CCST Networking – Module 5 Quiz

Questions

1. What is the binary equivalent of the decimal number 149?

    a. 01011010
    b. 10010101
    c. 01011011
    d. 10011010

2. You're assigning an IP address of 172.16.100.100 to a server. What is the default subnet mask (in dotted decimal notation) for that IP address?

    a. 255.0.0.0
    b. 0.0.255.255
    c. 255.255.255.0
    d. 255.255.0.0

3. Which of the following IP addresses cannot be routed, even within a private network?

    a. 169.254.10.123
    b. 10.58.49.128
    c. 172.16.45.97
    d. 192.168.45.5

4. You're working on a network configured to use Network Address Translation (NAT). As you're examining the NAT translation table on the router configured for NAT, you notice a PC on the inside of the network has an IP address of 10.1.1.24.

   The default gateway of the PC is 10.1.1.1. Since the PC's IP address isn't routable on the public Internet, it was translated (using NAT) into a publicly routable IP address of 198.51.100.12.

   The PC is communicating with a web server on the Internet. The web server has an IP address of 203.0.113.25.

   Which of the following addresses is classified by NAT as an Inside Global address?

   a. 10.1.1.24
   b. 10.1.1.1
   c. 198.51.100.12
   d. 203.0.113.25

5. You are performing a packet capture of a network where a PC is using DHCP to dynamically obtain IP address information. Which of the captured DHCP messages contains the requested IP address information?

   a. Offer
   b. Acknowledgement
   c. Discover
   d. Request

6. Which of the following is not a traffic flow supported by IPv4?

   a. Unicast
   b. Anycast
   c. Multicast
   d. Broadcast

Questions and Answers

1. What is the binary equivalent of the decimal number 149?

    a. 01011010
    b. 10010101
    c. 01011011
    d. 10011010

    Answer: b

    Explanation: To convert from 149 in decimal to binary, you can begin by making an 8-column table. The column headings start with 1 on the right and double all the way to 128, in the left-most column.

    Then, beginning on the left, we ask, “Is 149 greater than or equal to 128?” Since the answer is “yes,” we place a 1 in that column and find the difference (149 – 128 = 21).

    Then, in the 64 column we ask, “Is 21 greater than or equal to 64?” The answer is “no,” so we place a 0 in that column and move to the next column.

    Next, we ask, “Is 21 greater than or equal to 32?” Again, the answer is “no,” so we place a 0 in that column and move to the 16 column.

    When we ask, “Is 21 greater than 16,” the answer is “yes.” So, we put a 1 in the 16 column and find the difference (21 – 16 = 5).

    Now, in the 8 column, we ask, “Is 5 greater than or equal to 8?” It’s not, so we place a 0 in the 8 column and move to the 4 column.

    In the 4 column, we ask, “Is 5 greater than or equal to 4?” Since the answer is “yes,” we place a 1 in the 4 column and find the difference (5 – 4 = 1).

    We put a zero in both the 4 column and the 2 column, because 1 is not greater than or equal to either 4 or 2.

    Finally, in the 1 column, when we ask, “Is 1 equal to or greater than 1,” the answer is “yes.” So, we put a 1 in the 1 column, and we’re done!

    That leaves us with a binary number of 10010101.

We can check our work by adding up the column headings containing a 1 to see if that equals 149: 128 + 16 + 4 + 1 = 149

Video Reference: Binary Numbering

2. You're assigning an IP address of 172.16.100.100 to a server. What is the default subnet mask (in dotted decimal notation) for that IP address?

    a. 255.0.0.0
    b. 0.0.255.255
    c. 255.255.255.0
    d. 255.255.0.0

    Answer: d

    Explanation: An IP address of 172.16.100.100 is a Class B IPv4 address, because it has a 172 in the first octet. Class B addresses have a first octet in the range of 128 – 191.

    A Class B address has a default subnet mask of /16 in prefix notation, which equates to 255.255.0.0 in dotted decimal notation.

    Video Reference: IPv4 Address Format

3. Which of the following IP addresses cannot be routed, even within a private network?

    a. 169.254.10.123
    b. 10.58.49.128
    c. 172.16.45.97
    d. 192.168.45.5

    Answer: a

    Explanation: The IP addresses of 10.58.49.128, 172.16.45.97, and 192.168.45.5 are all private IP addresses, as defined by RFC 1918. Therefore, those addresses cannot be routed on the public Internet.

    However, 169.254.10.123 is an IP address automatically assigned by the APIPA (Automatic Private IP Addressing) process. APIPA addresses not only cannot be routed on the public Internet, they cannot even be routed within a private network. All APIPA addresses begin with 169.254 in the first two octets.

    Video Reference: Public vs. Private IP addresses

4. You're working on a network configured to use Network Address Translation (NAT). As you're examining the NAT translation table on the router configured for NAT, you notice a PC on the inside of the network has an IP address of 10.1.1.24.

   The default gateway of the PC is 10.1.1.1. Since the PC's IP address isn't routable on the public Internet, it was translated (using NAT) into a publicly routable IP address of 198.51.100.12.

   The PC is communicating with a web server on the Internet. The web server has an IP address of 203.0.113.25.

   Which of the following addresses is classified by NAT as an Inside Global address?

   a. 10.1.1.24
   b. 10.1.1.1
   c. 198.51.100.12
   d. 203.0.113.25

   Answer: c

   Explanation: The IP address of 10.1.1.24 is an Inside Local address because it refers to a device on the Inside of our network (i.e., the PC), and the address is Locally routable.

   The IP address of 10.1.1.1 is only acting as the PC's default gateway and does not appear in the NAT translation table.

   The IP address of 198.51.100.12 is an Inside Global address because it refers to a device on the Inside of our network (i.e., the PC), and the address is Globally routable.

   The IP address of 203.0.113.25 is an Outside Global address because it refers to a device on the Outside of our network (i.e., the web server), and the address is Globally routable.

   Video Reference: Network Address Translation

5. You are performing a packet capture of a network where a PC is using DHCP to dynamically obtain IP address information. Which of the captured DHCP messages contains the requested IP address information?

    a. Offer
    b. Acknowledgement
    c. Discover
    d. Request

    Answer: b

    Explanation: The Discover message is a broadcast sent out by a client in an attempt to find a DHCP server.

    DHCP servers receiving the Discover message each respond with an Offer message.

    When the client receives the Offer messages, the server that sent the first received Offer message is selected.

    The client then announces its selected server and requests IP address information from that selected server by sending a Request broadcast message.

    The DHCP server then responds to the client with an Acknowledgement message, which contains the requested IP address information.

    Video Reference: IPv4 Autoconfiguration

6. Which of the following is not a traffic flow supported by IPv4?

    a. Unicast
    b. Anycast
    c. Multicast
    d. Broadcast

    Answer: b

    Explanation: Unicast is one-to-one communication and is supported by IPv4.

    Multicast is one-to-many communication and is supported by IPv4. Specifically, “many” refers to members of a multicast group.

    Broadcast is one-to-all communication and is supported by IPv4. Specifically, “all” refers to all devices on a subnet.

Anycast is one-to-nearest communication and is not supported by IPv4. However, IPv6 does support Anycast, which allows multiple servers on the Internet to have the same IPv6 address, and a client's request can be directed to the "nearest" server using that shared IP address. The nearness of a server is determined by a router's IP routing table.

Video Reference: IPv4 Traffic Flows