 6

Which of the following are spanning tree port states? (Select three answer choices)

- A. learning
- B. spanning

- C. listening
- D. forwarding
- E. initializing
- F. filtering
- G. permitting

Answer: A, C, D

Explanation:

There are 4 STP states that a bridge port can be in: Blocking, Listening, Learning, and Forwarding:

Spanning-Tree Intermediate States

State	Forwards Data Frames?	Learns MACs Based on Received Frames?	Transitory or Stable State?
Blocking	No	No	Stable
Listening	No	No	Transitory
Learning	No	Yes	Transitory
Forwarding	Yes	Yes	Stable

QUESTION NO: 7

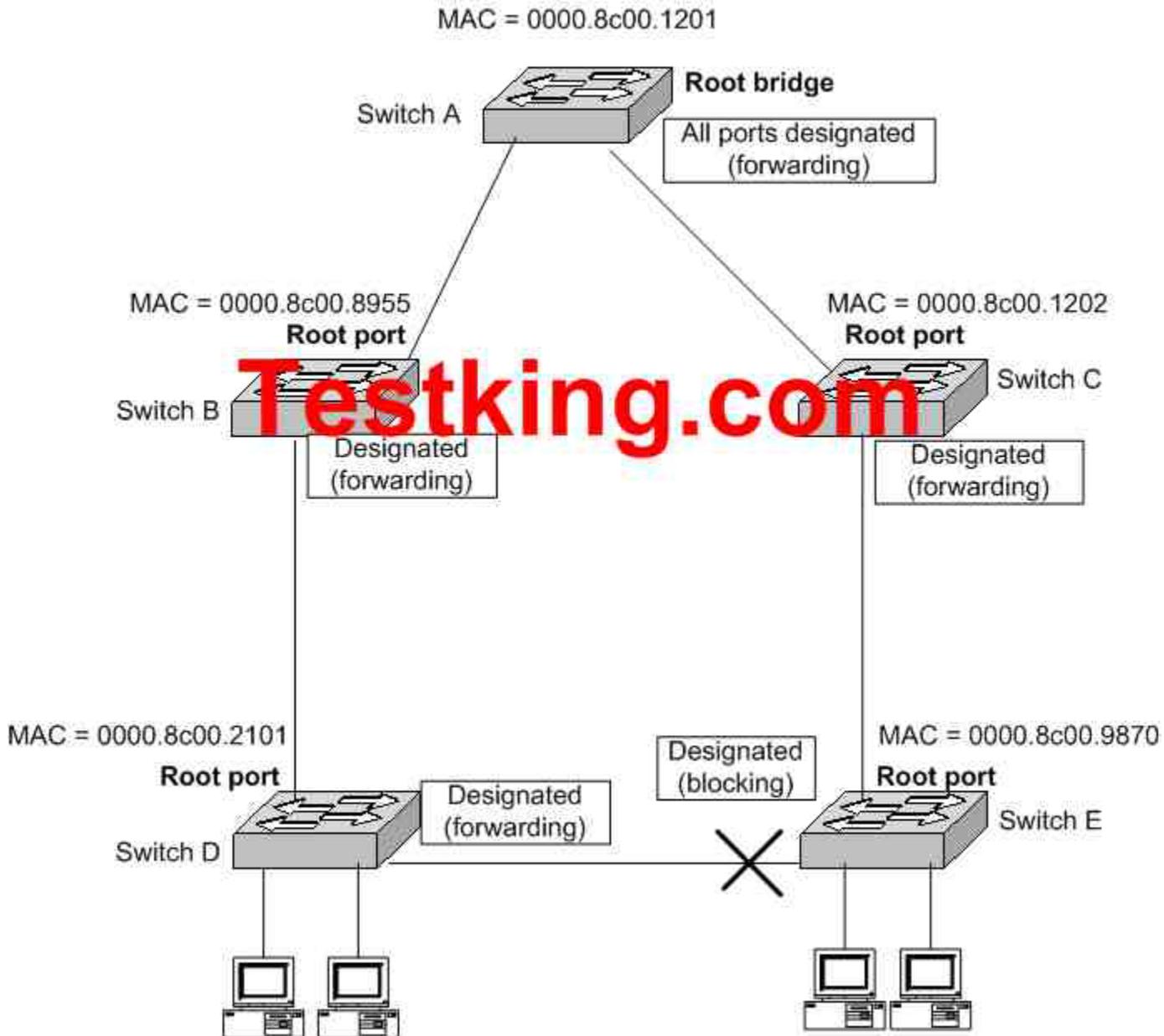
What are the switch and bridge port characteristics of a layer two spanning-tree network that is fully converged?

- A. All switch and bridge ports are in the forwarding state.
- B. All switch and bridge ports are in the stand-by state.
- C. All switch and bridge ports are assigned as either root or designated ports.
- D. All switch and bridge ports are in either the forwarding or blocking state.
- E. All switch and bridge are either blocking or looping.

Answer: D

Explanation:

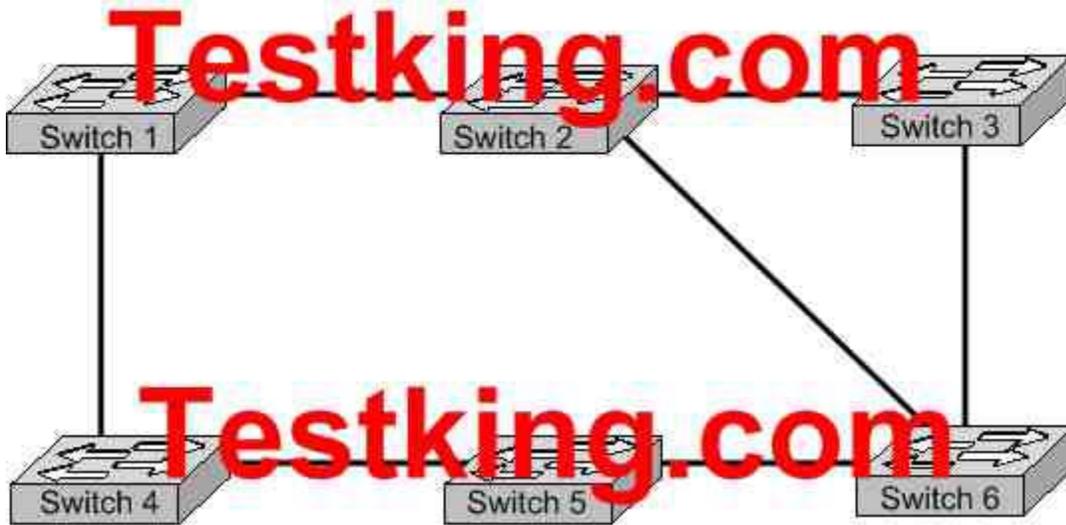
When a switch first comes up, it will be in the listening and learning states. This is needed so that the switch learns the MAC addresses of the devices on the LAN, and to learn where any loops in the network may exist. After this initial period of listening and learning, the ports will be forwarding to the hosts, or blocking certain ports that create a loop in the network. An example of this is shown below:



In the above figure, after the network has converged, spanning tree protocol puts each port either in designated (Forwarding) or Non-designated (Blocking) state. So, Choice D is correct.

QUESTION NO: 8

The Testking LAN consists of 6 switches connected together as shown in the diagram below:



What is the name of the potential problem of this switch setup, and what protocol can prevent its occurrence. (Select only one answer choice)

- A. routing loops, hold down timers
- B. switching loops, split horizon
- C. routing loops, split horizon
- D. switching loops, VTP
- E. routing loops, STP
- F. switching loops, STP

Answer: F

Explanation: The spanning-Tree Protocol (STP) prevents loops from being formed when switches or bridges are interconnected via multiple paths. Spanning-Tree Protocol implements the 802.1D IEEE algorithm by exchanging BPDU messages with other switches to detect loops, and then removes the loop by shutting down selected bridge interfaces. This algorithm guarantees that there is one and only one active path between two network devices.

QUESTION NO: 9

In a switched LAN network, what is the Spanning-Tree algorithm used for?

- A. It is used to provide a mechanism for routing updates in switched environments.
- B. It is used to prevent routing loops in networks with redundant routes.
- C. It is used to prevent switching loops in networks with redundant switched routes.

- D. It is used to manage, the addition, deletion, and naming of VLANs across multiple switches.
- E. It is used to segment a network into multiple collision domains.
- F. None of the above.
- G. All of the above are functions of STP.

Answer: C

Explanation:

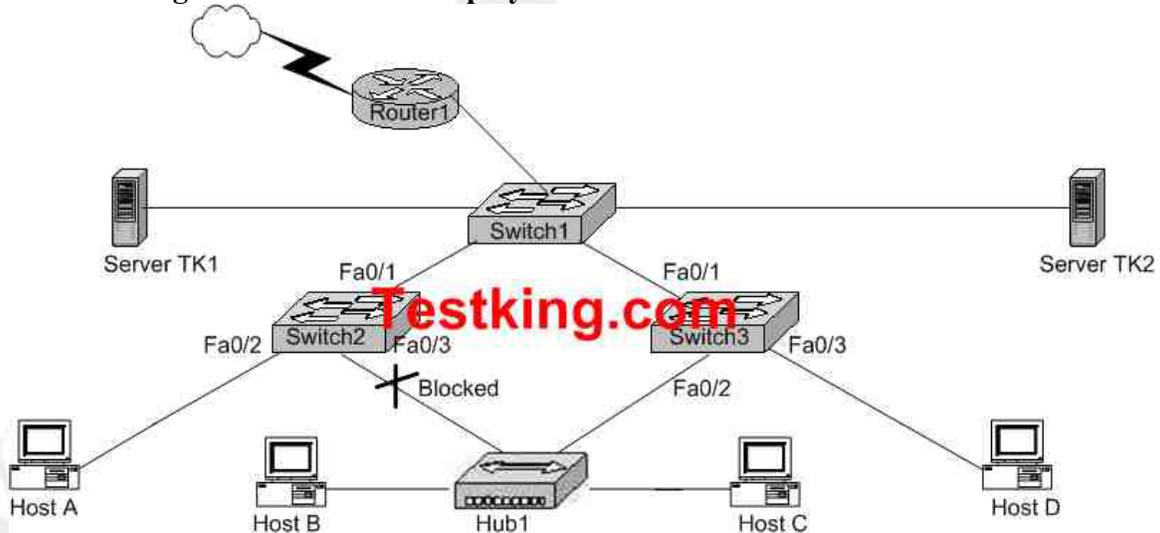
To avoid loops, all bridging devices, including switches, use STP. STP causes each interface on a bridging device to settle into a blocking state or a forwarding state. Blocking means that the interface cannot forward or receive data frames. Forwarding means that the interface can send and receive data frames. By having a correct subset of the interfaces blocked, a single currently active logical path will exist between each pair of LANs. STP resides at the data link layer, so it is used to prevent loops within a switched network. It is not used to prevent routing loops; that is the function of the mechanisms within a routing protocol.

Reference:

CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) page 248.

QUESTION NO: 10

The Testking switched LAN is displayed in the network below:



In the network shown in the diagram, which ports on Switch2 are receiving BPDUs?

- A. Fa 0/1 only
- B. Fa 0/2 only
- C. Fa 0/3 only

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- D. Fa 0/1 and Fa 0/2 only
- E. Fa 0/1 and Fa 0/3 only
- F. All three ports

Answer: F

Explanation:

Spanning-Tree Protocol (STP) prevents loops from being formed when switches or bridges are interconnected via multiple paths. Spanning-Tree Protocol implements the 802.1D IEEE algorithm by exchanging BPDU messages with other switches to detect loops, and then removes the loop by shutting down selected bridge interfaces. This algorithm guarantees that there is one and only one active path between two network devices. BPDU information is passed to all ports, even those ports that are currently in the blocking state. BPDU information is needed at all ports so that when a STP topology change is needed, such as when a blocked port becomes an active forwarding port, all ports will be aware of the change.

Compare and contrast key characteristics of LAN environments (24 questions)

QUESTION NO: 1

Which of the statements below are true regarding the availability of bandwidth on a network? (Select all that apply.)

- A. Bandwidth availability is decreasing.
- B. Bandwidth availability is infinite.
- C. Bandwidth is used when analyzing network performance.
- D. Bandwidth availability is finite.
- E. Bandwidth availability is fixed.

Answer: C, D

Explanation: C is correct because performance analyzing software is notorious for consuming bandwidth. Most network management devices use SNMP, which consumes bandwidth. D is correct because although new technologies are providing for more bandwidth and a network can be engineered to give more priority to different devices, there is a finite amount of bandwidth available at any given time.

Incorrect Answers:

- A. This is incorrect because new technologies are actually increasing the amount of potential bandwidth.
- B. For any given network, the amount of bandwidth available to end users is usually fixed, and based on the speed of the connection to access connection. For example, any given PC with a 10/100 NIC will be limited to 100Mbps of throughput at any given time.
- E. This is incorrect because it's always possible to upgrade a scalable technology or allocate resources differently.

QUESTION NO: 2

Which one of the following actions would actually increase congestion on an Ethernet network?

- A. Increasing the number of collision domains.
- B. Micro-segmenting the network.
- C. Adding hubs for connectivity to the network.
- D. Putting additional switches in the network.
- E. Implementing VLANs in the network.

Answer: C

Explanation:

All of the answer choices above except for C are all good ways of reducing network congestion. Hubs on the other hand increase congestion, because they allow the addition of more users, therefore more potential traffic, more collisions (if it's a half-duplex) and their use will result in increased overall congestion.

Incorrect Answers:

A, B, D, E. These answers all describe the use of VLANs, which are used to decrease the size of any given collision domain and to decrease the amount of link level multicast and broadcast traffic.

QUESTION NO: 3

You have an Ethernet network. Which of the conditions below can lead to increased congestion on your network? (Select two answer choices)

- A. The use of Full-Duplex Mode.
- B. The Creation on New Collision Domains.
- C. The Creation on New Broadcast Domains.
- D. The Addition of Hubs to the Network.
- E. The use of switches in the Network.
- F. The Amount of ARP or IPX SAP Traffic.

Answer: D, F

Explanation:

Hubs on their own don't create congestion, but the hosts that connect to them do. Generally, the addition of hubs means additional hosts connected to the hubs, all within the same collision domain. Finally, as networks become larger, more broadcast traffic such as ARP requests and IPX SAP packets get generated, which can lead to increased network congestion.

Incorrect Answers:

- A. This is incorrect because the use of full duplex will increase the amount of bandwidth while eliminating collisions at the same time.
- B, C. These methods describe the use of segmentation and VLAN use, which will decrease traffic on the individual segments.
- E. This is incorrect because switches are the preferred method of reducing collision domains.

QUESTION NO: 4

Which of the following can lead to the contribution of LAN traffic congestion? (Select all that apply)

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- A. Too many hosts in a broadcast domain
- B. Full duplex operation
- C. Broadcast storms
- D. Multicasting
- E. Segmentation
- F. Low bandwidth

Answer: A, C, D, F

Explanation:

Choice A is correct because the more hosts on a broadcast domain, the more traffic that is created. Choice C contributes to congestion because broadcast storms can become very problematic, and lead to complete network saturation. Multicasts are similar to broadcasts in their use on a LAN. Finally, if there is not enough bandwidth, traffic sessions can time out. This leads to new transmissions and the re-sending of data, which can lead to more congestion.

Incorrect Answers:

B, E. These are incorrect because full duplex operation and segmented networks actually result in less congestion.

QUESTION NO: 5

You have been contracted by TestKing to replace the network cabling of their LAN's. The System Administrator gives you specific instructions that he needs to use cabling in the LAN that is NOT susceptible to EMI.

What kind of cable would you use to satisfy the administrator's needs?

- A. Thicknet coaxial cable.
- B. Thinnet coaxial cable.
- C. Category 5 UTP cable.
- D. Category 5 STP cable.
- E. Fiber optic cable.
- F. All of the above

Answer: E

Explanation:

EMI stands for Electro-Magnetic Interference, which can cause the corruption of packets as they traverse the network. If this is a major concern then fiber is the best choice.

Fiber optic cable is more secure, supports longer distances and higher speeds, and is not susceptible to EMI. The major drawback of fiber is that it is the most expensive choice.

QUESTION NO: 6

What is the IEEE standard associated with Gigabit Ethernet? (Select two answer choices)

- A. 802.11
- B. 802.5
- C. 802.3ab
- D. 802.3ae
- E. 802.3z
- F. 802.3u

Answer: C, E

Explanation:

The IEEE 802.3z standard describes 1000BASE-SX.

The 1000BaseT standard was released in June 1999, defined by IEEE 802.3ab.

Incorrect Answers:

- A. This describes the standard used for wireless networks.
- B. This is the standard for token ring networks.
- D. On June 17, 2002 the IEEE 802.3ae specification for 10 Gigabit Ethernet was approved as an IEEE standard by the IEEE Standards Association (IEEE-SA) Standards Board.
- F. IEEE 802.3u describes the standard for 100BASE-TX.

