Assignment module -5: Network Fundamentals and Building Networks

Section 1: Multiple Choice

1. What is the primary function of a router in a computer network?

a) Assigning IP addresses to devices

b) Providing wireless connectivity to devices

Ans: c) Forwarding data packets between networks

d) Managing user authentication and access control

2. What is the purpose of DHCP (Dynamic Host Configuration Protocol) in a computer network?

a) Assigning static IP addresses to devices

b) Resolving domain names to IP addresses

c) Managing network traffic and congestion

Ans: d) Dynamically assigning IP addresses to devices

3. Which network device operates at Layer 2 (Data Link Layer) of the OSI model and forwards data packets based on MAC addresses?

Ans: a) Router

b) Switch

c) Hub

d) Repeater

4. Which network topology connects all devices in a linear fashion, with each device connected to a central cable or backbone?

a) Star

Ans: b) Bus

c) Ring

d) Mesh

Section 2: True or False

True or False: A VLAN (Virtual Local Area Network) allows network administrators to logically segment a single physical network into multiple virtual networks, each with its own broadcast domain.

Ans: True

True or False: TCP (Transmission Control Protocol) is a connectionless protocol that provides reliable, ordered, and error-checked delivery of data packets over a network.

Ans: False

True or False: A firewall is a hardware or software-based security system that monitors and controls incoming and outgoing network traffic based on predetermined security rules.

Ans: True

Section 4: Practical

8. Describe the steps involved in setting up a wireless network for a small office or home office (SOHO) environment.

Ans:

Here's to setting up a wireless network for a Small Office or Home Office (SOHO):

1. Choose a Wireless Router

- Select a router with sufficient coverage (Wi-Fi 5 or Wi-Fi 6).

2. Connect the Router to the Modem

- Plug the router's WAN port into the modem using an Ethernet cable.
- Power on both the router and the modem.

3. Access the Router Settings

- Connect to the router via Wi-Fi or Ethernet.
- Open a web browser and type the router's IP address (e.g., **192.168.1.1**).
- Log in using the default username and password (usually found on the router).

4. Set Up Wi-Fi Network

- Change the **SSID** (Wi-Fi network name) to something unique.
- Set a strong **Wi-Fi password**.
- Choose **WPA2 or WPA3** for security.

5. Secure the Router

- Change the **admin password** for the router settings.
- Enable the **firewall** for extra security.

6. Test Wi-Fi Connection

- Disconnect Ethernet, and connect a device (phone/laptop) to the Wi-Fi.
- Check the internet connection is working.

7. Connect Other Devices

- Connect other devices (printers, smartphones) to the Wi-Fi network using the SSID and password.

8. Regular Maintenance

- Keep the router's firmware updated.
- Change Wi-Fi passwords regularly and monitor connected devices.

9. Demonstrate how to configure a router for Internet access using DHCP (Dynamic Host Configuration Protocol).

Ans:

Here's to **configure a router for Internet access using DHCP (Dynamic Host Configuration Protocol)**:

1. Connect the Router

- Connect the **WAN/Internet port** of the router to the **modem** using an Ethernet cable.
- Plug the router's **LAN port** into a computer or connect via Wi-Fi.

2. Access the Router's Configuration Page

- Open a web browser (like Chrome or Firefox).
- Type the router's **IP address** (e.g., **192.168.1.1**) in the address bar.
- Enter the **username** and **password** to log in (usually found on the router label).

3. Navigate to the Internet Settings

- Find the section called **"WAN"** or **"Internet Settings"** in the router's configuration page.
- Select **DHCP** as the connection type (the router will automatically get the IP from the modem).

4. Configure DHCP Settings

- **Enable DHCP** for the router. This allows the router to automatically assign IP addresses to connected devices.
- Set the **IP address range** (usually, the router will automatically suggest a default range, e.g., **192.168.1.100** to **192.168.1.200**).

5. Save Settings

- Save the changes by clicking the **"Save"** or **"Apply"** button.

6. Restart the Router

- Restart the router if required to apply the settings.

7. Test Internet Connectivity

- Connect a device (laptop, phone) to the router using Wi-Fi or Ethernet.
- Open a web browser and check if the internet is working.

8. Verify DHCP Functionality

- Check if the device receives an IP address automatically from the router (usually within the configured range).
- You can verify by going to the device's network settings and ensuring it shows an **IP address** like **192.168.1.x**.

Section 5:

10. Discuss the importance of network documentation in the context of building and managing networks.

Ans:

Here's **why network documentation is important**:

1. Helps in Planning and Design

- **Blueprint for setup**: Shows how the network is structured, helping with future upgrades and expansions.
- **Resource Management**: Helps in efficiently allocating IP addresses, hardware, and bandwidth.

2. Assists in Troubleshooting

- **Quick fixes**: Helps identify and solve problems faster by having all network details on hand.
- **Faster Recovery**: In case of failure, you can restore the network quickly using the documented configurations.

3. Ensures Compliance and Security

- **Regulatory Requirements**: Helps meet legal and regulatory standards by tracking network setup and configurations.
- **Security Audits**: Easier to conduct security checks and ensure safety if everything is documented.

4. Makes Maintenance and Upgrades Easier

- **Smooth Maintenance**: Helps in keeping the network running efficiently and avoiding issues during updates or repairs.
- **Consistency**: Ensures new devices or changes fit well with the existing network setup.

5. Aids Knowledge Transfer

- **Training New Staff**: Makes it easier to onboard new team members since they can refer to the documentation.
- **Sharing Knowledge**: Helps teams share and access important network information.

6. Supports Disaster Recovery

- **Backup Plan**: In case of network failure, documentation helps restore everything quickly.

7. Controls Costs

- **Budgeting**: Helps keep track of network resources and costs, avoiding unnecessary expenses.
- **Prevents Redundancy**: Ensures resources aren’t duplicated, reducing waste.