**Assignment: module -5 = Network Fundamentals and Building Network:**

**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

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

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?

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

b) Bus

c) Ring

d) Mesh

**Section 2: True or False :**

5) 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. = TRUE

6) 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. = False

7) 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. = TRUE

**Section 3: Short answer**

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

1. **Plan Network Layout:**
   * Determine the optimal locations for the router and wireless access points to ensure good coverage.
2. **Choose Hardware:**
   * Select a wireless router and any additional access points or range extenders if needed.
3. **Connect Router:**
   * Connect the router to the modem provided by your Internet Service Provider (ISP) using an Ethernet cable.
4. **Power On Devices:**
   * Plug in and power on the modem and router. Wait for them to initialize.
5. **Access Router Settings:**
   * Connect a computer to the router using an Ethernet cable or via Wi-Fi.
   * Open a web browser and enter the router's IP address to access its settings (often 192.168.1.1 or 192.168.0.1).
6. **Configure SSID and Password:**
   * Set a unique SSID (network name) and a strong Wi-Fi password (WPA2 or WPA3 encryption).
7. **Configure Security Settings:**
   * Enable firewall, configure guest network (if needed), and set up any additional security features.
8. **Set Up DHCP:**
   * Ensure DHCP is enabled to automatically assign IP addresses to connected devices.
9. **Position Router:**
   * Place the router in a central location to optimize wireless coverage.
10. **Connect Devices:**
    * Connect computers, smartphones, printers, and other devices to the wireless network using the SSID and password.
11. **Test Connectivity:**
    * Ensure all devices can connect to the network and access the internet.
12. **Update Firmware:**
    * Check for and install any firmware updates for the router to ensure optimal performance and security.
13. **Backup Configuration:**
    * Save or backup the router configuration settings for future reference.

**Section 4: Practical**

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

1. **Connect to Router:**
   * Connect your computer to the router using an Ethernet cable or via Wi-Fi.
2. **Access Router Settings:**
   * Open a web browser.
   * Enter the router's IP address in the address bar (commonly 192.168.1.1 or 192.168.0.1).
   * Log in using the default username and password (often found on the router or in the manual).
3. **Navigate to Internet/WAN Settings:**
   * Find the section labeled "Internet," "WAN," or "Network."
4. **Select DHCP for Internet Connection:**
   * Choose the option for "Automatic Configuration - DHCP" or similar.
   * This setting allows the router to obtain an IP address automatically from the ISP.
5. **Save Settings:**
   * Click "Save" or "Apply" to save the changes.
6. **Reboot Router:**
   * Reboot the router if prompted, or manually power cycle the router to apply the new settings.
7. **Test Internet Connection:**
   * Once the router restarts, check the connection status in the router's admin interface.
   * Open a web browser and try to access a website to confirm internet connectivity.
8. **Update Router Firmware:**
   * Check for and install any available firmware updates to ensure the router is running the latest software.
9. **Secure the Router:**
   * Set a strong administrator password.
   * Configure Wi-Fi settings with a unique SSID and a strong password (WPA2 or WPA3 encryption).
10. **Backup Configuration:**
    * Save or backup the router configuration settings for future reference.

**Section 5: Essay :**

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

1. **Troubleshooting and Maintenance:**
   * Provides a clear map of the network layout, making it easier to identify and resolve issues quickly.
2. **Planning and Expansion:**
   * Helps in planning network expansions or upgrades by showing existing infrastructure and identifying potential bottlenecks or limitations.
3. **Compliance and Security:**
   * Ensures compliance with industry standards and regulations by maintaining records of network configurations, policies, and security settings.
4. **Knowledge Transfer:**
   * Facilitates knowledge transfer between team members, especially when onboarding new staff or when existing staff leave, ensuring continuity.
5. **Performance Monitoring:**
   * Assists in monitoring network performance by providing baseline configurations and historical data for comparison.
6. **Incident Response:**
   * Enhances incident response by detailing network configurations and dependencies, enabling faster and more effective recovery from outages or attacks.
7. **Audit and Documentation:**
   * Provides a documented trail for audits, helping to verify that network configurations meet organizational policies and compliance requirements.
8. **Cost Management:**
   * Aids in managing costs by keeping track of hardware, software licenses, and maintenance schedules, ensuring optimal use of resources.
9. **Efficiency and Productivity:**
   * Increases efficiency and productivity by reducing the time spent searching for information and ensuring that network assets are well-documented and accessible.
10. **Design and Architecture Review:**
    * Supports network design reviews and architecture planning by offering detailed diagrams and documentation, ensuring that designs are well thought out and scalable.

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