QUESTION NO: 7

On a half-duplex Ethernet LAN, two hosts attempt to send data simultaneously, resulting in a collision. Following this collision, what will the hosts do? (Select all valid answers)

- A. The destination host sends a request to the source for retransmission.
- B. The jam signal indicates that the collision has been cleared.
- C. The hosts will attempt to resume transmission after a time delay has expired.
- D. An electrical pulse indicates that the collision has cleared.
- E. The router on the segment will signal that the collision has cleared.
- F. The hosts will do nothing, as the higher layers are responsible for data error correction and re-transmission.

Answer: C

Explanation:

When a host on an Ethernet LAN has information to send, the following steps are taken:

1. A device with a frame to send listens until Ethernet is not busy.
2. When the Ethernet is not busy, the sender begins sending the frame.
3. The sender listens to make sure that no collision occurred.

4. Once the senders hear the collision, they each send a jamming signal, to ensure that all stations recognize the collision.
5. After the jamming is complete, each sender randomizes a timer and waits that long.
6. When each timer expires, the process starts over with step 1.

QUESTION NO: 8

Which of the following statements correctly describe the differences between half-duplex and full-duplex Ethernet? (Select two answer choices.)

- A. Full-duplex Ethernet uses CSMA/CD to prevent collisions.
- B. Half-duplex Ethernet uses a loopback circuit to detect collisions.
- C. A full-duplex Ethernet card allows 20Mbps for data transmission.
- D. Full-duplex Ethernet makes use of two pairs of wires for data.
- E. An Ethernet hub can operate both half and full duplex simultaneously.

Answer: B, D

Explanation:

Half-duplex Ethernet send and receives on the same line, so a loopback needs to be set to detect collisions. Alternatively, full-duplex Ethernet doesn't have to because it uses two pairs of wire, one to send and the other to receive. Collisions are not possible on full duplex Ethernet networks.

Incorrect Answers:

- A. Full duplex uses both pairs of wires, so transmissions are sent on the first pair, and data that is received come in on the other pair. This prevents collisions.
- C. Full duplex allows for data to be sent and received at the same time. It will not double the amount of bandwidth at any given time. The speed of the Ethernet link will remain at 10/100.
- E. Hubs are shared devices and can only support one mode, unlike switches.

QUESTION NO: 9

Why is full-duplex Ethernet superior to its single-duplex counterpart? (Select two answer choices.)

- A. It uses inexpensive hubs
- B. It operates without collisions
- C. It operates on switches
- D. It provides faster data transfer
- E. It utilizes fewer wiring pairs

Answer: B, D

Explanation:

Full duplex Ethernet allows concurrent sending and receiving, which allows the full bandwidth to be used for both sending and receiving. The result is a collision free network with increased throughput.

Incorrect Answers:

A, C. These are incorrect because full duplex doesn't require hubs or switches. Full duplex operation can be used on switch and router ports, as well as PC hosts.

E. This is incorrect because full duplex actually uses more wiring pairs. In full duplex, both wire pairs are used. Half duplex uses only a single pair.

QUESTION NO: 10

What are the differences between full-duplex Ethernet and half-duplex Ethernet? (Select all that apply)

- A. Half-duplex Ethernet operates in a shared collision domain.
- B. Full-duplex Ethernet has a lower effective throughput.
- C. Half-duplex Ethernet operates in a private collision domain.
- D. Full-duplex Ethernet allows two-way communication.
- E. Half-duplex Ethernet operates in a private broadcast domain.

Answer: A, D

Explanation:

The original Ethernet specifications used a shared bus, over which only one frame could be sent at any point in time. So, a single device could not be sending a frame and receiving a frame at the same time because it would mean that a collision was occurring. Half duplex stations use CSMA/CD to prevent collisions on the network, because the collision domain is shared. Full duplex Ethernet eliminated the need to collision detection, by allowing for two way communication.

Incorrect Answers:

B. Full duplex effectively doubles the throughput of half-duplex operation, because data can be both sent and received at the full 10/100 speed.

C, E. In half duplex operation, the network is shared between all devices in the collision domain.

QUESTION NO: 11

When you compare the differences between half-duplex and full-duplex Ethernet, which of the following characteristics are exclusive to half-duplex? (Select two answer choices)

- A. Half-duplex Ethernet operates in a shared collision domain.

- B. Half-duplex Ethernet operates in an exclusive broadcast domain.
- C. Half-duplex Ethernet has efficient throughput.
- D. Half-duplex Ethernet has lower effective throughput.
- E. Half-duplex Ethernet operates in an exclusive collision domain.

Answer: A, D

Explanation:

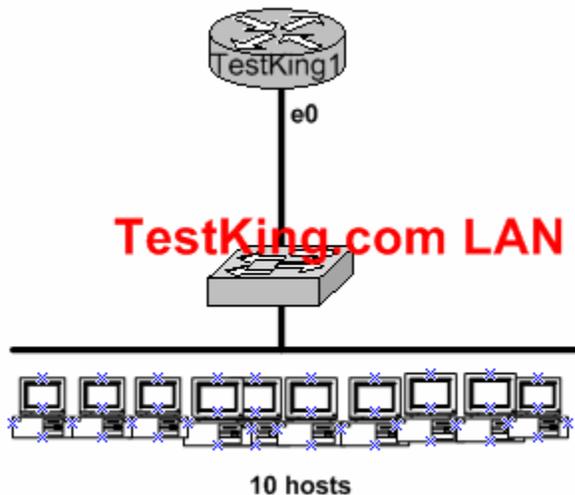
A single device could not be sending a frame and receiving a frame at the same time because it would mean that a collision was occurring. So, devices simply chose not to send a frame while receiving a frame. That logic is called half-duplex logic.

Ethernet switches allow multiple frames to be sent over different ports at the same time. Additionally, if only one device is connected to a switch port, there is never a possibility that a collision could occur. So, LAN switches with only one device cabled to each port of the switch allow the use of full-duplex operation. Full duplex means that an Ethernet card can send and receive concurrently.

Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 62-63.

QUESTION NO: 12

The TestKing LAN consists of 10 PC users as shown in the diagram below:



Each of the hosts is connected to their own 10Mbps half-duplex switch port to the e0 interface of a router. How much bandwidth is available to each individual host?

- A. 1 Mbps
- B. 10 Mbps
- C. 20 Mbps
- D. 100 Mbps
- E. 120 Mbps

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Answer: B

Explanation:

Although ten hosts are sharing a 10Mbps half duplex connection, there are still 10Mbps available to them under the best hypothetical circumstances. Unlike hubs, each switch port will be allocated the entire bandwidth. Hubs are shared devices, so in this example if there was a hub in place then the 10 hosts would all be sharing one 10Mbps connection.

QUESTION NO: 13

Which of the following data network would you implement if you wanted a wireless network that had a relatively high data rate, but was limited to very short distances?

- A. Broadband personal comm. Service (PCS)
- B. Broadband circuit
- C. Infrared
- D. Spread spectrum
- E. Cable

Answer: C

Explanation:

A good example of the range of an infrared is a television remote control or a garage door opener. Infrared networks are capable of high data rates, but they are limited in the distance between the infrared points, and also by the fact that a line of sight between the nodes is usually required.

Incorrect answers:

A, D. Although these are both wireless methods, the data rate capabilities are somewhat limited, especially when compared to infrared links.

B, E. Although these are both capable of relatively high data rates, they do not use wireless technology.

QUESTION NO: 14

Which IEEE standard is used to define Wi-Fi?

- A. IEEE 802.3
- B. IEEE 802.5
- C. IEEE 802.11h
- D. IEEE 802.11c
- E. IEEE 802.11

Answer: E

Explanation:

IEEE 802.11 was the original standard for wireless networks. However, the standard had a few ambiguities allowed for potential problems with compatibility between devices. To ensure compatibility, a group of companies formed the Wireless Ethernet Compatibility Alliance (WECA), which has come to be known as the Wi-Fi Alliance, to ensure that their products would work together. The term Wi-Fi is now used to refer to any IEEE 802.11 wireless network products that have passed the Wi-Fi Alliance certification tests.

Incorrect Answers:

- A. This is the standard used for Ethernet networks.
- B. This is the standard used in Token Ring networks.
- C, D. These standards are not currently used. The most prevalent types of wireless 802.11 networks are 802.11a, 802.11b, and 802.11g.

QUESTION NO: 15

What is the maximum data rate specified by the IEEE 802.11B standard for wireless LANS?

- A. 10 Mbps
- B. 11 Mbps
- C. 54 Mbps
- D. 100 Mbps
- E. none of the above

Answer: B

Explanation:

The maximum speed for 802.11b is 11 Mbps.

Incorrect Answers:

- A. This is the maximum speed for legacy Ethernet networks.
- C. This is the maximum speed supported by the other prevalent wireless standards, 802.11a and 802.11g.
- D. This is the maximum speed of fast Ethernet connections.

QUESTION NO: 16

Assuming you build networks to exact specifications, what is the recommended maximum length a 10BaseT cable can be before it has to be segmented or repeated?

- A. 100 meters
- B. 100 feet
- C. 100 yards

D. 200 meters

Answer: A

Explanation:

The distance standards are in meters and 10BaseT has a distance restriction of 100 meters. If you go further than that, you compromise data integrity. 10BaseT is the predominant cable type used in Ethernet networks.

QUESTION NO: 17

Which of the following are actual varieties of network crosstalk? (Select all the valid answer choices)

- A. near-end crosstalk(NEXT)
- B. middle open-end crosstalk(MOEXT)
- C. power sum near-end crosstalk(PSNEXT)
- D. jittery crosstalk(JEXT)
- E. far end crosstalk(FEXT)

Answer: A, C, E

Explanation:

Near End Crosstalk (NEXT) is crosstalk measured at the transmitting end of the cable. Far End Crosstalk (FEXT) is measured at the far end from where the signal was injected into the cable. Power Sum NEXT (PSNEXT) is basically a mathematical calculation that simulates all four wire pairs being energized at the same time. PSNEXT calculations are used to ensure that a cable will not exceed crosstalk noise performance requirements when all pairs are operating simultaneously. PSNEXT is typically used in Gigabit Ethernet, rather than 10BaseT or 100BaseT.

Reference: Sybex CCNA 4.0 - P. 30

QUESTION NO: 18

Which of the following processes, is used to find the hardware address of a LAN device?

- A. Inverse-ARP
- B. Reverse-ARP
- C. Proxy ARP
- D. ARP

Answer: D

Explanation:

When a device needs to resolve a logical IP address to the physical Ethernet address (MAC), it uses the Address Resolution Protocol (ARP.)

Incorrect Answers:

A, B. Inverse ARP (sometimes also referred to reverse ARP), is used to resolve a known hardware MAC address to the IP address.

QUESTION NO: 19

Which one of the protocols below allows a router to respond to an ARP request destined to a remote host?

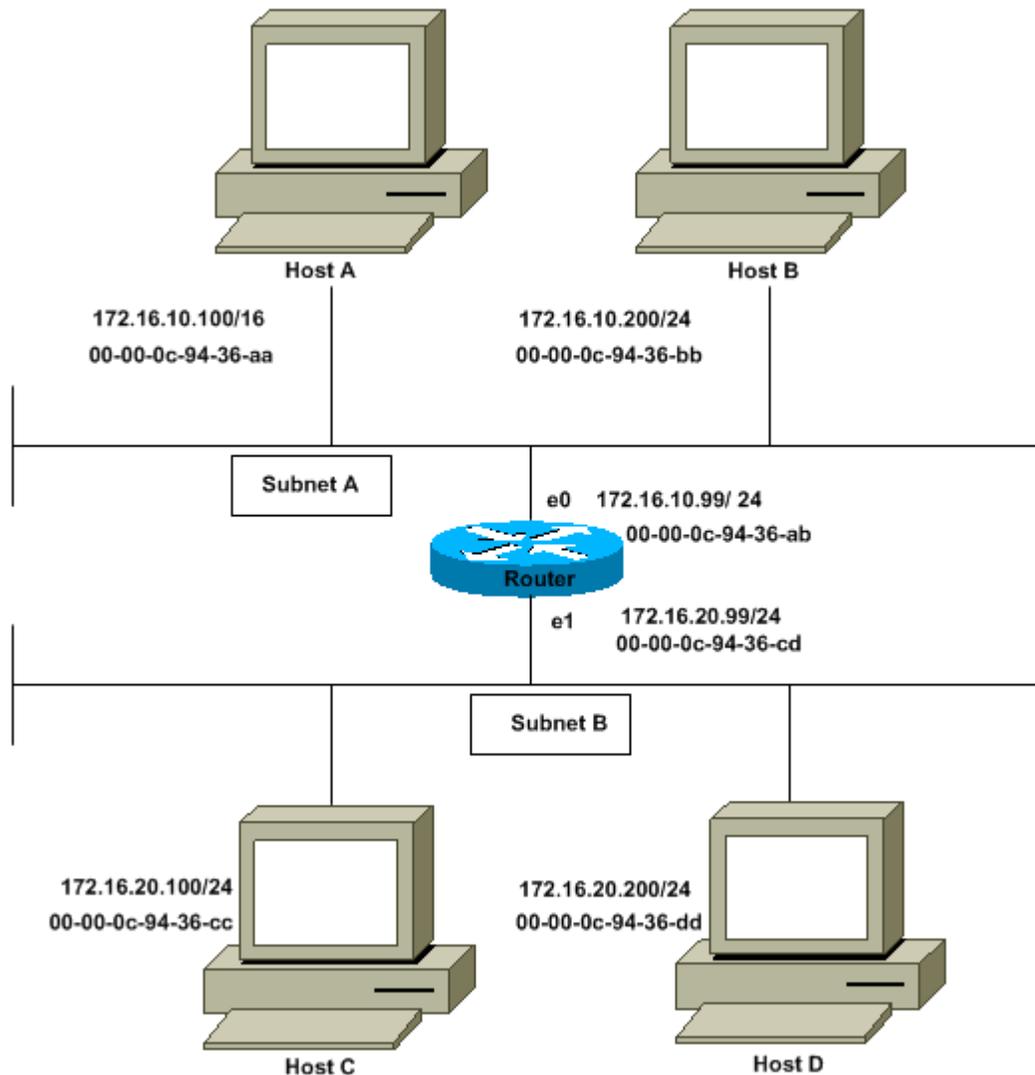
- A. Gateway DP
- B. Reverse ARP
- C. proxy ARP
- D. Inverse ARP
- E. indirect ARP

Answer: C

Explanation:

Below is an example taken from Cisco describing how proxy ARP operates:

Network Diagram



The Host A (172.16.10.100) on Subnet A needs to send packets to Host D (172.16.20.200) on Subnet B. As shown in the diagram above, Host A has a /16 subnet mask. What this means is that Host A believes that it is directly connected to all of network 172.16.0.0. When Host A needs to communicate with any devices it believes are directly connected, it will send an ARP request to the destination. Therefore, when Host A needs to send a packet to Host D, Host A believes that Host D is directly connected, so it sends an ARP request to Host D.

To reach Host D (172.16.20.200), Host A needs the MAC address of Host D.

Therefore, Host A broadcasts an ARP request on Subnet A, as below:

Sender's MAC Address	Sender's IP Address	Target MAC Address	Target IP Address
----------------------------	------------------------	--------------------------	----------------------

00-00-0c-94-36-aa	172.16.10.100	00-00-00-00-00-00	172.16.20.200
-------------------	---------------	-------------------	---------------

In above ARP request, Host A (172.16.10.100) is requesting that Host D (172.16.20.200) send its MAC address. The above ARP request packet is then encapsulated in an Ethernet frame with Host A's MAC address as the source address and a broadcast (FFFF.FFFF.FFFF) as the destination address. Since the ARP request is a broadcast, it reaches all the nodes in the Subnet A, including the router's e0 interface, but does not reach Host D. The broadcast will not reach Host D because routers, by default, do not forward broadcasts.

Since the router knows that the target address (172.16.20.200) is on another subnet and can reach Host D, it will reply with its own MAC address to Host A.

Sender's MAC Address	Sender's IP Address	Target MAC Address	Target IP Address
00-00-0c-94-36-ab	172.16.20.200	00-00-0c-94-36-aa	172.16.10.100

Above is the Proxy ARP reply that the router sends to Host A. The proxy ARP reply packet is encapsulated in an Ethernet frame with router's MAC address as the source address and Host A's MAC address as the destination address. The ARP replies are always unicast to the original requester.

