4.3.6 Practice Questions

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Score: 100%

Passing Score: 80%

Question 1. ✓ Correct

You are configuring a network and have been assigned the network address of 221.12.12.0. You want to subnet the network to allow 5 subnets with 20 hosts per subnet. Which subnet mask should you use?

- 255.255.255.128
- 255.255.255.248
- 255.255.255.192
- 255.255.255.240
- → 255.255.255.224

Explanation

Use 255.255.255.224 as the subnet mask. To find the number of subnets supported, use the formula *2^n*, where *n* is the number of additional masked bits. 224 masks 3 bits, giving you 2^3, or 8 subnets.

To find the maximum number of hosts per subnet, use the formula *2^n - 2*, where *n* is the number of unmasked bits. 224 has 5 unmasked bits, giving you 2^5 - 2, or 30 hosts per subnet.

Selecting 255.255.255.240 as the subnet mask gives you 14 possible subnets (2^4 - 2), but each subnet would only have a maximum of 14 hosts (2^4 - 2).

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Question 2. ✓ Correct

You have a single router with three subnets as shown. Each subnet has the number of hosts specified.

You need to select a subnet mask for each subnet that provides sufficient host addresses without wasting addresses.

Which mask values should you use?

→ ◉
- SubnetA = 255.255.255.192
- SubnetB = 255.255.255.224
- SubnetC = 255.255.255.128

○
- SubnetA = 255.255.255.64
- SubnetB = 255.255.255.32
- SubnetC = 255.255.255.64

○
- SubnetA = 255.255.255.128
- SubnetB = 255.255.255.240
- SubnetC = 255.255.255.192

○
- SubnetA = 255.255.255.224
- SubnetB = 255.255.255.240
- SubnetC = 255.255.255.192

Explanation

To support 50 hosts, use a mask of 255.255.255.192. This masks 26 bits and provides up to 62 hosts. A mask of 255.255.255.224 only provides 30 host addresses.

To support 15 hosts, use a mask of 255.255.255.224. This masks 27 bits and provides up to 30 hosts. A mask of 255.255.255.240 would provide only 14 host addresses.

To support 65 hosts, use a mask of 255.255.255.128. This masks 25 bits and provides up to 126 hosts. The mask of 255.255.255.192 provides only 62 host addresses.

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Question 3. ✓ Correct

You need to design a network that supports 275 hosts. You want to place all hosts in a single broadcast domain, and you want to make sure you do not waste IP addresses.

How should you implement your plan?

- Use a router to create two subnets. Put 250 hosts on one subnet and 25 hosts on the other subnet. Use 255.255.255.0 and 255.255.255.224 as subnet masks.
- Use a router to create two subnets, with half of the hosts on each subnet. Use a mask of 255.255.255.0 on each subnet.
- Connect a router to a switch with a single connection. Create two subinterfaces on the router. Use a mask of 255.255.255.0 for each subinterface.
- Use a bridge on a single subnet. Use a mask of 255.255.255.128 for each bridge port.
- → ◉ Place all hosts on the same subnet. Use a mask of 255.255.254.0.

Explanation

To have all hosts on the same broadcast domain, you will need a single subnet. Use a mask of 255.255.254.0 to support up to 510 hosts. While this method wastes 235 host addresses, it is the only method described that results in a single broadcast domain.

Like physical interfaces, a subinterface marks the boundary of a subnet and therefore a broadcast domain. Both sides of a bridge are on the same subnet, but you do not assign subnet masks to the bridge. Using different network addresses on each side of the bridge would prevent hosts from communicating with each other. Using a mask of 255.255.255.0 would not provide enough addresses, resulting in some hosts sharing an address.

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Question 4. ✓ Correct

You have a network with two routers as shown. You need to choose subnet addresses for subnets 1 and 2.

Which of the following subnets would you use? (Select two.)

- [x] 172.30.12.0/28
- [ ] 172.30.12.8/28
- [x] 172.30.12.128/26
- [ ] 172.30.12.64/26
- [ ] 172.30.12.64/27
- [ ] 172.30.12.8/27

Explanation

For subnet 1, you will need a 28-bit mask to provide up to 14 host addresses. Using a 27-bit mask would waste IP addresses. For subnet 2, you will need a 26-bit mask to give you up to 62 host addresses (a 27-bit mask provides only 30 host addresses).

For subnet 1, use 172.30.12.0 as the subnet address. 172.30.12.8 is not a valid subnet address for a 28-bit mask (valid subnets must be in increments of 16: 0, 16, 32, etc.). For subnet 2, use 172.30.12.128.

172.30.12.64 is a valid subnet address, but the range of IP addresses (172.30.12.65 to 172.30.12.126) overlaps with the 172.30.12.96/27 subnet.

