**Repeat CA for Network Services**

**Question 1**

1. **Explain the three different address allocation mechanisms used by DHCPv4**

Automatic Allocation: A client is given a permanent IP address by the server.

Dynamic Allocation: The server assigns a client an IP address for a limited time or until the client explicitly relinquishes the address.

Manual Allocation: A specific IP address is given to a single device by an admin, DHCP only signals the ip address to the device.

1. **Describe the DHCP operations for lease origination and lease renewal. Include all the steps required.**

To renew a lease, the DHCP client sends a DHCPREQUEST packet straight to the DHCP server from whence the lease was received. If the DHCP server is online, it renews the lease and sends a DHCPACK packet to the client, with the new lease period and any updated configuration settings.

**So, these steps in short are:**

**DHCP Discover,**

**DHCP lease offer,**

**DHCP lease Request**

**and Finishes with a DHCP lease Ack Or a Negative Acknowledgement if it fails**

**Question 2**

1. **List the four main reasons for subnetting an IP network address.**

The four main reasons for subnetting an IP Address would be:

To improve network security

To provide better network performance and speed

To make sure there’s less network congestion

Limits the IP usage to control growth of the network and handle administration easier

**(b) As a network administrator you are given the following network address: 172.18.0.0/16 Scenario: You want to have the maximum possible number of subnets, but you need to accommodate at least 2000 hosts per subnet**.

Provide the following information:

The custom subnet masks: 255.255.248.0/21

The total number of subnets: 8192

The total number of hosts per subnet: 2048

The total number of hosts on the entire network: 2046

The network address for the first four subnets:

1. 172.0.0.0
2. 172.0.8.0
3. 172.0.16.0
4. 172.0.24.0

The broadcast address for the first four subnets:

1. 172.0.7.255
2. 172.0.15.255
3. 172.0.23.255
4. 172.0.31.255

The first and last host address for the first four legal subnets:

1. 172.0.0.1 - 172.0.7.254
2. 172.0.8.1 - 172.0.15.254
3. 172.0.16.1 - 172.0.23.254
4. 172.0.24.1 - 172.0.31.254

**(C) What is the function of a subnet mask?**

A subnet mask's job is to divide the network and host into two distinct portions, one identifying the host, aka the computer, and the other identifying the network to which the computer belongs.

**Question 3**

1. **Explain three basic functions of a Router**

A router performs numerous roles, the most important of which is to transfer packets based on a routing table. A router handles traffic across networks by passing data to its intended IP address and allowing multiple devices to use the same connection via it. It is essentially the network's brain and aids in improved internet connectivity to the internet.

1. **Write the commands to add the IP address 220.56.80.4/28 to the LAN interface Fa 0/0. Each command must be in the correct mode.**

en

conf t

int

interface fa0/0

ip address 220.56.80.4 255.255.255.240

no shut

1. **Write the commands to activate RIP for networks 195.54.23.0 and 222.67.52.0. Each command must be in the correct mode.**

en

conf t

router rip

network 195.54.23.0

network 222.67.52.0

exit

1. **What is wrong with the command below for IP address 220.34.56.0/26 and how would you correct it?**



The command isn’t typed out in full it’s IP address and the subnet mask is wrong, it’s 255.255.255.192, the command would turn out to be IP Address 220.34.56.0 255.255.255.192

1. **Explain the phrase ‘time to convergence’**

The term time to convergence is in reference/meaning to how long the time is take for all routers to align with the change to the route, this is also known as convergence time rather than time to convergence.

**Question 4**

1. **What is the difference between classless and classful IPv4 addressing?**

The difference between a classless and classful ip address is that the classful ip address not only divides the ip address into 5 different categories but also does not send the subnet mask along with their updates, unlike the classless address, the classless address sends the subnet mask along with their updates and was made to replace classful ip addressing in order to reduce ip address depletion/segmentation

1. **Complete the table below:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| IP Address/Prefix | Network Address | First Address | Last Address | Broadcast Address |
| 196.48.200.50/20 | 196.48.192.0 | 196.48.192.1 | 196.48.207.254 | 196.48.207.225 |
| 200.61.84.190/12 | 200.48.0.0 | 200.48.0.1 | 200.63.255.254 | 200.63.255.255 |
| 10.10.10.196/25 | 10.10.10.128 | 10.10.10.129 | 10.10.10.254 | 10.10.10.255 |
| 172.16.31.187/22 | 172.16.28.0 | 172.16.28.1 | 172.16.31.254 | 172.16.31.255 |
| 156.78.92.5/18 | 156.78.64.0 | 156.78.64.1 | 156.78.127.254 | 1556.78.127.255 |

**Question 5**

1. **Explain in detail how switches can be used to reduce traffic loads on a network. Illustrate your answer with any appropriate examples/diagrams. Mention the different types of domains and include VLANS.**

Switches can be used to filter / reduce traffic loads on a network by filtering it through switch breaks one network into many small networks, so the distance and repeater limitations are restarted. Second, this same segmentation isolates traffic and reduces collisions relieving network congestion

Diagram

Description automatically generated

1. **Describe the 3 types of Inter-VLAN routing.**

Legacy inter-vlan routing, this method uses multiple router interfaces which connect each to a switch port in different vlans which serve as default gateways

Router-on-a-stick is when a router has a single or logical connection to a network where one router is connected to a switch via a single cable

SVI also known as Switch virtual interface uses a bridging function and routing function of a vlan device using physical or virtualports, SVI is mostly virtual