On receiving this ARP reply, Host A updates its ARP table as below:

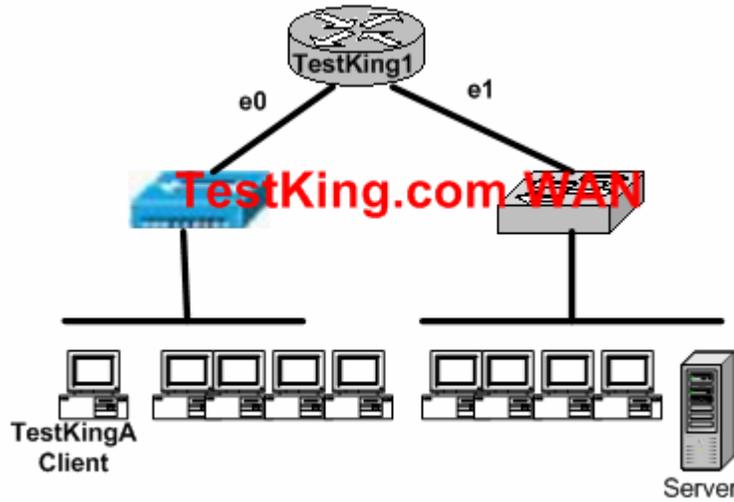
IP Address	MAC Address
172.16.20.200	00-00-0c-94-36-ab

From now on Host A will forward all the packets that it wants to reach 172.16.20.200 (Host D) to the MAC address 00-00-0c-94-36-ab (router). Since the router knows how to reach Host D, the router forwards the packet to Host D. The ARP cache on the hosts in Subnet A is populated with the MAC address of the router for all the hosts on Subnet B. Hence, all packets destined to Subnet B are sent to the router. The router forwards those packets to the hosts in Subnet B.

Reference: <http://www.cisco.com/warp/public/105/5.html>

QUESTION NO: 20

The TestKingA host and Server are separated by the TestKing1 router as shown in the diagram below:



The host TestKingA is downloading a file from the server. What is the source MAC address on the frames that TestKingA receives from the server on the network above? (Select only one answer choice)

- A. The MAC address of router interface e0.
- B. The MAC address of router interface e1.
- C. The MAC address of TestKingA.
- D. The MAC address of the server network interface.

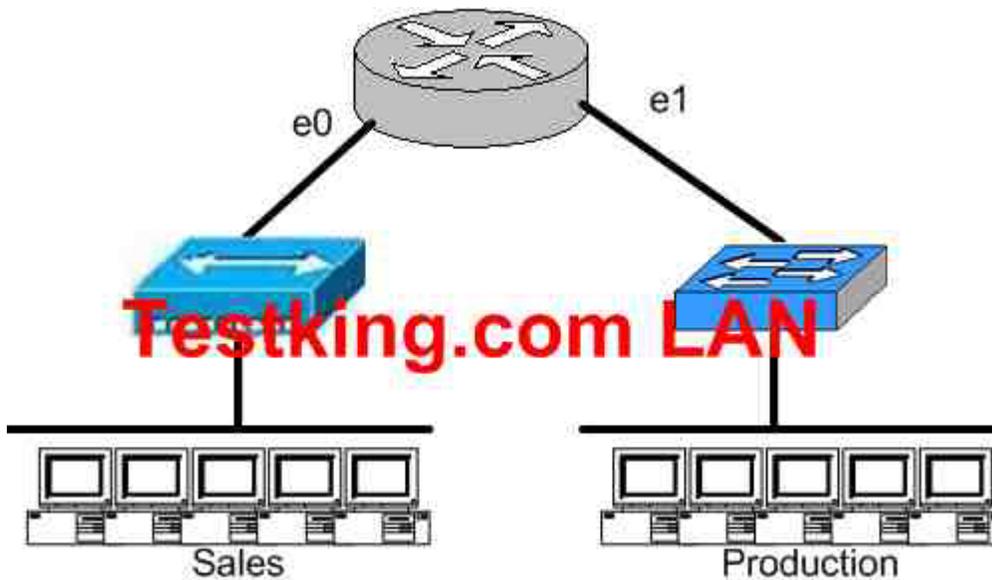
Answer: D

Explanation:

Even though the frames are passing through a router, the source and destination MAC address will not change during the data transmission.

QUESTION NO: 21

The Sales and Production networks are separated by a Testking router as shown in the diagram below:



Which of the following statements most accurately describes the characteristics of the above networks broadcast and collision domains? (Select the two best answer choices)

- A. There are two broadcast domains in the network.
- B. There are four broadcast domains in the network.
- C. There are six broadcast domains in the network.
- D. There are four collision domains in the network.
- E. There are five collision domains in the network.
- F. There are seven collision domains in the network.

Answer: A, F

Explanation:

We have two broadcast domains total in this network, one with the Sales network and another consisting of the Production network. We have 5 computers and one port for E1 so we have 6 collision domains because a switch is being used in the Production department and one collision domain for the Sales department because a hub is being used there.

QUESTION NO: 22

Which of the addresses below is an example of a valid unicast address?

- A. 172.31.128.255/18
- B. 255.255.255.255
- C. 192.168.24.59/30
- D. FFFF.FFFF.FFFF

E. 224.0.0.5

Answer: A

Explanation

If we take this address and convert it to binary we have:
10101100.00100000.10|000000.11111111 = valid IP

Incorrect Answers:

- B. This is the all hosts broadcast address
- C. This is a broadcast address for this given subnet.
- D. This is reserved for the all hosts broadcast MAC address.
- E. This is a reserved, class D address. Class D addresses are reserved for multicast use. This particular address is used by OSPF routers.

QUESTION NO: 23

Two stations on a LAN transmit at the same time, resulting in a collision. What happens when a collision occurs on the network? (Choose all that apply)

- A. Each device on the Ethernet segment stops transmitting for a short time.
- B. A jam signal informs all devices that a collision occurred.
- C. When data transmission resumes, the devices that were involved in the collision have priority to transmit.
- D. The devices that are involved in the collision stops transmitting for a short time.
- E. The collision invokes a random back-off algorithm.

Answer: B, D, E

Explanation:

When a host on an Ethernet LAN has information to send, the following steps are taken:

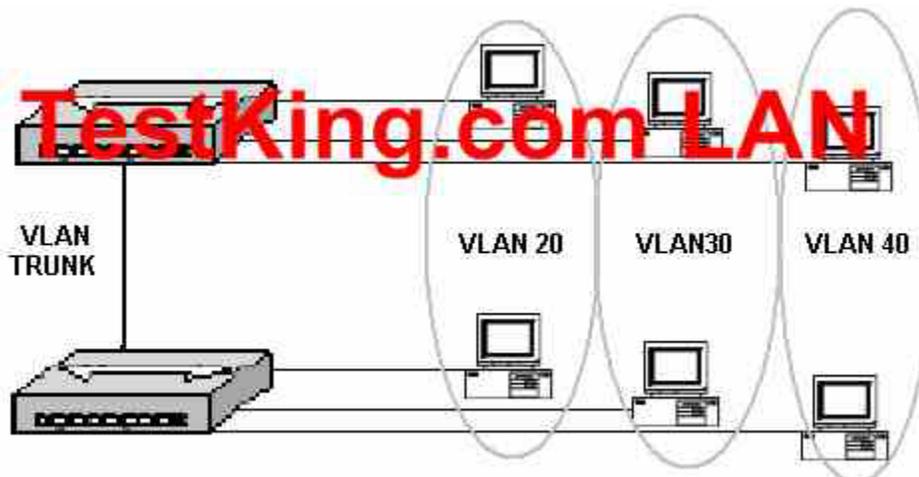
1. A device with a frame to send listens until Ethernet is not busy.
2. When the Ethernet is not busy, the sender begins sending the frame.
3. The sender listens to make sure that no collision occurred.
4. Once the senders hear the collision, they each send a jamming signal, to ensure that all stations recognize the collision.
5. After the jamming is complete, each sender randomizes a timer and waits that long.
6. When each timer expires, the process starts over with step 1.

Incorrect Answers:

- A. Only the stations involved in the collision stop transmitting for a short time, not all stations on the LAN.
- C. No priority is given to any stations once a collision has occurred.

QUESTION NO: 24

A trunk is configured between two Catalyst switches in the Testking network as shown in the diagram below:



Based on the information above, how many broadcast domains exist in the diagram?

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

Answer: C

Explanation:

VLANs are used to logically segment a LAN network into multiple sub-networks. Each sub-network then resides in its own separate broadcast domain. In this case, there are 3 separate VLANs on this network, creating 3 different broadcast domains. The Trunk itself is used to carry information for all 3 of these VLANs, and the trunk itself is not considered to reside in a broadcast domain.

Evaluate the characteristics of routing protocols (43 questions)

QUESTION NO: 1

Part of the job as a network administrator is being able to make a distinction between routed protocols and routing protocols.

Which of the following statements is true regarding them? (Choose all that apply)

- A. A routing protocol is assigned to an interface and determines the method of packet delivery.
- B. A routed protocol is assigned to an interface and determines the method of packet delivery.
- C. A routing protocol determines the path of a packet through a network.
- D. A routed protocol determines the path of a packet through a network.
- E. A routing protocol operates at the transport layer of the OSI model.
- F. A routed protocol updates the routing table of a router.

Answer: B, C

Explanation:

A routing protocol learns routes and puts those routes in a routing table. Examples of routing protocols are EIGRP, OSPF, and BGP.

A routed protocol is the type of packet forwarded, or routed, through a network. Examples of routed protocols include IP, IPX, and Appletalk.

Incorrect Answers:

- A. Routing protocols are assigned to routers. This answer correctly describes a routed protocol.
- D. This describes the function of a routing protocol.
- E. Routing protocols operate at layer 3, which is the network layer, of the OSI model.
- F. This is a function of a routing protocol.

QUESTION NO: 2

Which one of the routing protocol below does NOT use a distance vector algorithm to calculate a route to a given destination? (Select all that apply)

- A. RIP
- B. IPX RIP
- C. IGRP
- D. OSPF
- E. IS-IS

Answer: D

Explanation:

Only OSPF and IS-IS are true link-state routing protocols. The other choices are distance-vector routing protocols.

QUESTION NO: 3

Non-contiguous networks can pose a problem for network reachability in certain circumstances. Which of the following routing protocols have means of minimizing the risk? (Select three choices)

- A. RIP v1
- B. RIP v2
- C. EIGRP
- D. IGRP
- E. OSPF
- F. VLSM

Answer: B, C, E

Explanation:

OSPF, RIP version 2, and EIGRP all provide support for discontinuous networks. This is provided by the fact that subnet mask information is advertised along with the routes, and these protocols all support Variable Length Subnet Masks (VLSM).

Incorrect Answers:

A. Whenever RIP version 1 advertises a network across a different major net boundary, RIP summarizes the advertised network at the major net boundary. RIP version 2 is an updated version of RIP, and one of the main features that it was able to provide over RIPv1 is support for VLSM information.

D. IGRP does not support VLSM. Like RIP version 2, EIGRP is the updated version of IGRP, which provides support for VLSM.

F. VLSM is the feature that is required to support non-contiguous networks, but VLSM is not itself a routing protocol.

QUESTION NO: 4

Study the exhibit below regarding various routing protocols and their characteristics:

Select these	Place RIP Version 1 characteristics here
has a default administrative distance of 100	place here
has a default administrative distance of 110	place here
has a default administrative distance of 120	place here
has a maximum hop count of 15	Place IGRP characteristics here
has a maximum hop count of 224	place here
has a maximum hop count of 255	place here
use hop count to determine best path	Place EIGRP characteristics here
uses DUAL algorithm	place here
uses SPF algorithm	place here
supports classless routing	place here

Move the correct statements on the left to its associated routing protocol on the right side. (Note: Not all choices will be used)

Answer:

Select these	Place RIP Version 1 characteristics here
has a default administrative distance of 110	<div>use hop count to determine best path</div> <div>has a maximum hop count of 15</div> <div>has a default administrative distance of 120</div>
has a maximum hop count of 15	Place IGRP characteristics here
	<div>has a maximum hop count of 255</div> <div>has a default administrative distance of 100</div>
	Place EIGRP characteristics here
uses SPF algorithm	<div>uses DUAL algorithm</div> <div>supports classless routing</div> <div>has a maximum hop count of 224</div>

Explanation:

Enhanced IGRP (EIGRP)

It is a classless, enhanced distance-vector, Cisco proprietary protocol. Like IGRP, EIGRP uses the concept of an autonomous system to describe the set of contiguous routers that run the same routing protocol and share routing information. But unlike IGRP, EIGRP includes the subnet mask in its route updates. The advertisement of subnet information allows us to use VLSM and summarization when designing our networks.

EIGRP is sometimes referred to as a hybrid routing protocol because it has characteristics of both distance-vector and link-state protocols.

EIGRP has a maximum hop count of 224.

EIGRP supports two types of routes:

Internal EIGRP route: These are routes originated within a specific autonomous system by EIGRP routers that are members of the same autonomous system. The administrative distance of an internal EIGRP route is 90.

External EIGRP route: These routes appear within EIGRP routing tables due to either manual or automatic redistribution, and they represent networks that originated outside of the EIGRP autonomous system. The administrative distance of an external EIGRP route is 170.

Reference: Todd Lammle, CCNA Study Guide 4th Edition, Sybex Inc. 2004, Page 266 & 270.

EIGRP Metric

EIGRP metric is different than that of IGRP by a factor of 256 because of the metric field size: IGRP uses only 24 bits in its update packet for the metric field, whereas EIGRP uses 32 bits in its update packet for the metric field. The difference of 8 bits requires the IGRP metric to be multiplied by 256 to obtain the EIGRP metric.

Reference: Troubleshooting IP Routing Protocols, Cisco Press, ISBN 1-58705-019-6,

QUESTION NO: 5

Which of the following technologies can be used in distance vector routing protocols to prevent routing loops? (Select all valid answer choices)

- A. Spanning Tree Protocol
- B. Shortest path first tree
- C. Link-state advertisements (LSA)
- D. Hold-down timers
- E. Split horizon
- F. VRRP

Answer: D, E

Explanation:

In order to prevent information from looping throughout a network, distance vector protocols use the following mechanisms:

- **Split horizon** – the routing protocol advertises routes out an interface only if they were not learned from updates entering that interface.

- **Hold-down timer** – After finding out that a router to a subnet has failed, a router waits a certain period of time before believing any other routing information about that subnet.

In addition to these, a finite number of hops are also used. This ensures that packets do not loop through a network indefinitely.

Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 154.

QUESTION NO: 6

Which of the following routing protocols are less likely prone to problems in non contiguous networks? (Select all valid responses)

- A. IGRP
- B. ICMP
- C. OSPF
- D. RIP v1
- E. RIP v2
- F. EIGRP

Answer: C, E, F

Explanation:

OSPF, RIP v2, and EIGRP all support VLSM information, which will eliminate the problems that can arise from non contiguous networks.

Incorrect Answers:

A, D. IGRP and RIP version 1 are distance vector routing protocols that do not support VLSM information, so they are prone to problems that can arise from discontinuous network schemes.

B. ICMP (Internet Control Message Protocol) is not a routing protocol. It is used primarily for the management and monitoring of networks.

QUESTION NO: 7

Which of the following statements describe the characteristic of link state routing protocols? (Choose all that apply.)

- A. The exchange of an advertisement is triggered by a change in the network.
- B. All routers exchange routing tables with each other in a multipoint network.
- C. Packets are routed based upon the shortest path to the destination.
- D. Paths are chosen depending on the cost efficiency factor.
- E. Every router in an OSPF area is capable of representing the entire network topology.

- F. Only the designated router in an OSPF area can represent the entire network topology.

Answer: A, C, E

Explanation:

The predominant link state routing protocols are OSPF and IS-IS. The following describes the features and functionality of OSPF:

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 route 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 happen all at once, so the overhead is minimal.
- Uses cost for the metric.

Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 417

QUESTION NO: 8

In EIGRP, what kind of route information is stored in RAM and maintained by way of hello packets and update packets? (Select two answer choices)

- A. Neighbor Table
- B. SRF Table
- C. RTP Table
- D. Topology Table
- E. Query Table
- F. Dual Table

Answer: A, D

Explanation:

In EIGRP the only two tables of significance are the neighbor table and the topology table.

Reference: Sybex CCNA StudyGuide edition 4, Page 271.

QUESTION NO: 9

What is the maximum number of hops OSPF allows before it deems a network unreachable?

- A. 15
- B. 16
- C. 99
- D. 255
- E. Unlimited

Answer: E

OSPF is a link state protocol. Link state protocols do not use hops to mark networks as unreachable. Instead OSPF implements a steady state operation to its adjacent neighbors by sending and receiving small Hello packets periodically. When an OSPF router does not receive a Hello packet for a specified time period, it assumes that the neighbor is down. The router then runs the SPF algorithm to calculate new routes.

Reference:

TestKing 640-801 Study Guide, Section 5.2 “Steady State Operation”.

Incorrect Answers:

- A. This is the maximum number of hops that a RIP network could use before the route is deemed unreachable.
- B. When a RIP routes receives a routing update for a route that shows a hop count of 16, the route is considered to be unreachable. RIP routers use this to prevent packets from looping through the network indefinitely, but OSPF routers do not.

