**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:**
  + **Gather Equipment:** Router, modem, Ethernet cables, and devices.
  + **Connect Modem and Router:** Power them up and link with an Ethernet cable.
  + **Access Router Settings:** Connect a computer to the router, open a browser, and log in using the router’s IP address.
  + **Configure Wi-Fi:** Set the network name (SSID), choose security (WPA2/WPA3), and set a strong password.
  + **Connect Devices:** Select the Wi-Fi network on each device and enter the password.
  + **Test Connection:** Ensure all devices can access the internet.
  + **Secure Network:** Change default passwords, update firmware, and enable encryption.

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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:**

**Step 1: Connect Your Router**

1. **Connect Modem:** Plug your modem into the WAN/Internet port on your router.
2. **Power Up:** Turn on both the modem and the router.

**Step 2: Access Router Settings**

1. **Connect to Router:** Use an Ethernet cable to connect a computer to one of the router’s LAN ports.
2. **Open Browser:** Open a web browser and enter the router’s IP address (usually found in the router’s manual or on a sticker on the router).
3. **Log In:** Enter the default username and password (also found in the manual or on the router).

**Step 3: Enable DHCP**

1. **Navigate to DHCP Settings:** Look for a section labeled "LAN" or "Network" settings.
2. **Enable DHCP:** Ensure the DHCP server is enabled. This will allow the router to automatically assign IP addresses to devices on your network.

**Step 4: Configure DHCP Settings (if needed)**

1. **Set IP Range:** Define the range of IP addresses that the router can assign to devices.
2. **Set Gateway:** Ensure the router’s IP address is set as the default gateway.
3. **Set DNS Servers:** Optionally, you can specify DNS servers for your network.

**Step 5: Save and Apply Settings**

1. **Save Changes:** Save the settings and apply them.
2. **Restart Router:** Restart the router if necessary to apply the changes.

**Step 6: Connect Devices**

1. **Connect Devices:** On each device, go to the Wi-Fi settings and select your network’s SSID.
2. **Enter Password:** Enter the Wi-Fi password and connect.

**Step 7: Test Connectivity**

**Check Connection:** Ensure all devices can connect to the Wi-Fi network and access the internet.

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| **SECTION 5: ESSAY** |

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

* **Answer:**

**1. Troubleshooting and Maintenance**

* **Quick Reference:** Documentation provides a quick reference for network configurations, making it easier to identify and fix issues.
* **Error Resolution:** Helps in diagnosing and resolving errors swiftly, minimizing downtime.

**2. Network Security**

* **Access Control:** Detailed records help manage who has access to what parts of the network.
* **Audit Trail:** Provides an audit trail of changes, which is essential for security compliance and tracking unauthorized modifications.

**3. Efficient Network Management**

* **Configuration Management:** Keeps track of network configurations, ensuring consistency across devices.
* **Resource Allocation:** Helps in managing and allocating network resources efficiently.

**4. Scalability and Upgrades**

* **Planning:** Detailed documentation aids in planning network expansions and upgrades.
* **Implementation:** Facilitates smoother implementation of new technologies or scaling the existing network.

**5. Knowledge Transfer**

* **Onboarding:** Assists in training new employees by providing them with comprehensive network information.
* **Continuity:** Ensures continuity of network management even when key personnel are unavailable.

**6. Compliance and Audit**

* **Regulatory Compliance:** Helps in complying with industry regulations and standards.
* **Audit Preparation:** Makes it easier to prepare for and pass network audits.

**7. Disaster Recovery**

* **Recovery Plans:** Documentation includes disaster recovery plans, ensuring a swift and efficient response to network failures.