**Module 8: Network Access Basic routing and Advanced routing concept, switching concept**

**1. Explain Switch**

**Answer:**  A switch is a networking device used to connect devices in a local area network (LAN). It operates at the data link layer (Layer 2) of the OSI model, forwarding data based on MAC addresses. Some switches also function at Layer 3, performing routing tasks. Key features include:

* **MAC Address Table**: Maintains a table mapping MAC addresses to specific switch ports.
* **Full-Duplex Communication**: Allows simultaneous data transmission and reception.
* **High Throughput**: Reduces collisions and increases data flow efficiency.

**2. Explain Switch Boot Sequence**

**Answer:** The switch checks NVRAM for a saved configuration file (called the startup-config).

If a configuration file is found, it is loaded into RAM as the running-config, which becomes the active configuration.

If no configuration is found, the switch enters setup mode, prompting the user to configure basic settings interactively.

To load the operational settings (e.g., VLANs, interfaces, security settings) that were saved previously.

**3. Explain Three Methods to access Switch Command Line Interface.** **Answer:** **You** can access a switch's CLI through the following methods:

1. **Console Access:**
   * Uses a physical console cable (RJ-45 or USB) to connect the switch to a PC/laptop.
   * Requires terminal emulation software (e.g., PuTTY, Tera Term).
2. **Telnet/SSH:**
   * Provides remote access via IP.
   * Telnet is unsecure, while SSH is encrypted and secure.
3. **Auxiliary (AUX) Port:**
   * Access via modem or dedicated serial connection.
   * Primarily for remote management in legacy systems.

**4. Explain and Configuring the Cisco Internet Operating System**

**Answer:** The Cisco IOS is the operating system that runs on Cisco networking devices like switches and routers. It provides a CLI for configuration, monitoring, and troubleshooting.

Key Steps to Configure Cisco IOS:

1. Access the CLI:
   * Connect via console, SSH, or Telnet.
2. Enter Privileged EXEC Mode:
   * Use the enable command.
3. Enter Global Configuration Mode:
   * Use the configure terminal command.

4. Configure Device Settings:

* Set hostname: hostname <name>.
* Set passwords: enable secret <password>.
* Configure interfaces: interface <type/number>, followed by IP address commands.

5. Save the Configuration:

* Use the write memory or copy running-config startup-config command.

**5. Explain Switch Port**

A switch port is a physical interface on a switch that connects devices like computers, printers, or other switches. Each port can be configured for specific behaviors:

* Access Port: Connects to end devices and carries traffic for a single VLAN.
* Trunk Port: Connects to other switches/routers and carries traffic for multiple VLANs using tagging protocols like 802.1Q.
* Speed and Duplex Settings: Configurable as auto, full-duplex, or half-duplex with speed options (10/100/1000 Mbps).