**ASSIGNMENT – 4:**

**Network Fundamentals and Building Networks**

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| **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**

**Answer: (c)** Forwarding data packets between networks

**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**

**Answer:** (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**

**Answer: (b)** Switch

**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**

**Answer: (b)** Bus

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| **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.**

**Answer:** 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.**

**Answer:** 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.**

**Answer:** True

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| **SECTION 3: SHORT ANSWER** |

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

* **Answer:**
  + **Plan the Network –** Determine coverage area, number of devices, and internet speed requirements.
  + **Obtain Equipment –** Get a modem, wireless router, and necessary cables.
  + **Connect the Hardware –** Connect the modem to the router and power them on.
  + **Access Router Settings –** Log in to the router’s web interface using a browser.
  + **Configure Network Settings –** Set up SSID (Wi-Fi name), security mode (WPA3/WPA2), and strong password.
  + **Enable Security Features –** Configure firewall, MAC filtering, and firmware updates.
  + **Connect Devices –** Join computers, smartphones, and printers to the Wi-Fi network.
  + **Test and Optimize –** Check connectivity, adjust signal placement, and optimize settings for performance.

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| **SECTION 4: PRACTICAL APPLICATION** |

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

* **Answer:**

**• Connect the Hardware**

Plug the modem into the router’s WAN (Internet) port using an Ethernet cable.

Connect a computer to the router via Wi-Fi or an Ethernet cable.

**• Access the Router’s Web Interface**

Open a web browser and enter the router’s default IP address (e.g., 192.168.1.1 or 192.168.0.1).

Log in using the default or configured username and password.

**• Enable DHCP on the WAN Interface**

Navigate to the Internet/WAN settings.

Select "Obtain an IP address automatically (DHCP)" under connection type.

**• Configure LAN DHCP Settings (if needed)**

Go to LAN settings and ensure DHCP is enabled.

Set the DHCP IP range (e.g., 192.168.1.100 - 192.168.1.200).

**• Save and Apply Changes**

Click Save/Apply and allow the router to reboot if required.

**• Test the Connection**

Connect a device to the network and verify it receives an IP address dynamically.

Open a web page to confirm internet access.

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| **SECTION 5: ESSAY** |

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

* **Answer:**
  + Network documentation is a crucial aspect of designing, implementing, and maintaining a stable and efficient network. It involves recording details about network infrastructure, configurations, devices, and security settings.

**1. Simplifies Troubleshooting and Maintenance**

A well-documented network allows IT administrators to quickly identify and resolve issues when they arise. It provides a clear reference for IP addresses, device configurations, and network paths, reducing downtime and improving efficiency in problem-solving.

**2. Enhances Network Security**

Documenting firewall rules, access controls, and encryption settings helps organizations maintain security and comply with industry regulations. It ensures that vulnerabilities are identified and addressed, reducing the risk of cyber threats.

**3. Facilitates Network Expansion and Upgrades**

As organizations grow, their network needs change. Proper documentation helps IT teams scale the network efficiently, preventing misconfigurations and ensuring smooth integration of new devices and services.

**4. Supports Collaboration and Knowledge Transfer**

Having detailed documentation allows multiple IT personnel to manage the network effectively. It prevents knowledge loss when key employees leave and simplifies on boarding for new IT staff.

**5. Improves Cost Efficiency**

By reducing downtime, preventing configuration errors, and streamlining troubleshooting, network documentation helps save time and operational costs. It ensures that resources are used effectively and prevents unnecessary network redesigns.