Assignment module 3 : Understanding and Maintenance of 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

Ans: c) Forwarding data packets between networks

d) Managing user authentication and access control

2. What is the purpose of DNS (Domain Name System) in a computer network?

a) Encrypting data transmissions for security

b) Assigning IP addresses to devices dynamically

Ans: c) Converting domain names to IP addresses

d) Routing data packets between network segments

3. What type of network topology uses a centralized hub or switch to connect all devices?

Ans: a) Star

b) Bus

c) Ring

d) Mesh

4. Which network protocol is commonly used for securely accessing and transferring files over a network?

a) HTTP

Ans: b) FTP

c) SMTP

d) POP3

Section 2: True or False

5. 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

6. True or False: DHCP (Dynamic Host Configuration Protocol) assigns static IP addresses to network devices automatically**.**

Ans: False

7. True or False: VLANs (Virtual Local Area Networks) enable network segmentation by dividing a single physical network into multiple logical networks

Ans:True

Section 3: Short Answer

8. Explain the difference between a hub and a switch in a computer network

Ans:

Here's difference between a **hub** and a **switch** in a computer network:

Feature	Hub	Switch
Function	Broadcasts data to all devices on the network.	Sends data directly to the intended device.
Efficiency	Less efficient—creates more network traffic.	More efficient—reduces unnecessary traffic.
Speed	Slower, as all devices share bandwidth.	Faster, as each device gets dedicated bandwidth.
Data Handling	Cannot filter or manage data.	Filters and directs data intelligently.

Feature	Hub	Switch
Cost	Cheaper.	Slightly more expensive.
Use Case	Small, simple networks.	Larger, more complex networks.

9. Describe the process of troubleshooting network connectivity issues.

Ans:

Here's a process for troubleshooting network connectivity issues:

1. **Check Physical Connections:**
   - Ensure cables are plugged in and the router or switch is powered on.
2. **Restart Devices:**
   - Restart your computer, router, and modem.
3. **Check Wi-Fi or Network Settings:**
   - Make sure your device is connected to the correct network.
4. **Ping Test:**
   - Use the command `ping` to test connectivity to a website (e.g., `ping google.com`).
5. **Check IP Configuration:**
   - Ensure your device has the correct IP address (use `ipconfig` or `ifconfig`).
6. **Disable and Re-enable Network Adapter:**
   - Reset the adapter in your computer's network settings.
7. **Check for ISP Issues:**
   - Contact your Internet Service Provider if nothing works.
8. **Test with Another Device:**
   - See if another device can connect to rule out hardware issues.

Section 4: Practical Application

10. Demonstrate how to configure a wireless router's security settings to enhance network security.

Ans:

Here's to configure a wireless router's security settings:

1. **Log In to the Router:**
    - Connect to the router and enter its IP address (e.g., `192.168.1.1`) in a browser.
    - Log in using the admin username and password.
2. **Change the Default Password:**
    - Go to the **Admin Settings** and set a strong password for the router.
3. **Enable WPA3 or WPA2 Security:**
    - In **Wireless Settings**, select **WPA3** or **WPA2-PSK** for strong encryption.
    - Set a strong Wi-Fi password.
4. **Disable WPS (Wi-Fi Protected Setup):**
    - Turn off WPS to prevent easy access to the network.
5. **Enable Firewall:**
    - Activate the router's built-in firewall for added protection.
6. **Hide SSID (Optional):**
    - Hide your network name (SSID) so it's not visible to others.
7. **Update Firmware:**
    - Check for updates in the **Firmware Settings** and install the latest version.
8. **Save and Restart:**
    - Save changes and restart the router.

Section 5: Essay

11. Discuss the importance of network documentation and provide examples of information that should be documented.

Ans:

Importance of Network Documentation:

Network documentation is essential for managing, troubleshooting, and scaling a network effectively. It helps:

- **Troubleshooting:** Quickly identify and fix issues.
- **Management:** Keep track of devices and configurations.
- **Planning:** Simplify upgrades or expansions.
- **Collaboration:** Share network details with IT teams.
- **Security:** Identify unauthorized devices or access.

Examples of Information to Document:

1. **Network Topology:**
    - Diagram showing how devices (routers, switches, computers) are connected.
2. **IP Addressing:**
    - List of all IP addresses and the devices assigned to them.
3. **Device Details:**
    - Information like device names, models, serial numbers, and locations.
4. **Login Credentials:**
    - Admin usernames and passwords for routers, switches, and firewalls (stored securely).
5. **Configuration Settings:**
    - Current settings for devices (e.g., firewall rules, VLANs, or wireless SSIDs).
6. **Cable Layouts:**
    - Map of physical cable connections between devices.
7. **Backup Information:**
    - Locations of configuration backups and how to restore them.