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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.

7. Enable secret [password] is hashed using the _____ algorithm.
A. MD5
B. AH
C. PSK
D. ESP
E. WPA2

Ans:
A. MD5
The enable secret [password] is hashed using the **MD5** algorithm, which is a cryptographic hashing method used in Cisco devices for securely storing passwords.

8. An engineer connects to Router R1 and issues a show ip ospf neighbor command. The status of neighbor 2.2.2.2 lists FULL/BDR. What does the BDR mean?
A. R1 is an Area Border Router.
B. R1 is a backup designated router.
C. Router 2.2.2.2 is an Area Border Router.
D. Router 2.2.2.2 is a backup designated router.

Ans:

D. Router 2.2.2.2 is a backup designated router.
The BDR (Backup Designated Router) ensures network stability by taking over as the Designated Router (DR) if the current DR fails. The status FULL/BDR indicates that Router 2.2.2.2 is fully adjacent and functioning as a Backup Designated Router.

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9. Which command is used to view the neighbor discovery table on a PC?
A. show ipv6 neighbor
B. show ipv6 neighbors
C. netsh interface ipv6 show neighbor
D. netsh interface ipv6 show neighbors

Ans:

B. show ipv6 neighbors
The **show ipv6 neighbors** command displays the IPv6 neighbor discovery table, which contains information about neighboring devices, including their link-layer addresses and state.

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10. What type of variable is being shown? Routers = [R1, R2, R3]
A. List
B. Dictionary
C. Simple
D. Unsigned integers

Ans:

A. List

A **List** is an ordered collection of elements enclosed in square brackets. In this case, the list contains the elements R1, R2, and R3.

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11. Identify the fields in an IPv4 header. (Choose three)
A. Host component
B. Time to Live
C. Source address
D. Destination address
E. Network

Ans:

B. Time to Live
C. Source address
D. Destination address

The IPv4 header includes several key fields, such as:

- **Time to Live (TTL):** Limits the lifespan of the packet to prevent infinite looping.
- **Source Address:** Indicates the IP address of the sender.
- **Destination Address:** Indicates the IP address of the recipient.