**Module 3 CCNA**

**Cisco Wireless Technology**

Cisco Wireless Technology encompasses a range of solutions for wireless networking, including access points, controllers, and management software. Cisco's solutions offer robust, secure, and scalable wireless networks that support various applications, from small businesses to large enterprises. Key features include seamless roaming, advanced security protocols, and integration with Cisco DNA Center for network automation and assurance.

**List of IEEE Wireless Standards**

IEEE 802.11: Standards for wireless local area networks (WLANs).

802.11a: 5 GHz, 54 Mbps

802.11b: 2.4 GHz, 11 Mbps

802.11g: 2.4 GHz, 54 Mbps

802.11n: 2.4/5 GHz, 600 Mbps

802.11ac: 5 GHz, up to 3.46 Gbps

802.11ax (Wi-Fi 6): 2.4/5 GHz, up to 9.6 Gbps

**Wireless Topologies**

Infrastructure Mode: Uses a central access point (AP) to connect devices.

Ad Hoc Mode: Direct connection between devices without an AP.

Mesh Network: Multiple APs create a mesh for extended coverage and redundancy.

Point-to-Point (PtP): Direct link between two locations.

Point-to-Multipoint (PtMP): One AP connects multiple devices.

**Wireless Security Protocols and Encryption Methods**

WEP (Wired Equivalent Privacy): Basic encryption, now considered insecure.

WPA (Wi-Fi Protected Access): Uses TKIP for better security.

WPA2: Stronger encryption with AES.

WPA3: Improved security over WPA2, including better encryption methods and secure authentication.

**Example of DHCP Configuration**

**ip dhcp pool NETWORK\_POOL**

**network 192.168.1.0 255.255.255.0**

**default-router 192.168.1.1**

**dns-server 8.8.8.8 8.8.4.4**

**lease 7**

**What is ACL? Types of ACL and Example of Extended ACL**

Access Control List (ACL): A set of rules used to control network traffic and reduce network attacks. Types include:

Standard ACL: Filters traffic based only on source IP.

Extended ACL: Filters traffic based on source and destination IP, port numbers, and protocols.

Example of Extended ACL:

access-list 101 permit tcp 192.168.1.0 0.0.0.255 any eq 80

access-list 101 deny ip any any

Example of Port Security on a Switch

switchport mode access

switchport port-security

switchport port-security maximum 2

switchport port-security violation restrict

switchport port-security mac-address sticky

**List of WAN Connections with Protocols**

Leased Lines: PPP (point-to-point) , HDLC High level Data link protocol

Frame Relay: Frame Relay protocol

MPLS (Multiprotocol Label Switching): MPLS protocol

DSL: PPPoE

Cable Modem: DOCSIS

Explain Frame-Relay and PPP

Frame-Relay: A WAN protocol that uses virtual circuits to connect multiple locations. It offers cost-effective and scalable bandwidth allocation.

PPP (Point-to-Point Protocol): A layer 2 protocol used to establish a direct connection between two nodes. It supports authentication, encryption, and compression.

What is NAT? Explain with One Example

Network Address Translation (NAT): A method of remapping IP addresses by modifying network address information in the IP header of packets.

Example:

ip nat inside source list 1 interface GigabitEthernet0/1 overload

access-list 1 permit 192.168.1.0 0.0.0.255

What is HDLC? Which Command to Show in Software

HDLC (High-Level Data Link Control): A layer 2 protocol for synchronous data link layer communication.

Show Command:

show interfaces serial 0/0/0

What is Encapsulation? Example of GRE Tunnel

Encapsulation: Wrapping data with protocol information before transmission.

Example of GRE Tunnel:

interface Tunnel0

ip address 10.0.0.1 255.255.255.252

tunnel source 192.168.1.1

tunnel destination 192.168.2.1