**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

c) Forwarding data packets between networks

d) Managing user authentication and access control

ANS: c) Forwarding data packets between networks

1. 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

ANS: d) Dynamically assigning IP addresses to devices

1. 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

ANS: b) Switch

1. 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

ANS: b) Bus

**Section 2: True or False**

1. 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

1. 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

1. 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 3: Short Answer**

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

ANS:

**Steps to Set Up a Wireless Network for SOHO**

1. **Plan the Network Requirements**
   * Determine the number of devices that will connect (laptops, smartphones, printers, etc.).
   * Identify the required network speed and coverage area.
   * Decide on the internet service provider (ISP) and the type of internet connection (DSL, cable, fiber, etc.).
2. **Select the Wireless Equipment**
   * Choose a wireless router or a wireless access point (AP) suitable for your network size and speed requirements.
   * For SOHO, a combined modem-router device is often used.
   * Consider equipment supporting modern standards like Wi-Fi 5 (802.11ac) or Wi-Fi 6 (802.11ax) for better performance.
3. **Set Up the Internet Connection**
   * Connect the modem (or modem-router combo) to the ISP’s internet source (telephone line, cable, or fiber).
   * Power on the modem and ensure it gets an IP address from the ISP.
4. **Configure the Wireless Router**
   * Connect the wireless router to the modem (if separate devices).
   * Access the router’s admin interface by typing its IP address in a web browser (commonly 192.168.0.1 or 192.168.1.1).
   * Log in using default credentials (change these after initial setup).
5. **Set Wireless Network Parameters**
   * SSID (Service Set Identifier): Set a unique and easy-to-recognize network name.
   * Security: Enable WPA2 or WPA3 encryption for securing wireless connections.
   * Password: Create a strong password for wireless access.
   * Choose the wireless channel to avoid interference from nearby networks
6. **Configure Network Settings**
   * Set DHCP (Dynamic Host Configuration Protocol) to automatically assign IP addresses to devices.
   * Optionally, set static IP addresses for specific devices
   * Configure firewall settings for network security.
7. **Connect Wireless Devices**
   * On each device (PC, smartphone, printer), scan for the wireless network SSID.
   * Enter the wireless password to connect.
   * Verify internet access and network resource sharing.
8. **Test and Optimize the Network**
   * Check signal strength in different areas of the office/home.
   * Adjust router placement for better coverage (central location, away from thick walls or electronic interference).
   * Optionally, add wireless range extenders or additional access points if needed.
9. **Backup Configuration and Documentation**
   * Save router configuration settings.
   * Document network layout, IP address ranges, SSIDs, and passwords for future reference.

**Section 4: Practical**

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

ANS:

**Steps to Configure a Router for Internet Access using DHCP**

**1. Connect the Hardware**

* Plug in the router’s power.
* Connect the router’s WAN/Internet port to the modem using an Ethernet cable.
* Connect your computer or phone to the router (via Wi-Fi or LAN port).

**2. Access Router Settings**

* Open a web browser and type the router’s IP address:
  + Usually 192.168.0.1 or 192.168.1.1
* Login with default credentials (e.g., admin / admin) – usually printed on the router.

**3. Set Internet Connection Type to DHCP**

* Go to the Internet/WAN settings or Network settings.
* Choose Connection Type: DHCP (or Dynamic IP).
* This allows the router to automatically get an IP address from your ISP.

**4. Set Up Wi-Fi**

* Go to Wireless settings.
* Set a Wi-Fi name (SSID) and a strong password.
* Enable WPA2/WPA3 security for protection.

**5. Save and Reboot**

* Click Save/Apply settings.
* Reboot the router if needed.

**6. Test the Connection**

* Connect a device to the Wi-Fi.
* Open a browser and check if you can access the Internet.

**Section 5: Essay**

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

ANS:

**Importance of Network Documentation in Building and Managing Networks**

Network documentation refers to keeping written or digital records of all the components, settings, and structure of a network.

**Why is Network Documentation Important?**

1. Easier Troubleshooting

* Helps quickly find and fix problems (e.g., wrong IP, faulty cable).
* Shows how devices are connected and configured.

2. Saves Time

* Reduces time needed to set up or change the network.
* New staff or technicians can understand the network faster.

3. Improves Network Management

* Tracks devices (routers, switches, PCs, etc.) and their settings.
* Makes it easier to manage IP addresses, ports, and connections.

4. Supports Security

* Helps identify unauthorized changes or devices.
* Keeps track of firewall rules, user access, and security settings.

5. Assists in Upgrades and Expansion

* When expanding the network, documentation shows what’s already in place.
* Makes it easier to plan upgrades without breaking the current setup.

6. Helps During Audits and Compliance

* Some industries require proper network documentation for legal or security compliance.

**What Should Be Documented?**

* Network topology diagram (how devices are connected)
* IP address assignments
* Device names and locations
* Router, switch, and firewall configurations
* User accounts and permissions
* Backup and recovery plans

**Network documentation is like a map of your network.**  
Without it, managing and fixing the network is confusing and time-consuming. With it, everything becomes easier, faster, and more secure.