QUESTION NO: 10

On the topic of the OSPF hello protocol; which of the statements below are true? (Select two answer choices)

- A. The OSPF Hello protocol provides dynamic neighbor discovery.
- B. The OSPF Hello protocol detects unreachable neighbors in 90 second intervals.
- C. The OSPF Hello protocol maintains neighbor relationships.

- D. The OSPF Hello protocol negotiates correctness parameters between neighboring interfaces.
- E. The OSPF Hello protocol uses timers to elect the router with the fastest links at the designated router.
- F. The OSPF Hello protocol broadcast hello packets throughout the internetwork to discover all routers that are running OSPF.

Answer: A, C

Explanation:

The Hello Packet

OSPF contains a protocol (the Hello protocol) that is used to establish and maintain relationships between neighboring nodes. These relationships are called adjacencies. Adjacencies are the basis for the exchange of routing data in OSPF.

It is through the use of this protocol, and packet type, that an OSPF node discovers the other OSPF nodes in its area. Its name is intentionally significant; the Hello protocol establishes communications between potential neighboring routers. The Hello protocol uses a special subpacket structure that is appended to the standard 24-octet OSPF header. Together, these structures form a hello packet.

All routers in an OSPF network must adhere to certain conventions that must be uniform throughout the network. These conventions include the following:

- The network mask
- The interval at which hello packets will be broadcast (the hello interval)
- The amount of time that must elapse before a non responding router will be declared dead (that is, the router dead interval) by the other routers in the network
- All routers in an OSPF network must agree to use the same value for each of these parameters; otherwise, the network might not operate properly. These parameters are exchanged using hello packets. Together, they comprise the basis for neighborly communications. **They ensure that neighbor relationships (known as adjacencies) are not formed between routers in different subnets and that all members of the network agree on how frequently to stay in contact with each other.**

The hello packet also includes a listing of other routers (using their unique router IDs) that the source router has recently been in contact with. **This field, the Neighbor field, facilitates the neighbor discovery process.** The hello packet also contains several other fields such as Designated Router and Backup Designated Router. **These fields are useful in maintaining adjacencies** and support the operation of the OSPF network in both periods of stability and convergence.

QUESTION NO: 11

A routing table contains static, RIP, and IGRP routes destined to the same network and network mask; with each set to its default administrative distance. Which route will it take?

- A. The RIP route
- B. The static route
- C. The IGRP route
- D. All three with a round robin load balancing technique.

Answer: B

Explanation:

To decide which route to use, IOS uses a concept called Administrative Distance. Administrative distance is a number that denotes how believable an entire routing protocol is on a single router. The lower the number, the better, or more believable the routing protocol.

Route Type	Administrative Distance
• Static	1
• IGRP	100
• RIP	120

Reference:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 177

QUESTION NO: 12

You are an administrator and you've just configured OSPF on a router with both physical and logical interfaces. Which of the following factors determine the router ID?

- A. The lowest network number of any interface.
- B. The highest network number of any interface.
- C. The highest IP address of any logical interface.
- D. The middle IP address of any logical interface.
- E. The lowest IP address of any physical interface.
- F. The highest IP address of any physical interface.
- G. The lowest IP address of any logical interface.

Answer: F

Explanation:

The OSPF topology database includes information about routers and the subnets, or links, to which they are attached. To identify the routers in the neighbor table's topology

database, OSPF uses a router ID (RID) for each router. A router's OSPF RID is that router's highest IP address on a physical interface when OSPF starts running.

Note: The OSPF router ID is a 32-bit IP address selected at the beginning of the OSPF process. The highest IP address configured on the router is the router ID. If a loopback address is configured, then it is the router ID. In case of multiple loopback addresses, the highest loopback address is the router ID. Once the router ID is elected it doesn't change unless the IP address is removed or OSPF restarts.

Reference: CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 208

QUESTION NO: 13

Under which network type circumstance would an OSPF router establish router adjacencies while not performing the DR/BDR election process?

- A. Point-to-point
- B. Broadcast
- C. Non-broadcast multi-access
- D. Backbone area 0
- E. None of the above

Answer: A

Explanation:

If there's a point to point connection, there's no need for a designated router or a backup designated router election since only two routers can exist on a point to point network segment.

Incorrect Answers:

B, C. All OSPF routers in a broadcast and non-broadcast multi-access network go through the DR and BDR election process.

D. The backbone area is not a network type, but a collection of OSPF networks links. Area 0 is reserved as the backbone area, and routers within area 0 may or may not go through the DR/BDR election process, depending on the network type.

QUESTION NO: 14

On the assumption that every OSPF router in a particular area is configured with the same priority value; which secondary value would be used as a router ID when there is no loopback interface set?

- A. The IP address of the first Fast Ethernet interface.
- B. The IP address of the console management interface.
- C. The highest IP address among its active interfaces.
- D. The lowest IP address among its active interfaces.

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- E. The priority value until a loopback interface is configured.

Answer: C

Explanation:

Ordinarily the loopback interface would be selected as the router ID, but since there is no loopback interface set, the router ID will be the IP address of the first active interface. If by chance that particular interface has more than one IP address, then the highest address will be selected as the Router ID in theory. In practice, the first interface to come up in an OSPF router will become the router ID, since the election process is non-preemptive.

QUESTION NO: 15

What are the different characteristics of distance vector and link state routing protocols?

- A. Distance vector protocols send the entire routing table to directly connected neighbors.
- B. Distance vector protocols are responsible for sending updates to all networks listed in the routing table.
- C. Link state protocols are responsible for sending the entire routing table to the whole network.
- D. Link state protocols send updates regarding their own links status to all other routers on the network.
- E. None of the above

Answer: A, D

Explanation:

Distance Vector Protocols:

Distance Vector Protocols advertise routing information by sending messages, called routing updates, out the interfaces on a router. These updates contain a series of entries, with each entry representing a subnet and a metric.

Link-State Protocols:

Sends partial updates when link status changes and floods full updates every 30 minutes. The flooding, however, does not happen all at once, so the overhead is minimal.

Reference: CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-094-5) Page 413 + 419

QUESTION NO: 16

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:

OSPF 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 NO: 17

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 NO: 18

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 route 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 happen all at once, so the overhead is 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 NO: 19

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:

OSPF 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 NO: 20

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 NO: 21

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 NO: 22

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 NO: 23

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 than 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 NO: 24

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 NO: 25

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 NO: 26

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 NO: 27

The Testking 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 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 NO: 28

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 NO: 29

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 NO: 30

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 from 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 NO: 31

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

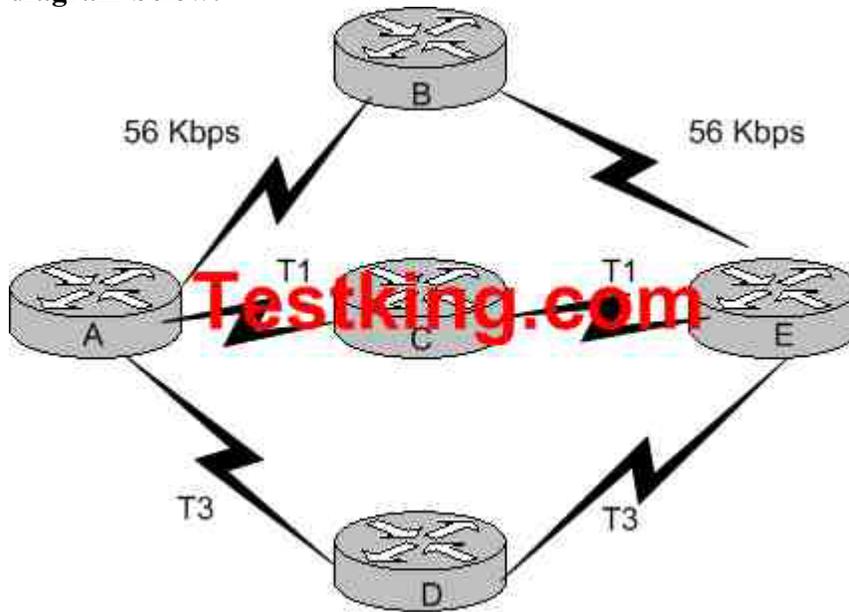
- A. There is no such requirement
- C. This is not a feature of split horizon

- 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 NO: 32

The Testking 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 NO: 33

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 mask information, support VLSM, and are classless or classful.

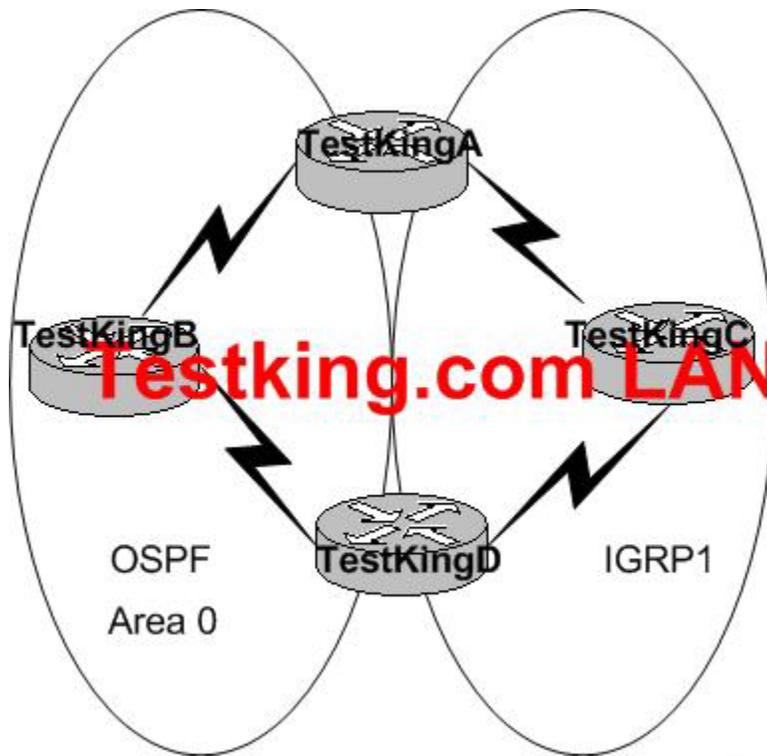
Table 7-3 Interior IP Routing Protocol: Classless or Classful?

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 NO: 34

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



In the Testking 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 TestKing A take to get to router TestKing D?

- A. It will take the route via TestKingB.
- B. It will take the route via TestKingC.
- 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 NO: 35

The following exhibit shows the router topology for the TestKing 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 all valid answer choices)

- A. TestKing4 exchanges directly with TestKing3.
- B. TestKing4 exchanges directly with TestKing2.
- C. TestKing4 exchanges directly with TestKing1.
- D. TestKing1 exchanges directly with TestKing3.
- E. TestKing1 exchanges directly with TestKing2.
- F. TestKing1 exchanges directly with TestKing4.

Answer: A, D

Explanation:

RIP exchanges routing tables with their adjacent neighbors. Therefore, TestKing3 will exchange routes with TestKing1, TestKing2 and TestKing4. Similarly, TestKing1 will exchange routes with TestKing3; TestKing2 will exchange routes with TestKing3; and TestKing4 will exchange routes with TestKing3. 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 NO: 36

The Testking network is utilizing RIP as the IP routing protocol. Router TK1 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?

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- 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 TK1.

QUESTION NO: 37

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 NO: 38

The Testking 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/tk365/technologies_tech_note09186a0080094195.shtml

QUESTION NO: 39

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

area	Indicates that routers can discover link-state information	Place here
full state	A collection of routers and networks	Place here
designated router (DR)	The router responsible for route synchronization	Place here
exchange state	Indicates that routers should all have identical link state databases	Place here

Answer:

Indicates that routers can discover link-state information	full state
A collection of routers and networks	area
The router responsible for route synchronization	designated router (DR)
Indicates that routers should all have identical link state databases	exchange state

QUESTION NO: 40

The routers named Testking1 and Testking2 are both configured with RIP only. What will happen in the event of Testking1 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 NO: 41

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-to-point 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 NO: 42

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 they are stored in both.

QUESTION NO: 43

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.

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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/tk365/tk207/technologies_tech_note09186a0080093f07.shtml#feasible

Evaluate the TCP/IP communication process and its associated protocols (13 questions)

QUESTION NO: 1

Which of the protocols below use TCP at the transport layer? (Select all that apply)

- 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 NO: 2

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 NO: 3

Which one of the following protocols uses both UDP and TCP ports for the transport layer operation?

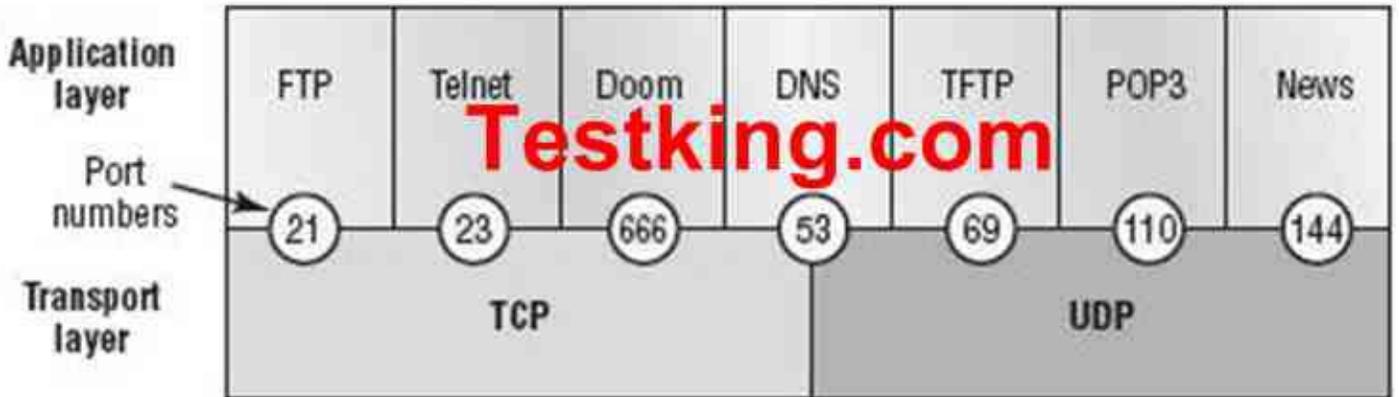
- A. FTP
- B. TFTP
- C. SMTP
- D. Telnet
- E. DNS

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 NO: 4

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 NO: 5

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.

Source port		Destination port	
Sequence number			
Acknowledgment number			
Data offset	Reserved	Flags	Window
Checksum		Urgent pointer	
Options (+ padding)			
Data (variable)			

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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.

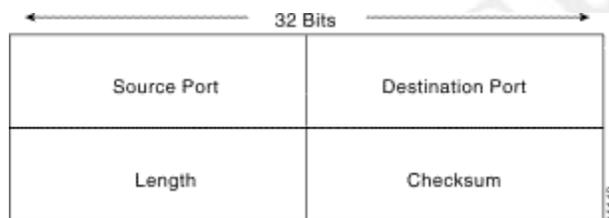
Unlike the TCP, UDP adds no reliability, flow-control, or error-recovery functions to IP. Because of UDP's simplicity, UDP headers contain fewer bytes and consume less network overhead than TCP.

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.



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 NO: 6

The corporate head office of TestKing 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 NO: 7

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 NO: 8

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 NO: 9

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.

DNS	Place here	21
FTP	Place here	23
Telnet	Place here	25
HTTP	Place here	53
SNMP	Place here	80
SMTP	Place here	161

Answer:

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FTP	21
Telnet	23
SNMP	161
DNS	53
HTTP	80
SMTP	25

QUESTION NO: 10

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 NO: 11

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.testking.com) to IP addresses. The IP address location of primary and secondary DNS resolver servers can be obtained for hosts using DHCP.

QUESTION NO: 12

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 NO: 13

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.

Describe the components of network devices (14 questions)

QUESTION NO: 1

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 NO: 2

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 NO: 3

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

QUESTION NO: 4

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 NO: 5

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 NO: 6

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 within 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 is 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 NO: 7

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 increase the number of collision 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 NO: 8

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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 NO: 9

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.

