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Module 8: Network Access Basic routing and Advance routing concept, switching concept-

1. Explain Switch
Ans:

A switch is a networking device used to connect multiple devices on a local area network (LAN). It operates at the Data Link Layer (Layer 2) of the OSI model and uses MAC addresses to forward data to the appropriate device. Switches enable efficient data transmission by directing packets only to the intended recipient, reducing network congestion.

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2. Explain Switch Boot Sequence
Ans:

The switch boot sequence involves the following steps:

1. **Power-On Self-Test (POST):** The switch performs diagnostics to ensure all hardware components are functioning.
2. **Loading the Boot Loader:** A small program initializes the CPU and other hardware components.
3. **Loading the IOS (Internetwork Operating System):** The switch locates and loads the Cisco IOS image from flash memory.
4. **Configuration Load:** The startup configuration is loaded from NVRAM. If no configuration exists, the switch enters setup mode.

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3. Explain Three Methods to Access Switch Command Line Interface
Ans:

1. **Console Access:** Connect directly to the switch using a console cable and a terminal emulator (e.g., PuTTY).
2. **Telnet Access:** Use the Telnet protocol to remotely access the switch CLI over the network. Telnet requires the switch to have an IP address configured.
3. **SSH Access:** Secure Shell (SSH) provides a secure method to remotely access the CLI. It encrypts all communications and is preferred over Telnet.

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4. Explain and Configuring the Cisco Internet Operating System
Ans:

Cisco IOS is the software used to manage Cisco devices. To configure a Cisco IOS device:

1. Access the device using the console, Telnet, or SSH.
2. Enter **privileged EXEC mode** by typing `enable`.
3. Access **global configuration mode** by typing `configure terminal`.
4. Apply configurations (e.g., IP address, VLANs, security settings).
5. Save the configuration using the command `write memory` or `copy running-config startup-config`.

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5. Explain Switch Port
Ans:

A switch port is a physical interface on a switch where devices such as computers, printers, or other network devices can connect. Switch ports can be configured as:

- **Access Ports:** Used to connect end devices to a single VLAN.
- **Trunk Ports:** Used to carry traffic for multiple VLANs between switches.
- **Dynamic Ports:** Can automatically negotiate their mode (access or trunk).

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6. Assuming that all four routers can ping each other's LAN IP addresses after the configuration has been applied, choose the routers that will be able to form a neighbor relationship with the other routers on the LAN.
Ans:

The routers that can form a neighbor relationship are **R1** and **R2**. This is because their configurations align with the necessary protocols (such as OSPF or EIGRP) to establish adjacency on the LAN.