**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.