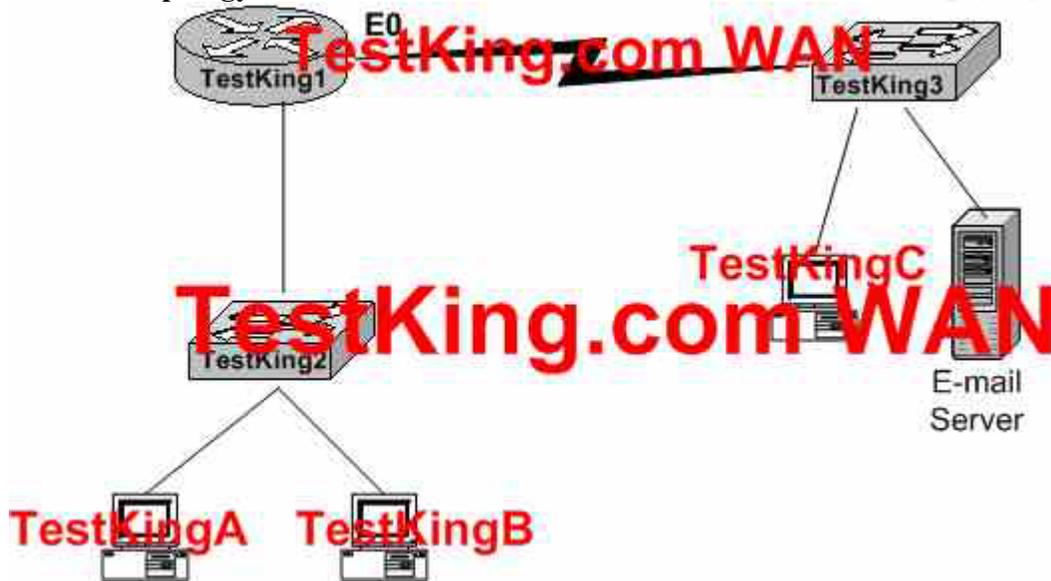
Switches are multiport bridges that allow you to create multiple broadcast domains. Each broadcast domain is like a distinct virtual bridge within a switch.

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 NO: 10

Network topology exhibit:



Which destination addresses will the computer TestKingA use to send data to the computer TestKingC? (Select two answer choices)

- A. The IP address of Switch TestKing2
- B. The MAC address of Switch TestKing2
- C. The IP address of TestKingC
- D. The MAC address of TestKingC
- E. The IP address of the router TestKing1's E0 interface.
- F. The Mac address of the router TestKing1's E0 interface.

Answer: C, F

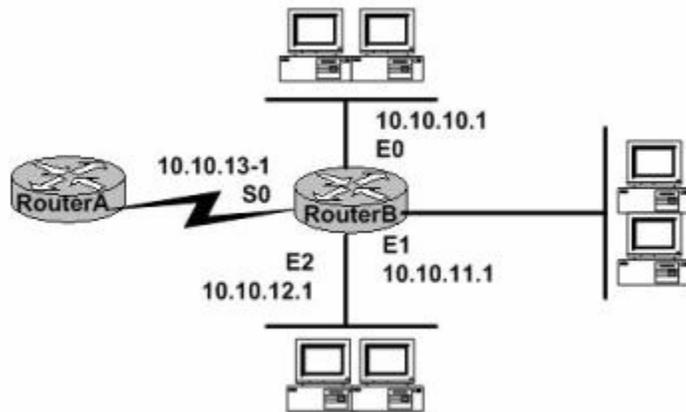
The correct answer should be destination IP address of the server. The source and destination IP address should not change throughout the duration of the data transmission. The destination MAC addresses belong to the nearest router for traffic that is destined to a host that is on a different network.

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 NO: 11

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 NO: 12

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 NO: 13

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 NO: 14

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 described 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.

Evaluate rules for packet control (11 questions)

QUESTION NO: 1

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

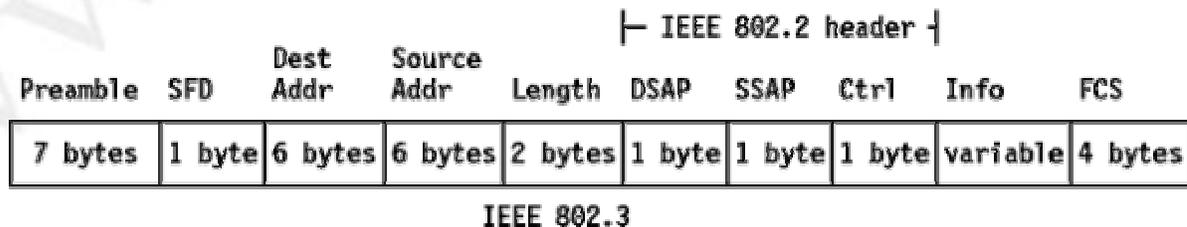
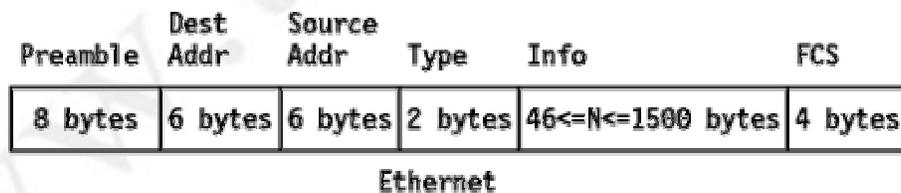
Explanation:

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.

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Reference: <http://www.auggy.mlnet.com/ibm/3376c28.html>

QUESTION NO: 2

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 NO: 3

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 circuit with 2 bearer channels and a single data channel. It has absolutely nothing to do with error correction in a data packet.

QUESTION NO: 4

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 case 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 NO: 5

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 NO: 6

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 NO: 7

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

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QUESTION NO: 8

Classify terms on the left hand side with their associated descriptions on the right hand side. (Not all of the answer choices are used)

Three-way handshake

PAR

Window

Sequencing

Ports

Place here	Provides reliability by requiring that the recipient acknowledges receipt of a group of segments before a timer expires.
------------	--

Place here	Initiates communication by establishing an initial sequence number and window size.
------------	---

Place here	The amount of data that can be sent before an acknowledgement is required.
------------	--

Place here	Allows multiple communications to the same host.
------------	--

Answer:

PAR

Three-way handshake	Provides reliability by requiring that the recipient acknowledges receipt of a group of segments before a timer expires.
Sequencing	Initiates communication by establishing an initial sequence number and window size.
Window	The amount of data that can be sent before an acknowledgement is required.
Ports	Allows multiple communications to the same host.

QUESTION NO: 9

The command “ip route 192.168.24.64 255.255.255.192 192.168.8.2 100” was configured on a router named TK1. 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 TK1 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 TK1 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 TK1.

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 NO: 10

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 NO: 11

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Three different Testking 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.

Evaluate key characteristics of WANs (18 questions)

QUESTION NO: 1

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 NO: 2

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 NO: 3

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 than 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 of 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 NO: 4

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 NO: 5

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 NO: 6

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. TK1(config-if)# encapsulation hdlc ansi
- B. TK1(config-if)# encapsulation ppp
- C. TK1(config-if)# encapsulation LAPD
- D. TK1(config-if)# encapsulation frame-relay ietf
- E. TK1(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 NO: 7

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 NO: 8

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.

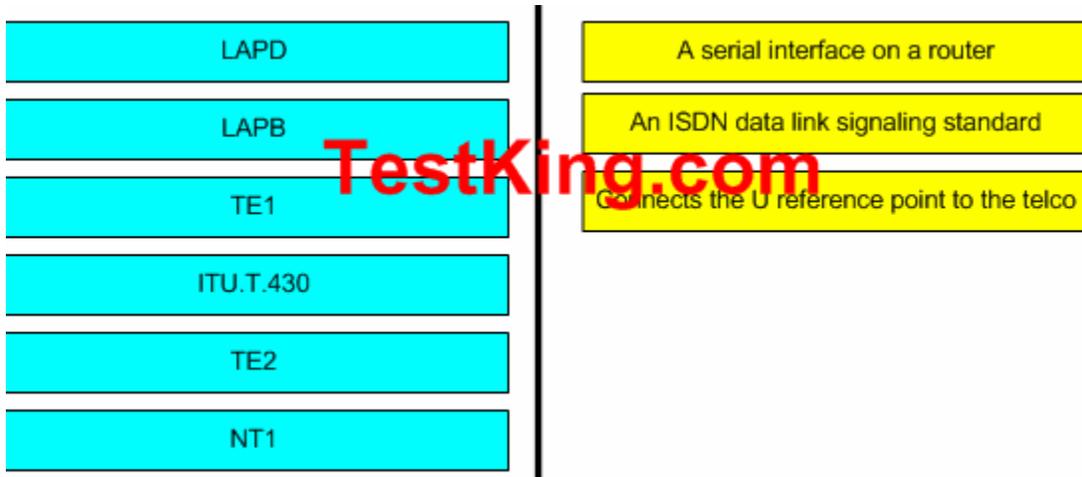
References:

CCNA Self-Study CCNA ICND exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Pages 308-317

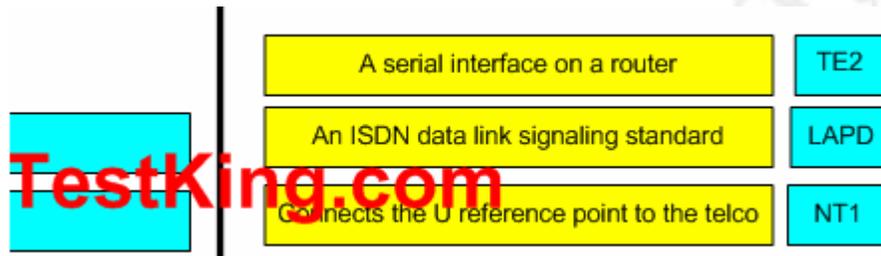
CCNA Self-Study CCNA INTRO exam certification Guide (Cisco Press, ISBN 1-58720-083-X) Page 101-103

QUESTION NO: 9

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)



Answer:



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 NO: 10

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 NO: 11

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 NO: 12

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 NO: 13

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 NO: 14

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.

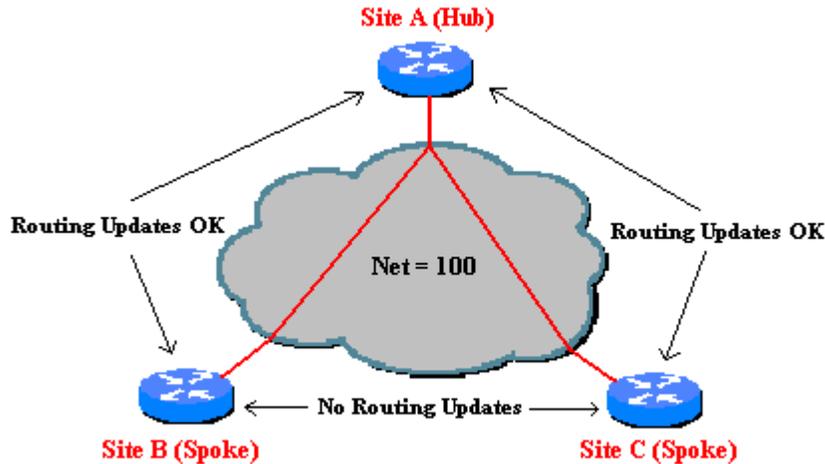


Figure 2: Split-horizon does not allow remote sites to send routing updates to each other.

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 NO: 15

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 NO: 16

The Testking Frame Relay network is displayed below:



In regard to router TestKing1; what is the function of the Frame Relay DLCI?

- A. Defines the signaling standard between TestKing1 and TestKing2.
- B. Classifies the encapsulation used between TestKing1 and TestKing2.
- C. Identifies the circuit between TestKing2 and the frame switch.
- D. Classifies the circuit between TestKing1 and TestKing2.
- E. Defines the signaling standard between TestKing1 and the frame switch.

Answer: C

Explanation:

TestKing1 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 TestKing2. The TestKing2's local switch forwards the frame out of the access link to TestKing2. 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 NO: 17

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 Relay 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 NO: 18

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:

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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.

MIXED QUESTIONS (76 questions)

QUESTION NO: 1

Which of the following are true regarding a network with a subnet mask of 255.255.248.0. Choose three

- A. It corresponds to a Class A address with 13 bits borrowed.
- B. It corresponds to a Class B address with 4 bits borrowed.
- C. The network address of the last subnet will have 248 in the 3rd octet.
- D. The first 21 bits make the host portion of the address.
- E. This subnet mask allows for 16 total subnets to be created.
- F. The subnetwork numbers will be in multiples of 8.

Answer: A, C, F

QUESTION NO: 2

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 NO: 3

A TestKing.com technician is troubleshooting connectivity problems between two routers that are directly connected through the serial line. The technician notices that the serial line is up but cannot see any neighbors displayed in the output of the show cdp neighbors command.

In which OSI layer is the problem most likely occurring?

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

Answer: B

Explanation:

As the question states that serial line is up, it means the problem is not on the Network layer. The administrator cannot see any output by issuing the show cdp neighbors command. It means that CDP is disabled and CDP is a protocol that runs over Layer 2 (the data link layer) on all Cisco routers, bridges, access servers, and switches.

QUESTION NO: 4

Network topology exhibit



In the exhibit a part of the TestKing.com is displayed. Notice the TestKing1 Switch and the TestKing2 hub.

Which of the devices shown can transmit simultaneously without causing collisions?

- A. All hosts
- B. Only hosts attached to the switch
- C. All hosts attached to the hub and one host attached to the switch
- D. All hosts attached to the switch and one host attached to the hub

Answer: B

Explanation:

As we know switch is the device which avoids collisions. When two computers communicate through a switch they make their own collision domain. So, there is no chance of collisions. Whenever a hub is included, it supports on half duplex communication and works on the phenomena of CSMA/CD so, there is always a chance of collision.

QUESTION NO: 5

Which is the correct fallback sequence for loading the Cisco IOS?

- A. ROM, Flash, NVRAM
- B. ROM, TFTP server, Flash
- C. Flash, TFTP server ROM
- D. Flash NVRAM, RAM

Answer: C

QUESTION NO: 6

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 NO: 7**Exhibit**

Source Port	Destination Port	Sequence Number	Acknowledgement 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 a 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.

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QUESTION NO: 8

Exhibit

TestKingC(config)# enable password testking1
TestKingC(config)# enable secret testking2
TestKingC(config)# line vty 0 4
TestKingC(config-line)# password testking3
TestKingC(config-line)# exit
TestKingC(config)# no enable testking2

A TestKing.com technician is connected to the router console port. After configuring the commands displayed in the exhibit, the technician log out and then logs back in at the console. Which password does the technician need to enter at the router prompt get back into the privileged EXEC mode?

- A. testking1
- B. testking2
- C. testking3
- D. A password would not be required.

Answer: B

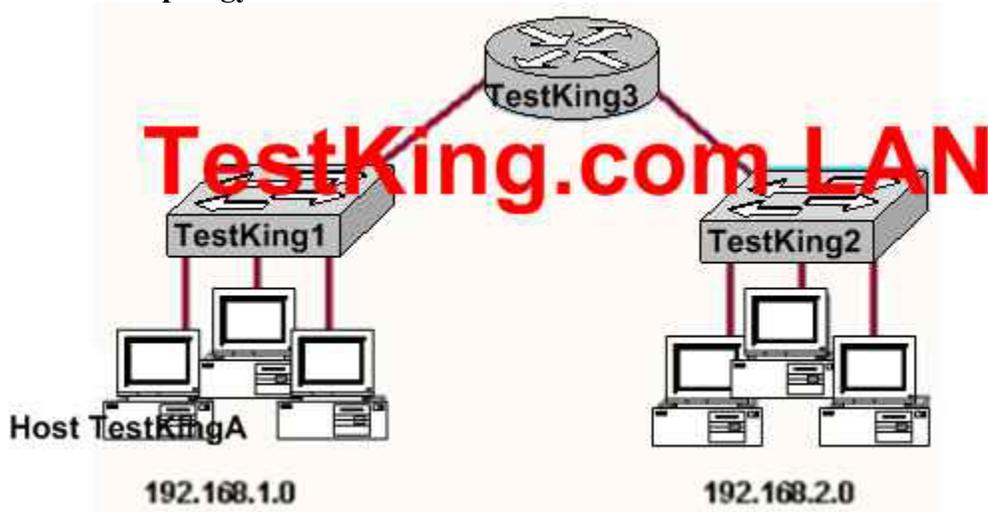
Explanation:

TestKing2 is the answer because the enable secret password is used to log back to the router. The enable password is used. The enable secret password always overwrites the enable password.

Answer c is incorrect because its for the vty

QUESTION NO: 9

Network topology exhibit



Study the network topology exhibit carefully, in particular the two switches TestKing1, TestKing2, and the router TestKing3.

Which statements are true in this scenario? Select two.

- A. All the devices in both networks will receive a broadcast to 255.255.255.255 sent by host TestKingA.
- B. Only the devices in network 192.168.1.0 will a broadcast to 255.255.255.255 sent by host TestKingA.
- C. All the devices on both networks are members of the same collision domain.
- D. The hosts on the 192.168.1.0 network form one collision domain, and the hosts on the 192.168.2.0 network form a second collision domain.
- E. Each host is in a separate collision domain.

Answer: B, D

QUESTION NO: 10**Drag and drop.**

Your TestKing.com boss asks you to match the descriptions to the corresponding router modes.

Router mode	Place description here
User EXEC mode	Place here
priveleged EXEC mode	Place here
Global configuration mode	Place here
specific configuration mode	Place here
Setup mode	Place here

Descriptions, select from these

Interactive configuration dialog
Provides access to all other router commands
Commands that affect interfaces/processes only
Commands that affect the entire system
Limited to basic monitoring commands

Answer:

Your TestKing.com boss asks you to match the descriptions to the corresponding router modes.