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Question 5. ✓ Correct

You have a small network with three subnets as shown. IP addresses for each router interface are also indicated.

You need to connect Wrk1_A to SubnetA and Wrk5_C to SubnetC. Which IP addresses should you use? (Select two.)

- [ ] Wrk1_A = 192.168.111.32
- [x] Wrk1_A = 192.168.111.62
- [ ] Wrk1_A = 192.168.111.65
- [x] Wrk5_C = 10.155.64.97
- [ ] Wrk5_C = 10.155.64.111
- [ ] Wrk5_C = 10.155.64.114

Explanation

For Wrk1_A, use 192.168.111.62; for Wrk5_C, use 10.155.64.97.

- SubnetA uses a 27-bit mask. The subnet used by the router has a subnet address of 192.168.111.32 with a broadcast address of 192.168.111.63.
- SubnetC uses a 28-bit mask. The subnet used by the router has a subnet address of 10.155.64.96 with a broadcast address of 10.155.64.111.

Hosts on the same subnet must have IP addresses within the subnet range. Neither the subnet address nor the broadcast address can be assigned to hosts.

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Question 6. ✓ Correct

Your client has a class B network address and needs to support 500 hosts on as many subnets as possible.

Which subnet mask should you recommend?

- 255.255.255.0
- → 255.255.254.0
- 255.255.255.128
- 255.255.255.224

Explanation

When applied to a class B network IP address, the subnet mask 255.255.254.0 can support 510 hosts on 126 subnets. To calculate this subnet mask, use the formula *2^n - 2* to find the number of available host addresses (where *n* is the number of unmasked bits or bits with a 0 value). So *2^n - 2* must equal at least 500 hosts.

- 2^8 - 2 = 254 hosts
- 2^9 - 2 = 510 hosts
- 2^10 - 2 = 1024 hosts

The best choice is 2^9 - 2, which gives 510 hosts and leaves 7 bits remaining in the second octet of the mask to address subnets. The number of subnet addresses that will be available are 126 subnets (2^7 - 2).

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Question 7. ✓ Correct

You have a network address of 133.233.11.0 and a subnet mask of 255.255.255.240.

How many assignable host addresses are on each subnet?

- 0
- 2
- 6
- → 14
- 30
- 62

Explanation

You can calculate the number of possible host addresses by completing the following steps:

1. Convert the subnet mask to binary (240 = 11110000).
2. Count the total number of unmasked bits in the subnet mask (4).
3. Use the formula *2^n - 2* where *n* is the number of unmasked bits. In this example, there are 2^4 - 2, or 14, host addresses for each subnet.

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Question 8. ✓ Correct

You have been assigned the IP address of 197.177.25.0 for your network. You have determined that you need five subnets to allow future growth. What subnet mask value would you use?

255.255.255.224 ✓

Explanation

Use 255.255.255.224 as the subnet mask value. You will need to borrow 3 bits for the custom subnet mask.

To calculate the subnet mask value, complete the following steps:

1. Convert the default subnet mask to binary.
2. Borrow bits from the mask. Use the formula *2^m* to identify the number of subnets and *2^n - 2* to identify the number of hosts per subnet for each selected mask.
3. Continue borrowing bits until you get enough subnets and hosts.

Verify your answer as follows:

There are 3 additional masked bits. Using the formula 2^3, you get 8 subnets. Borrowing only 2 bits gives you only 4 subnets. Borrowing 4 bits gives you too many subnets.

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Question 9. ✓ Correct

You have a network address of 132.66.0.0 and a subnet mask of 255.255.254.0.

How many possible host addresses are on each subnet, excluding host addresses of all 1s and all 0s?

- 62
- 0
- → 510
- 1022

Explanation

You can calculate the number of possible host addresses by completing the following steps:

1. Convert the subnet mask to binary (254 = 11111110).
2. Count the total number of unmasked bits in the subnet mask, including the empty octet to get a total of 9. For example, 1111111**0.000000000**.
3. Use the formula *2^n - 2*, where *n* is the number of unmasked bits. In this example, there are 2^9 - 2, or 510, host addresses for each subnet.

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Question 10. ✓ Correct

You have a network address of 220.16.22.0 and have selected 255.255.255.224 as the subnet mask value. How many possible subnets are there?

8 ✓

Explanation

There are eight possible subnets. You can identify the number of possible subnets by completing the following steps:

1. Convert the mask to binary (224=11100000).
2. Count the number of extra bits in the mask.
3. Use the formula *2^m* to find the number of subnets.

There are 3 extra masked bits. 2^3 gives you 8 subnets.

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