Router mode	Place description here
User EXEC mode	Place here
privileged EXEC mode	Place here
Global configuration mode	Place here
specific configuration mode	Place here
Setup mode	Place here

Descriptions, select from these

Interactive configuration dialog
Provides access to all other router commands
Commands that affect interfaces/processes only
Commands that affect the entire system
Limited to basic monitoring commands

QUESTION NO: 11

Which type of cable should be used to make a connection between the Fa0/0 port on a router and the Fa0/0 port switch?

- A. Rollover cable
- B. Console cable
- C. Crossover cable
- D. Straight-through cable
- E. Serial cable

Answer: D

Explanation:

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The Fast Ethernet ports on a switch and router are both RJ-45 ports. It means we have same devices at both ends. To connect similar devices we use a crossover cable.

QUESTION NO: 12

What components are required to *directly* connect two PCs so they are able to participate in a simple peer-to-peer network? Choose three

- A. Straight-through cable
- B. Compatible network interfaces
- C. Networking protocol
- D. Hub
- E. Crossover cable
- F. router

Answer: B, C, E

Explanation:

This cable can be used to directly connect two computers to each other without the use of a hub or switch.

Crossover cables are terminated with CAT 5 RJ-45 (RJ stands for "Registered Jack") modular plugs. RJ-45 plugs are similar to those you'll see on the end of your telephone cable except they have eight versus four contacts on the end of the plug. Also, make sure the ends you select are rated for CAT 5 wiring.

QUESTION NO: 13

The TestKing.com administrator has made changes to the router configuration but cannot remember if those changes were saved.

Which of the following commands allows the administrator to see the configuration that will load when the router is restarted?

- A. TestKingC# **show memory**
- B. TestKingC# **show startup-config**
- C. TestKingC# **show running-config**
- D. TestKingC# **show restart**

Answer: B

Explanation:

Show startup-config command displays the contents of the NVRAM. When we reload a router, it loads the configuration from NVRAM. So, the administrator can check from the show startup-config command whether he has saved the temporary configurations from Running-config (RAM) to Startup-config (NVRAM).

QUESTION NO: 14

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 NO: 15
Network topology exhibit



Host TestKingA needs to communicate with the e-mail server shown in the exhibit.
 What address will be placed on the destination address field of the frame when it leaves host TestKingA?

- A. The MAC address of TestKingA
- B. The MAC address of switch TestKing1
- C. The MAC address of the E0 interface of the TestKing3 router.
- D. The MAC address of the E1 interface of the TestKing3 router.
- E. The MAC address of switch TestKing2
- F. The MAC address of the email server

Answer: C

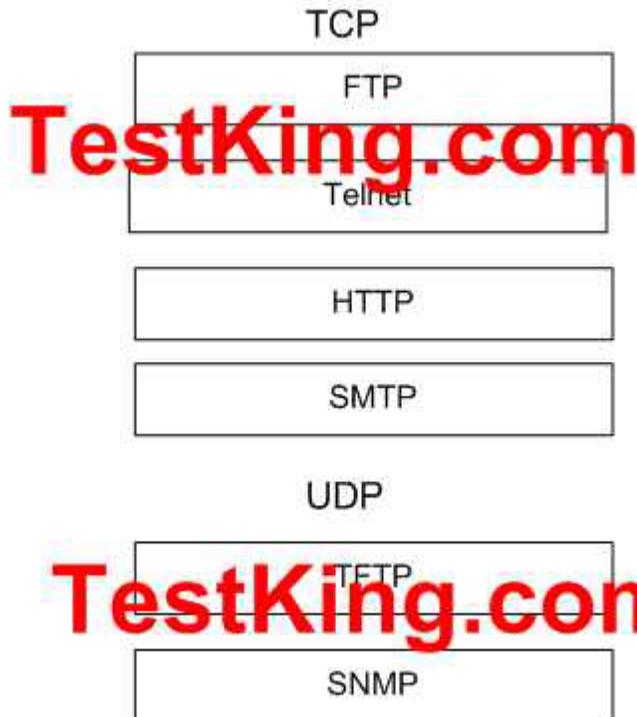
QUESTION NO: 16

Drag and drop.

Your TestKing.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
HTTP	Place here
	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 NO: 17

Which of the following IP addresses is a private IP address?

- A. 12.0.0.1
- B. 168.172.19.39
- C. 172.20.14.36
- D. 172.33.194.30
- E. 192.168.42.34

Answer: E

QUESTION NO: 18

WAN data link encapsulation types include which of the following? Choose two

- A. T1
- B. Frame Relay
- C. DSL
- D. PPP
- E. ISDN

Answer: B, D

Frame relay and PPP is used with WAN encapsulation.

Frame Relay most closely compares to the OSI data link layer (Layer 2). If you remember that the word "frame" describes the data link layer protocol data unit (PDU), it will be easy to remember that Frame Relay relates to OSI Layer 2. Like other data-link protocols, Frame Relay can be used to deliver packets (Layer 3 PDUs) between routers.

QUESTION NO: 19

What is the subnetwork address for a host with the IP address 201.100.5.68/28?

- A. 201.100.5.0
- B. 201.100.5.32
- C. 201.100.5.64
- D. 201.100.5.65
- E. 201.100.5.31
- F. 201.100.5.1

Answer: C

This is a C ip with a subnet mask of 255.255.255.240
the host 201.100.5.68/28 belong to the second subnet which is 201.100.5.64
this is determined by doing the following

subnets? $2^4 - 2 = 14$

hosts? $2^4 - 2 = 14$

valid subnet range? $256 - 240 = 16$

$16 + 16 = 32, 16 + 32 = 48, 16 + 48 = 64, 64 + 16 = 80$ and so as you can see the ip
201.100.5.68 belongs to the second subnet which is .64

QUESTION NO: 20

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Which commands are required to properly configure a router to run OSPF and to add network 192.168.16.0/24 to OSPF area 0? Select two

- A. TestKingRouter(config)# **router ospf 0**
- B. TestKingRouter(config)# **router ospf 1**
- C. TestKingRouter(config)# **router ospf area 0**
- D. TestKingRouter(config)# **network 192.168.16.0 0.0.0.255 0**
- E. TestKingRouter(config)# **network 192.168.16.0 0.0.0.255 area 0**
- F. TestKingRouter(config)# **network 192.168.16.0 255.255.255.0 area 0**

Answer: B, E

ospf do not use area 0

ospf range Cost is a metric value in the range 1-65535 ...

QUESTION NO: 21

Which router IOS commands can be used to troubleshoot LAN connectivity problems? Select three

- A. Ping
- B. Tracert
- C. Ipconfig
- D. Show ip route
- E. Winipcfg
- F. Show interfaces

Answer: A, D, F

QUESTION NO: 22

What is the purpose of Inverse ARP?

- A. To map a known IP address to a MAC address
- B. To map a known DLCI to a MAC address
- C. To map a known MAC address to an IP address
- D. To map a known DLCI address to a IP address
- E. To map a known IP address to a SPID address
- F. To map a known SPID address to a MAC address

Answer: D

Just as ARP resolves IP addresses to MAC addresses, Inverse ARP maps a known DLCI to an IP address.

Note: Do not mix up inverse ARP and reverse ARP. There is a Reverse ARP (RARP) for host machines that don't know their IP address. RARP enables them to request their IP address from the gateway's ARP cache.

QUESTION NO: 23

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 NO: 24

Which of the following IP addresses fall into the CIDR block of 115.54.4.0/22? Select three

- A. 115.54.8.32
- B. 115.54.7.64
- C. 115.54.6.255
- D. 115.54.3.32
- E. 115.54.5.128
- F. 115.54.12.128

Answer: B, C, E

Explanation :-

Given CIDR block of 115.54.4.0 /22:

subnet mask : 255.255.252.0

the IP addr range would be 115.54.4.1 to 115.54.7.254.

Therefore, 115.54.5.128 (E), 115.54.6.255 (C) and 115.54.7.64 (B) are correct.

QUESTION NO: 25

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

- A. The use of discontinuous 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

QUESTION NO: 26

Network topology exhibit



Routers TestKingB and TestKingC are configured for RIPv2 and have complete connectivity. Router TestKingA is added to the network. What is the most appropriate TestKingA configuration for full connectivity?

- A. TestKingA(config)# **router rip**
TestKingA(config)# **network 10.0.0.0**
TestKingA(config)# **network 172.16.0.0**
TestKingA(config)# **network 192.168.1.0**
- B. TestKingA(config)# **router rip**
TestKingA(config)# **network 10.0.0.0**
- C. TestKingA(config)# **router rip**
TestKingA(config)# **network 10.0.0.0**
TestKingA(config)# **network 172.16.0.0**
- D. TestKingA(config)# **router rip**
TestKingA(config)# **network 10.0.0.0**
TestKingA(config)# **network 192.168.1.0**

Answer: C

Explanation: When configuring RIP you configure only the directly connected networks that are to be advertised via the RIP routing process are to be configured.

Incorrect Answers:

- A. This choice implies that when configuring rip on a router every possible network in the entire system should be configured. This is not the case.
- B. Testking 1 requires the 172.16.0.0 network to be configured, not the 192.168.1.0 network.
- D. If the 172.16.0.0 network is omitted, then the other routers in the network will not be able to reach the LAN users of TestkingA via RIP.

QUESTION NO: 27

Exhibit

ip route 172.16.3.0 255.255.255.0 192.168.2***** (missing)

**Which of the following statements are true regarding the command in the exhibit?
Select two**

- A. The command is used to establish a static route.
- B. The default administrative distance is used.
- C. The command is used to configure the default route.
- D. The subnet mask for the source address is 255.255.255.0
- E. The command is used to establish a stub network

Answer: A, B

QUESTION NO: 28

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 NO: 29

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

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

Answer: C

Explanation :-

Given IP addr of 172.16.112.1 / 20,
subnet mask : 255.255.240.0
max. num of hosts = $((2^{12}) - 2) = 4096 - 2 = 4094$

QUESTION NO: 30

Which WAN protocol is used for out-of-band signaling?

- A. NCP
- B. HDLC
- C. LAPB
- D. LAPD

Answer: D

QUESTION NO: 31
Network topology Exhibit



You work as a network engineer at TestKing.com. The topology of the TestKing.com network is displayed in the exhibit. Host TestKing1 has established a connection with the HTTP server attached to interface E0 of the TestKingB router. Which of the following statements describe the information contained in protocol data units sent *from* host TestKing1 to this server? Select three

- A. The destination port number in a segment header will have a value of 80.
- B. The destination port number in a segment header will have a unique value greater than or equal to 1023.
- C. The destination address of a frame will be the MAC address of the HTTP server interface.
- D. The destination address of a frame will be the MAC address of the E0 interface of the TestKingA router.
- E. The destination IP address of a packet will be the IP address of the the E0 interface of the TestKingA router.

Answer: A, C, E

QUESTION NO: 32

Network topology Exhibit



You work as a network engineer at TestKing.com. The topology of the TestKing.com network is displayed in the exhibit. Which of the following are valid configuration values for the hosts? Select three

- A. Host TestKing1 IP address: 192.1.1.85
- B. Host TestKing1 subnet mask: 255.255.255.224
- C. Host TestKing2 IP address: 192.1.1.125
- D. Host TestKing2 default gateway: 192.1.1.85
- E. Host TestKing3 IP address: 192.1.1.166
- F. Host TestKing3 subnet mask: 255.255.255.224

Answer: A, C, F

Explanation:

The answers A and C are right, because the ip address 192.1.1.85 and 192.1.1.125 are in the same subnet 192.1.1.64 as the ip address of the subinterface 0/1.1.

The answer e is wrong, because the network address of the ip address 192.1.1.166 is 192.1.1.160.

QUESTION NO: 33**Network topology Exhibit**

```

TestKingA# show running-config
<some output text omitted>

interface serial0/0
 bandwidth 64
 ip address 172.16.100.2 255.255.255.0
 encapsulation frame-relay
 frame-relay map in 172.16.100.1 200 broadcast

```



You work as a network engineer at TestKing.com. The topology of the TestKing.com network is displayed in the exhibit. Router TestKingA is unable to reach router TestKingB. Both routes are running IOS version 12.0. After reviewing the command output and the network topology exhibit, what is the most likely cause of the problem?

- A. Incorrect bandwidth configuration
- B. Incorrect LMI configuration
- C. Incorrect map statement
- D. Incorrect IP address

Answer: C

Study the exhibit. The routers have been configured with wrong DLCI.

QUESTION NO: 34

You work as a network engineer at TestKing.com. You are required to allow establishment of a Telnet session with a router TestKingC. Which set command must be configured?

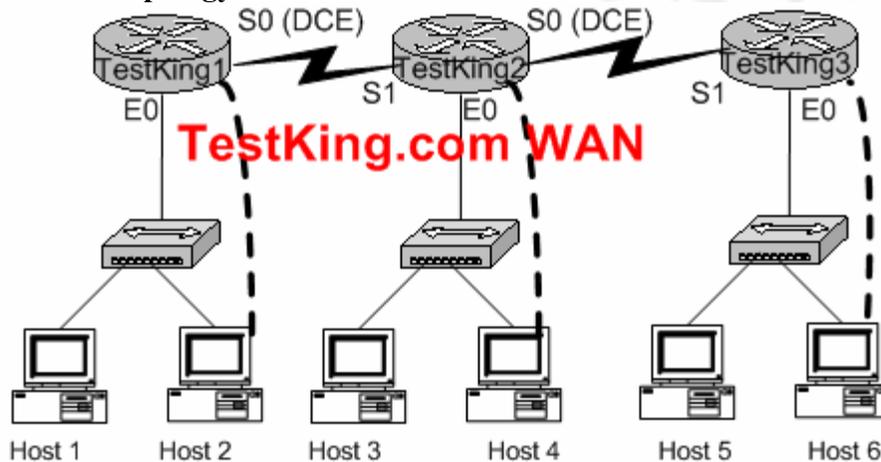
- A. TestKingC(config)# **line console 0**
TestKingC(config-line)# **enable password testking**
- B. TestKingC(config)# **line console 0**
TestKingC(config-line)# **enable secret testking**
TestKingC(config-line)# **login**
- C. TestKingC(config)# **line console 0**
TestKingC(config-line)# **password testking**
TestKingC(config-line)# **login**

- D. TestKingC(config)# line vty 0
TestKingC(config-line)# enable password testking
- E. TestKingC(config)# line vty 0
TestKingC(config-line)# enable secret testking
TestKingC(config-line)# login
- F. TestKingC(config)# line vty 0
TestKingC(config-line)# password testking
TestKingC(config-line)# login

Answer: F

QUESTION NO: 35

Network Topology Exhibit



You work as a network engineer at TestKing.com. Three TestKing stores have established network connectivity. The routers are named TestKing1, TestKing2, and TestKing3. The manager at the TestKing site, Tess King, has decided to deny the ability of anyone from any other network to connect to the TestKing3 router with the ping command. Implement an access list on the TestKing3 router to deny this detection but allow all other types of traffic to pass. The access list should contain no more than three statements. The routers have been configured with the following specifications:

- The routers are named TestKing1, TestKing2, and TestKing3.
- RIP is the routing protocol.
- Clocking signal is provided on the serial 0 interfaces.
- The password on each router is "testking".
- The subnet mask on all interfaces is the default mask.

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- The IP addresses are listed in the chart below.

TestKing1

E0 192.168.49.1
S0 192.168.51.1.

TestKing2

E0 192.168.53.1
S0 192.168.55.1
S1 192.168.51.2

TestKing3

E0 192.168.57.1
S1 192.168.55.2

To configure the router click on the host icon that is connected to a router by a serial console cable.

Answer:

Click on Host 6 to connect to and configure TestKing3.

```
configure terminal
access-list 101 deny icmp any 192.168.57.1 0.0.0.0
access-list 101 deny icmp any 192.168.55.2 0.0.0.0
access-list 101 permit ip any any
interface ethernet0
ip access-group 101 out
ctrl z
copy running-config startup-config
```

QUESTION NO: 36

Which of the following are benefits of VLANs? Choose three

- A. They increase the size of collision domains.
- B. They allow logical grouping of users by function.
- C. They can enhance network security,
- D. The increase the size of broadcast domains while decreasing the number of the broadcast domains.
- E. The increase the number of broadcast domains while decreasing the size of the broadcast domains.
- F. They simplify switch administration.

Answer: B, E, F

QUESTION NO: 37

Your boss at TestKing.com asks you to match the terms with the appropriate OSI layer. Not all options are used

Network Layer

Transport Layer

Place here

Place here

Place here

Place here

Place here

Place here

Terms, select from these

bits

IP addresses

windowing

packets

segments

routing

UDP

MAC addresses

switching

Answer:

Your boss at TestKing.com asks you to match the terms with the appropriate OSI layer. Not all options are used



Terms, select from these

**QUESTION NO: 38**

Which address represents a unicast address?

- A. 224.1.5.2
- B. FFFF.FFFF.FFFF.
- C. 192.168.24.59/30
- D. 255.255.255.255
- E. 172.31.128.255/18

Answer: E

Explanation :-

172.31.128.255 is the only unicast address. It seems to be a broadcast address, because of 255 in the last octett, the broadcast address for this network is 172.31.131.255.

Not A: 224.1.5.2 is a multicast address.

QUESTION NO: 39

You are the network administrator at TestKing. You apply the following access list on the E0 outbound interface connected to the 192.168.1.8/29 LAN:

```
access-list 21 deny tcp 192.168.1.8 0.0.0.7 eq 20 any
```

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access-list 21 deny tcp 192.168.1.8 0.0.0.7 eq 21 any

What will the effect of this access list be?

- A. All traffic will be allowed to out of E0 except FTP traffic.
- B. FTP traffic from 192.168.1.22 to any host will be blocked.
- C. FTP traffic from 192.168.1.9 to any host will be blocked.
- D. All traffic will be prevented from leaving E0.
- E. All FTP traffic to network 192.168.1.9/29 from any host will be blocked.

Answer: D

Explanation:

By default access list is having implicit deny statement at the end. In this example there is no permit statement, so it will deny all traffic exiting E0 Interface.

QUESTION NO: 40

You are a technician at TestKing. Your assistant applied an IP access control list to Router TK1. You want to check the placement and direction of the access control list.

Which command should you use?

- A. `show access-list`
- B. `show ip access-list`
- C. `show ip interface`
- D. `show interface`
- E. `show interface list`

Answer: A

Explanation:

To display the contents of current access lists, use the **show access-lists** command in privileged EXEC mode.

QUESTION NO: 41

With regard to bridges and switches, which of the following statements are true? (Choose all that apply.)

- A. Switches are primarily software based while bridges are hardware based.
- B. Both bridges and switches forward Layer 2 broadcasts.

- C. Bridges are faster than switches.
- D. Switches typically have a higher number of ports than bridges.
- E. Bridges define broadcast domain while switches define collision domains.
- F. Both bridges and switches make forwarding decisions based on Layer 2 addresses.

Answer: B D F

QUESTION NO: 42

You are the network administrator at TestKing. You need to perform password recovery on Router TK1.

What must you modify in the password recovery process? (Choose two.)

- A. Configuration register
- B. NVRAM
- C. Boot flash
- D. CMOS
- E. Flash

Answer: A, B

Explanation:

Recovering a Lost Password

This section describes how to recover a lost enable password and how to enter a new enable secret password.

Password recovery consists of the following major processes:

Determining the Configuration Register Value

- With this process, you determine the configuration of the router, so that you may restore the configuration after the password is recovered.

Resetting the Router

- With this process, you reconfigure the router to its initial startup configuration. You then display the enable password, if one is used.

Resetting the Password

- If you are using an enable secret password, you enter a new password with this process. You then restore the router to its prior configuration.

Resetting the Configuration Register Value

- If you are using an enable password, you use this process to restore the router to its prior configuration.

QUESTION NO: 43

You work as network consultant. Your customer, TestKing Inc, has a class C network license. TestKing wants you to subnet the network to provide a separate subnet for each of its 5 departments. Each subnet must support at least 24 hosts.

Which subnet mask should you use?
Which network mask should you use?

- A. 255.255.255.192
- B. 255.255.255.224
- C. 255.255.255.240
- D. 255.255.255.248
- E. 255.255.255.252
- F. 255.255.255.254

Answer: B

Explanation:

The default subnet mask for class C network is 255.255.255.0. If one has to create 5 subnets, then 3 bits are required. With 3 bits we can create 6 subnets. Remaining 5 bits are used for Hosts. One can create 30 hosts using 5 bits in host field. This matches with requirement.

QUESTION NO: 44

Your TestKing trainee Bob asks you what 11111001 binary is in decimal. What should you tell him?

- A. 6
- B. 193
- C. 225
- D. 241
- E. 249

Answer: E

Explanation:

$128 + 64 + 32 + 16 + 8 = 249$

QUESTION NO: 45

Exhibit

- 1) The IOS image in flash is missing

- 2) No Network connectivity is available.
- 3) The router fallback IOS image is corrupt.

How will a Cisco 2600 series router respond if the conditions listed in the exhibit exist during the boot process?

- A. The router will enter setup mode.
- B. The router will enter ROM monitor mode.
- C. The router will enter global configuration mode.
- D. The boot will hang until an IOS is available.

Answer: B

Explanation:

Cisco router can look for IOS in FLASH, TFTP server, and ROM. **The default option is to look for IOS only in FLASH, and in case the IOS in flash is corrupt, to look in ROM.**

You can add the following commands to the configuration file to make a router to look for IOS image in FLASH, then TFTP server, then in ROM:

```
boot system flash ios_filename  
boot system TFTP ios_filename TFTP_address  
boot system rom
```

These 3 lines in the configuration file will force the router to look for IOS in the FLASH first, then in TFTP server, and then in rom.

QUESTION NO: 46

Exhibit

```

TestKingC # show interfaces serial 0/0
Serial0/0 is administratively down, line protocol is down
Hardware is HD64570
Internet address is 192.168.100.1/24
MTU 1500 bytes, BW 1544 Kbit, DLY 20000 usec,
  reliability 255/255, txload 1/255, rxload 1/255
Encapsulation HDLC, loopback not set

```

The result of the show interfaces serial 0/0 command is displayed in the exhibit. What command should be executed to make this interface operational?

- A. TestKingC(config-if)# **enable**
- B. TestKingC(config-if)# **no keepalive**
- C. TestKingC(config-if)# **encapsulation ppp**
- D. TestKingC(config-if)# **no shutdown**
- E. TestKingC(config-if)# **clockrate 56000**
- F. TestKingC(config-if)# **line protocol up**

Answer: D

Explanation:

no shutdown

Enable the interface and the configuration changes you have just made on the interface.

Serial0 is administratively down, line protocol is up.

The possible causes for this state are

- The serial interface has been disabled with the **shutdown interface configuration command**.
- Different interfaces on the router are using the same IP address.

The following are some steps you can take to isolate the problem:

- Use the **show configuration** privileged EXEC command to display the serial port configuration. If "shutdown" is displayed after "interface Serial0," use the **no shutdown interface configuration command to enable the interface**.
- Use the **show interface** privileged EXEC command to display the IP addresses for all router interfaces. Use the **ip address interface configuration command** to assign unique IP addresses to the router interfaces.

QUESTION NO: 47

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Which command will reinitialize the router and totally replace the running configuration with the current startup configuration?

- A. TestKingB# reload
- B. TestKingB# copy tftp startup-config
- C. TestKingB# copy startup.-config running-config
- D. TestKingB# copy running-config flash
- E. TestKingB# setup

Answer: A

Explanation:

Enter the copy system:running-config nvram:startup-config command to save your configuration changes to your startup configuration so that they will not be lost if there is a system reload or power outage. For example:

```
Router# copy system:running-config nvram:startup-config
Building configuration...
```

It might take a minute or two to save the configuration. After the configuration has been saved, the following output appears:

```
[OK]
Router#
```

On most platforms, this task saves the configuration to NVRAM. On the Class A Flash file system platforms, this task saves the configuration to the location specified by the CONFIG_FILE environment variable. The CONFIG_FILE variable defaults to NVRAM.

QUESTION NO: 48

What is the maximum number of IP addresses that can be assigned to hosts on a local subnet that use the 255.255.255.224 subnet mask?

- A. 14
- B. 15
- C. 16
- D. 30
- E. 31
- F. 32

Answer: D

Explanation:

The subnet mask 255.255.255.224 means that there are 27 network bits. The remaining 5 bits are the host bits. The maximum possible combinations with 5 bits are $2^5 = 32$. As all zero's and all one's hosts are not allowed so, maximum number of valid hosts with the mask 255.255.255.224 are $2^5 - 2 = 32 - 2 = 30$ Hosts

QUESTION NO: 49

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

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

Answer: A, D

QUESTION NO: 50

Network topology exhibit



Which statements describe the interconnections displayed in the exhibit? Select two

- A. Traffic from host TestKing A to host TestKingD will be collision free.
- B. Traffic from host TestKing C to host TestKingG will be collision free.
- C. Traffic from host TestKing E to host TestKingG will be collision free.
- D. Host TestKingB can be connected at full duplex.
- E. Host TestKingF can be connected at full duplex.

Answer: A, D

QUESTION NO: 51

Network topology exhibit



A Cisco router TestKing2 and a Catalyst Switch TestKing switch are connected as shown in the exhibit. The TestKing.com technician is working on a computer that is connected to the management console of the switch. In order to configure the default gateway for the switch, the technician needs to learn the IP address of the attached router interface.

Which IOS command will provide this information in the absence of Layer 3 connectivity?

- A. `ping router_ip_address`
- B. `ping switchr_ip_address`
- C. `show ip rarp`

- D. show cdp neighbors detail
- E. show ip neighbors
- F. show dhcp-config

Answer: D

QUESTION NO: 52

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 NO: 53

Which IOS user EXEC command will allow a network technician to determine which router in the path to an unreachable network host should be examined more closely for the cause of the network failure?

- A. TestKingB> telnet
- B. TestKingB > ping
- C. TestKingB > trace
- D. TestKingB > show ip route
- E. TestKingB > show interface
- F. TestKingB > show cdp neighbors

Answer: Pending. Send your suggestion to feedback@testking.com

QUESTION NO: 54

Which router console commands are used to manage telnet sessions to other routers? Select three.

- A. TestKingD# **disconnect3**
- B. TestKingD# **exit session 2**
- C. TestKingD# **kill connection 1**
- D. TestKingD# **show sessions**
- E. TestKingD# **show connection all**
- F. TestKingD# **resume 4**

Answer: Pending. Send your suggestion to feedback@testking.com

QUESTION NO: 55

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

- A. application
- B. presentation
- C. session
- D. transport
- E. network
- F. data link
- G. physical

Answer: E

QUESTION NO: 56

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

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

Answer: B

QUESTION NO: 57

Which of the following are true of Ethernet technology?

- A. Hosts use a logical ring topology.
- B. Hosts use a logical bus topology
- C. Hosts must wait for an electronic signal to transfer data.
- D. Hosts are directly connected to a wiring concentrator called a MSAU.

Answer: B

QUESTION NO: 58

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 NO: 59

Which command can be used to determine the type of cable attached to the Serial 0/0 interface on a router?

- A. show interfaces serial 0/0
- B. show running-config
- C. show version

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- D. show controllers serial 0/0
- E. show ip interface
- F. show line serial 0/0

Answer: D

The **show controllers** command shows that the physical layer is working and what type of cable is connected. In the output below, Prasit is connected at the DCE end and Spicey at the DTE end.

```

prasit#
show controllers serial 0

HD unit 1, idb = 0xF22E4, driver structure at 0xF7778

buffer size 1524 HD unit 0 1, V.35 DCE cable, clockrate 64000

```

!--- Output suppressed.

QUESTION NO: 60

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: B

QUESTION NO: 61

Which Layer 1 devices can be used to enlarge the area covered by a single LAN segment? Select two

- A. Switch
- B. Router

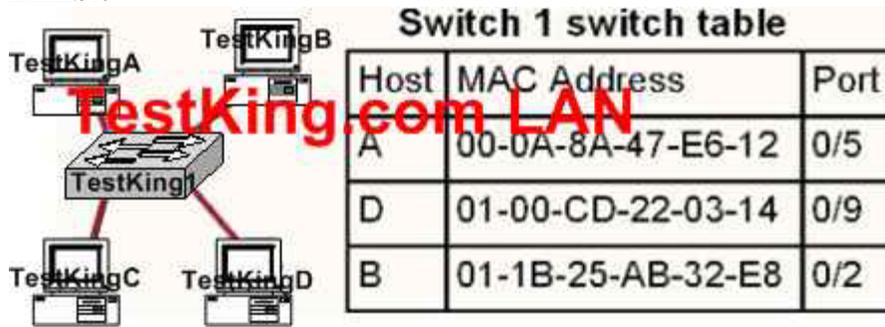
- C. NIC
- D. hub
- E. Repeater
- F. RJ-45 transceiver

Answer: D, E

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QUESTION NO: 62

Exhibit



Host TestKingB sends a frame to host TestKingC.
What will the switch do with the frame?

- A. Drop the frame
- B. Send the frame out all ports except port 0/2
- C. Return the frame to host TestKingB
- D. Send an ARP request for host TestKingC
- E. Send an ICMP Host Unreachable message to Host TestKing B
- F. Record the destination MAC address in the switching table and send the frame directly to Host TestKingC

Answer: B

An Ethernet switch appears to use the same logic as a transparent bridge. However, the internal logic of the switch is optimized for performing the basic function of choosing when to forward and when to filter a frame. Just as with a transparent bridge, the basic logic of a LAN switch is as follows:

Step 1 A frame is received.

Step 2 If the destination is a broadcast or multicast, forward on all ports.

Step 3 If the destination is a unicast and the address is not in the address table, forward on all ports.

Step 4 If the destination is a unicast and the address is in the address table, forward the frame out the associated port, unless the MAC address is associated with the incoming port.

QUESTION NO: 63

What information is supplied by CDP? Select three.

- A. Device identifiers
- B. Capabilities list
- C. Platform

- D. Route identifier
- E. Neighbour traffic data

Answer: A, B, C

Explanation:

CDP is a Cisco proprietary protocol; to support forwarding CDP messages over an interface, that interface must support SNAP headers. Any LAN interface, HDLC, Frame Relay, and ATM all support CDP. The router or switch can discover Layer 3 addressing details of neighboring routers—without even configuring that Layer 3 protocol—because CDP is not dependent on any particular Layer 3 protocol.

CDP discovers several useful details from the neighboring device:

- **Device Identifier**—Typically the host name.
- **Address list**—Network and data link addresses.
- **Port Identifier**—Text that identifies the port, which is another name for an interface.
- **Capabilities list**—Information on what the device does—for instance, a router or switch.
- **Platform**—The model and OS level running in the device.

QUESTION NO: 64

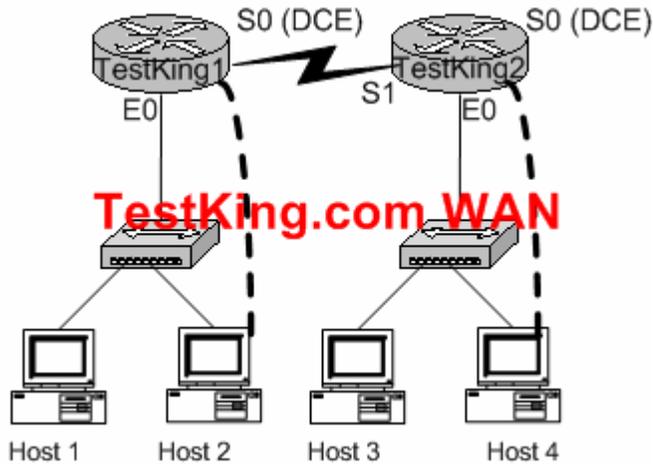
If a host on a network has the address 172.16.45.14/30, what is the address of the subnetwork to which this host belongs?

- A. 172.16.45.0
- B. 172.16.45.4
- C. 172.16.45.8
- D. 172.16.45.12
- E. 172.16.45.18

Answer: D

QUESTION NO: 65

Network topology exhibit:



You work as a network engineer at TestKing.com. Assign the IP address of 192.168.174.27 and the default subnet mask to the E0 interface of the TestKing1 router. The router have been configured with the following specifications.

- The routers are named TestKing1 and TestKing2
- The password on each router is “testking”

To configure the router click on a host icon that is connected to a router by a serial cable.

Answer:

```
testking1>
testking1>ena
testking1#config t
Enter configuration commands, one per line. End with CNTL/Z.
testking1(config)#interface ethernet 0
testking1(config-if)#ip address 192.168.174.27 255.255.255.0
testking1(config-if)#no shutdown
%LINK-3-UPDOWN: Interface Ethernet0, changed state to up
testking1(config-if)#^Z
%SYS-5-CONFIG_I: Configured from console by console

testking1#copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]
```

Explanation:

The question is asking you to configure the ip address 192.168.174.27 255.255.2 for the ethernet 0

you do this by logging into the router using the following commands:

Ena
 config terminal
 specify interface which is ethernet 0
 specify ip address
 issue no shutdown to bring up the interface up
 then exit or ctrl+z
 finally save the configuration by using the command copy running-config
 startup-config

QUESTION NO: 65

Which of the following IP addresses for the network 27.35.16.32/28 can be assigned to hosts? Choose three

- A. 27.35.16.32
- B. 27.35.16.33
- C. 27.35.16.48
- D. 27.35.16.47
- E. 27.35.16.45
- F. 27.35.16.44

Answer: B, E, F

Explanation:

	25	26	27	/28					
	.128	64	32	16	8	4	2	1	
/28	0	0	0	0	1	1	1	1	
network	32	0	0	1	0	0	0	0	0
next network	0	0	1	1	0	0	0	0	0

(which equals 48)

Range of host values are:

RANGE	0	0	1	0	0	0	0	1
TO RANGE	0	0	1	0	1	1	1	0

network is 32

the next network is $32 + 16 = 48$

the range is $32 + 1$ to $48 - 2$.

this results in a range 33 to 46.

and b, e, f

Incorrect answers:

32 cannot be used it is the network; 47 cannot be used it is the broadcast.

- A. IS A NETWORK
- C. IS A NETWORK
- D. IS A BROADCAST

QUESTION NO: 66

Network topology exhibit



A TestKing.com network administrator is adding host TestKing3 to the network shown in the exhibit.

Which IP address can be assigned this host on this network?

- A. 192.1.1.14
- B. 192.1.1.18
- C. 192.1.1.20
- D. 192.1.1.30
- E. 192.1.1.31
- F. 192.1.1.36

Answer: B, D

Explanation:

Subnet Mask of 255.255.255.240 means 4-bits of subnetting. When we do 4-bits of subnetting, we have a total of 16 subnets having 16 hosts each. Subnets will be

192.1.1.0 ----- 191.1.1.15	(0-15)
192.1.1.16 ---- 191.1.1.31	(16-31)
192.1.1.32 ---- 191.1.1.47	(32-47)
192.1.1.240---- 192.1.1.255	(240-255)

Only choices B and D are in the valid range **192.1.1.16 ---- 191.1.1.31 (16-31)**

QUESTION NO: 67

Exhibit

TestKing3# show ip route

....output omitted....

Gateway of last resort is 140.8.100.5 to network 0.0.0.0

R 140.8.7.0/24 [120/3] via 150.8.12.9:00:00:20 serial 0/1

O 140.8.5.5/24 [110/782] via 140.8.100.5 , 00:38:34 serial 0/0

R 140.8.78.8/29 [120/2] via 150.8.12.9 : 00:00:22 serial 0/1

C 140.8.100.0/28 is directly connected, serial 0/0

150.8.0.0/15 is variable subnetted, 2 subnets, 2 masks

O 150.8.0.0/24 is directly connected, serial 0/1

R 150.8.0.0/16 [120/4] via 150.8.12.9:00:00:23 serial 0/1

O 0.0.0.0/0 [110/2738] via 140.8.100.5,00:38:34, serial 0/0

In the route highlighted in the graphic, what does the number 782 represent?

- A. Administrative distance
- B. delay to the destination
- C. cost of the route
- D. hop count

Answer: Pending. Send your suggestion to feedback@testking.com

QUESTION NO: 68

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

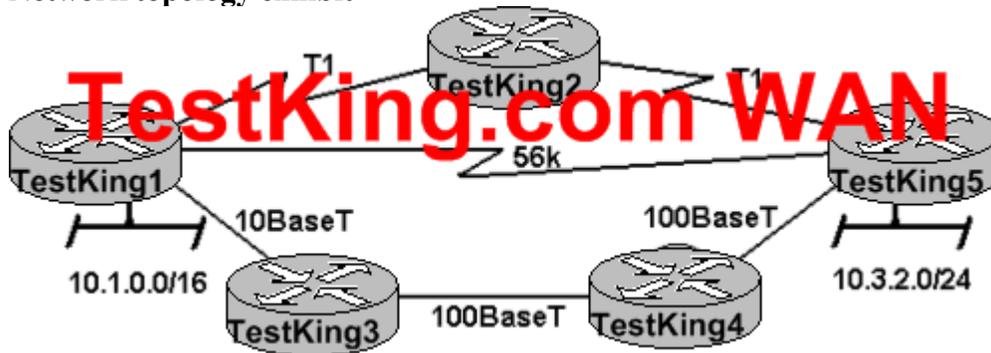
- A. Source Port
- B. Acknowledgement Number
- C. Request Number
- D. Destination Address
- E. Window

F. Data

Answer: Pending. Send your suggestion to feedback@testking.com

QUESTION NO: 69

Network topology exhibit



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 TESTKING1 to TESTKING3 to TESTKING4 to TESTKING5.
- B. If RIPv2 is the routing protocol, the path will be from TESTKING1 to TESTKING3 to TESTKING1 to TESTKING5.
- C. If EIGRP is the routing protocol, the path will be from TESTKING1 to TESTKING3 to TESTKING4 to TESTKING5.
- D. If EIGRP is the routing protocol, the path will be from TESTKING1 to TESTKING2 to TESTKING5.
- E. If OSPF is the routing protocol, the path will be from TESTKING1 to TESTKING5.

Answer: Pending. Send your suggestion to feedback@testking.com

QUESTION NO: 70

Exhibit, Drag and Drop

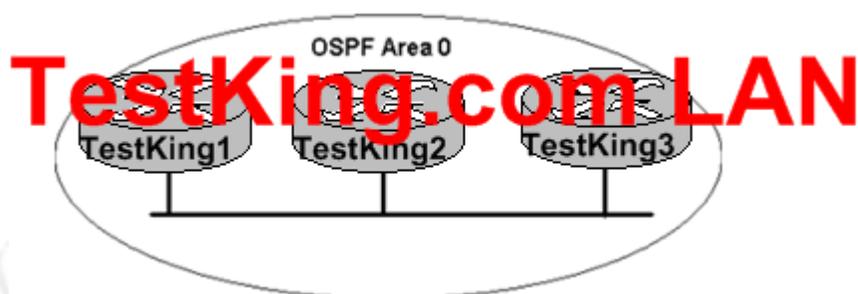
As a TestKing.com instructor you are required to drag the network problem on the left under the correct OSI layer on the Right.

Router Serial Line Down	Physical Layer Problems
Router Serial Line Protocol Down	
Switch Port Link Light is Off	
Excessive Ethernet Collisions	
Router Serial Line up, No CDP Neighbors	Data Link Layer Problems
Dialup authentication failure	
Router serial line encapsulation failure	

Answer: Pending. Send your suggestion to feedback@testking.com

QUESTION NO: 71

Network topology exhibit



TESTKING1 is unable to establish an OSPF neighbor relationship with TESTKING3. What are possible reasons for this problem?(Choose Two).

- A. All of the routers need to be configured for backbone Area1.
- B. TESTKING1 and TESTKING2 are the DR and BDR, so OSPF will not establish neighbor adjacency with TESTKING3

- C. A static route has been configured from TESTKING1 to TESTKING3 and prevents the neighbor adjacency from being established.
- D. The hello and dead interval timers are not set to the same values on TESTKING1 and TESTKING3.
- E. EIGRP is also configured on these routers with a lower administrative distance.
- F. TESTKING1 and TESTKING3 are configured in different areas.

Answer: Pending. Send your suggestion to feedback@testking.com

QUESTION NO: 72

Exhibit

system image file is "flash;c2600-ik8033-mz.122-8.Ts.bin

cisco 2620 (MPC860 processor (revision 0x200) with 16384/2048k
byte of
memory
processor board ID JAD05076EF6
M860 processor:part number 0, mask 49.
Bridging software
x.25 software version 3.0.0
1 Fast Ethernet (IEEE 802.3 interface (s)
2 Low speed serial (synch/asynch) network interface (s)
32k bytes of non-volatile configuration memory.
16384k bytes of processor board System Flash (Read/Write)
configuration register is 0x2142

A router consistently loses its configuration each time it reboots. Given the output shown in the graphic, what is the cause of this problem?

Answer: Pending. Send your suggestion to feedback@testking.com

Note: Incomplete

QUESTION NO: 73

Exhibit

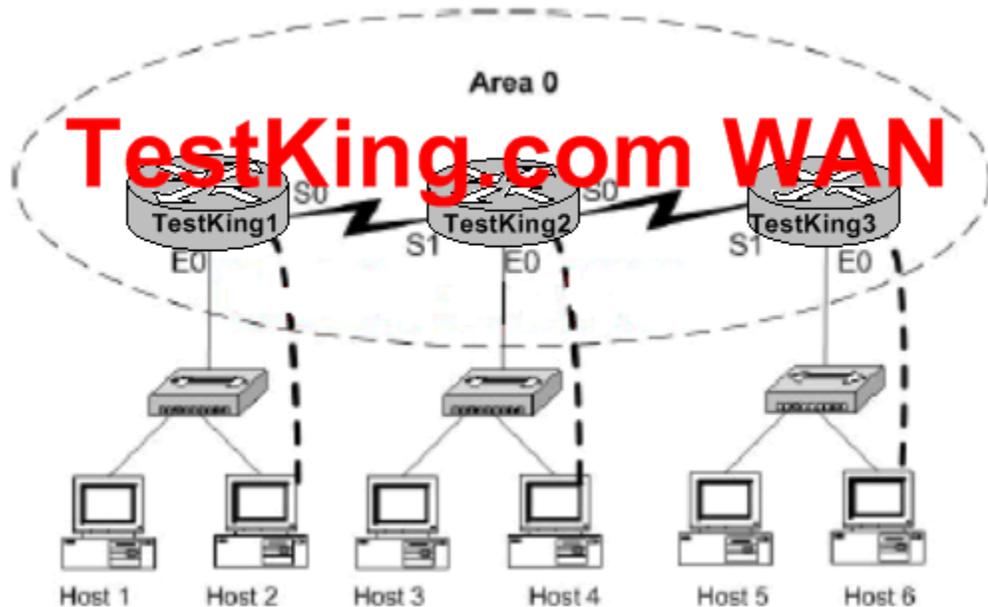
```
access-list 10 permit 172.29.16.0 0.0.0.255
access-list 10 permit 172.29.17.0 0.0.0.255
access-list 10 permit 172.29.18.0 0.0.0.255
access-list 10 permit 172.29.19.0 0.0.0.255
```

An access list was written with the four statements shown in the graphic. which single access list statement will combine all four of these statements into a single statements that will have exactly the same effect?

- A. access-list 10 permit 172.29.16.0 0.0.0.255
- B. access-list 10 permit 172.29.16.0 0.0.1.255
- C. access-list 10 permit 172.29.16.0 0.0.3.255
- D. access-list 10 permit 172.29.16.0 0.0.15.255
- E. access-list 10 permit 172.29.0.0 0.0.255.255

Answer: Pending. Send your suggestion to feedback@testking.com

QUESTION NO: 74
Network topology exhibit



TestKing.com has decided to network three locations to improve efficiency in inventory control. The routers have been named TestKing1, TestKing2, TestKing3. The necessary networking has been completed router was recently installed but connectivity is not complete because in incomplete routing tables. Identify and correct any problem you see in the configuration.

Note: The OSPF process must be configured to allow interfaces in specific subnets to participate in the routing process.

The IP address and passwords are listed in the chart.

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LAB A

Name : TestKing1

E0 : 192.168.15.0 /24

S0 : 192.168.161.5 /30

Secret Password : testking

LAB B

Name : TestKing2

E0 : 192.168.26.1 /24

S0 : 192.168.161.10 /30

S1 : 192.168.161.6 /30

Secret Password : testking

LAB C

Name : TestKing3

E0 : 192.168.32.1 /24

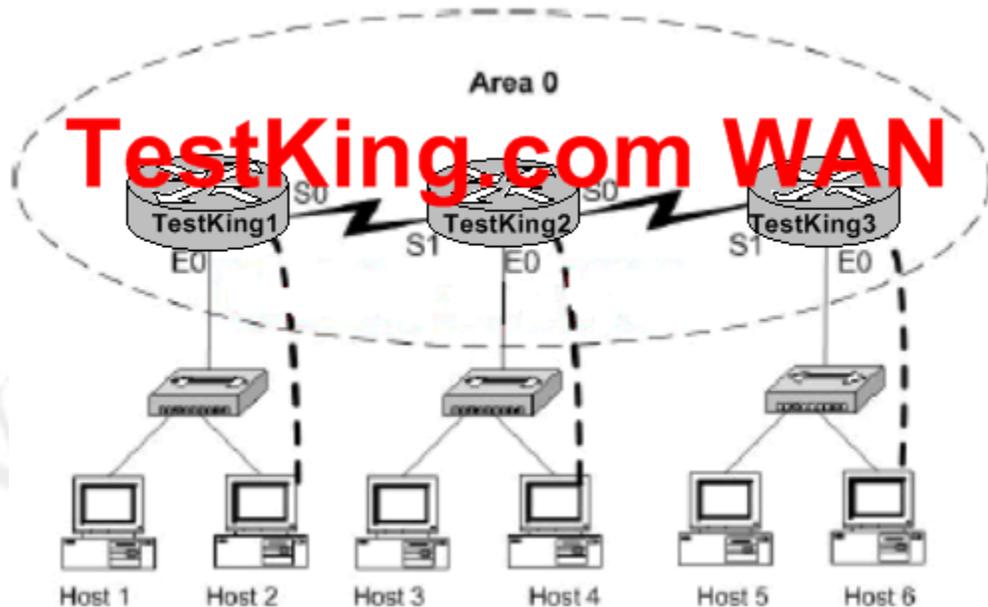
S1 : 192.168.161.9 /30

Secret Password : testking

Answer: Pending. Send your suggestion to feedback@testking.com

QUESTION NO: 75

Network topology exhibit



TestKing.com has decided to network three locations to improve efficiency in inventory control. The routers have been named TestKing1, TestKing2, TestKing3.

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The necessary networking has been completed router was recently installed but connectivity is not complete because in incomplete routing tables. Identify and correct any problem you see in the configuration.

Note: The OSPF process must be configured to allow interfaces in specific subnets to participate in the routing process.

The IP address and passwords are listed in the chart.

LAB A

Name : TestKing1

E0 : 192.168.4.1 /24

S0 : 192.168.163.5 /30

Secret Password : testking

LAB B

Name : TestKing2

E0 : 192.168.24.1 /24

S0 : 192.168.163.10 /30

S1 : 192.168.163.6 /30

Secret Password : testking

LAB C

Name : TestKing3

E0 : 192.168.40.1 /24

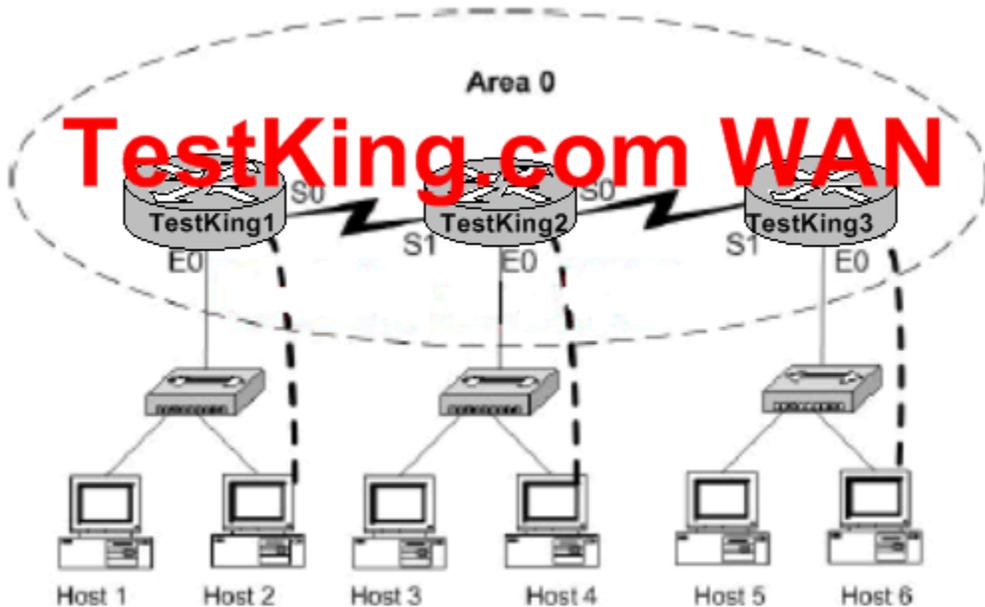
S1 : 192.168.163.9 /30

Secret Password : testking

Answer: Pending. Send your suggestion to feedback@testking.com

QUESTION NO: 76

Network topology exhibit



TestKing.com has decided to network three locations to improve efficiency in inventory control. The routers have been named TestKing1, TestKing2, TestKing3. The necessary networking has been completed router was recently installed but connectivity is not complete because in incomplete routing tables. Identify and correct any problem you see in the configuration.

Note: The OSPF process must be configured to allow interfaces in specific subnets to participate in the routing process.

The IP address and passwords are listed in the chart.

LAB A

Name : TestKing1
 E0 : 192.168.0.1 /24
 S0 : 192.168.135.5 /30
 Secret Password : testking

LAB B

Name : TestKing2
 E0 : 192.168.24.1 /24
 S0 : 192.168.135.10 /30
 S1 : 192.168.135.6 /30
 Secret Password : testking

LAB C

Name : TestKing3
 E0 : 192.168.43.1 /24
 S1 : 192.168.135.9 /30

Secret Password : testking

Answer: Pending. Send your suggestion to feedback@testking.com

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