

# CCNA Assignments

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## Module - I

(1) Explain is the OSI reference model?

- OSI Stands for open system Interconnection is a reference model that describes how information from a software application in one computer move through a physical medium to the software application in another computer.
- There are the seven OSI layers. Each layer has different functions.
  1. Physical Layer
  2. Data-link Layer.
  3. Network Layer.
  4. Transport Layer.
  5. Session Layer.
  6. Presentation Layer.
  7. Application Layer.

- 1. Physical Layer.
  - The main functionality of the Physical Layer is to transmit the individual bits from one node to another node.
- Lowest Layer of the OSI model.

## 2. Data-link Layer:-

- This layer is responsible for the error-free transfer of data frames.
- It is mainly responsible for the unique identification ~~between~~ of each device that resides on a local network.

## 3. Network Layer:-

- It is a layer 3 that manages device addressing, tracks the location of device on the network.
- The protocols used to route the network traffic are known as Network layer protocols.

## 4. Transport Layer:-

- The Transport layer is a layer to ensure that message are transmitted in the order in which they are sent and there is no duplication of data.

- The main responsibility of the Transport layer is to transfer the data completely.

## 5. Session Layer

- The Session Layer is used to establish, maintain and synchronize the interaction between communicating devices.
- It is Layer 3 in the OSI model.

## 6. Presentation Layer :

- A Presentation Layer is mainly concerned with the syntax and semantics of the information exchanged between the two systems.
- It acts as a data translator for network.
- This layer is a part of the operating system that converts the data from one presentation format to another format.

## 7. Application Layer

- Application Layer serves as a window for users and application processes to access network service.



→ It handles issues such as network transparency, resource allocation, etc.

## (2) What is a Network?

→ A network is collection of computers, servers, mainframes, network devices, peripherals, or other devices connected to allow data sharing.

Example:-

An Example of a Network is the Internet, which connects millions of people all over the world.

## (3) What are Routers?

→ Routers are networking devices operating at layer 3 of a Network Layer of the OSI model.

→ They are responsible for receiving, analysing, and forwarding data packets among the connected computer networks.

→ When a data packet arrives, the router inspects the destination address, consults its routing tables to decide the optimal route and then forwards the packet along this route.

#### (4) Explaining Encapsulation.

→ Encapsulation is a process by which a lower-layer protocol receives data from a higher-layer protocol and then places the data into the data portion of its frame.

→ Thus, encapsulation is the process of enclosing one type of packet using another type of packet.

→ Encapsulation at the lowest level of the OSI reference model is sometimes referred as framing.

#### (5) Peer-to-Peer Communication.

→ A Peer-to-Peer (P2P) network is a type of network in which each participant can act as both a client and a server, allowing them to share resources.

and information directly with one another without the need for a central server.

- P2P networks are decentralized, meaning that there is no central authority or organization that controls the network or its resources.
- In a P2P network, each peer has equal status and can connect to any other peer on the network.

### (6) What is TCP and UDP?

#### → TCP

- Transmission Control Protocol.
- TCP is a connection-based protocol.
- TCP is more reliable, it transfers data more slowly.

→ For Example, we want to view a Web Page, then we expect that nothing should be missing on the page. If we want to download a file, then we require a complete file, nothing should be missing either it could be a text or an image.

## → UDP

→ UDP stands for User Datagram Protocol. its working is similar to the TCP as it is also used for sending and receiving the message.

→ UDP is a Connectionless Protocol. Connectionless means that no connection establishes prior to communication.

7) What is Internetwork operating system software?

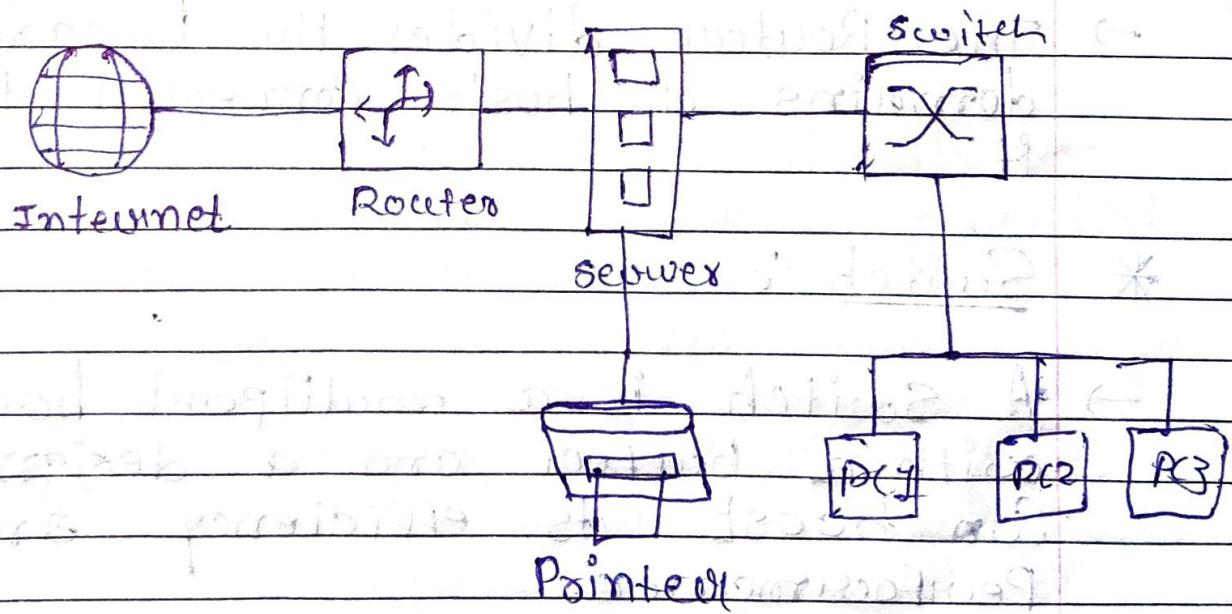
→ Cisco IOS is a Proprietary operating system that runs on Cisco Systems routers and switches.

→ The core function of Cisco IOS is to enable data communications between network nodes.

→ In addition to routing and switching Cisco IOS offers dozens of additional services that an administrator can use to improve the performance and security of network traffic.

8) Explain LAN and discuss any example.

- A local Area Network (LAN) is a Network contained within a Small geographic area.
- Usually within the same building. Home WiFi networks and small business network are common examples of LANs.
- Most LANs connect to the internet at a central Point: a router. Home LANs often use a single router.



Local Area Network

(9) Explain Network Device - Router, Switch and Hub.

\* Router :-

- Router is a device like a switch that routes data packets based on their IP addresses.
- The Router is mainly a Network Layer device. Routers normally connect LANs and WANs and have a dynamically updating routing table based on which they make decisions on routing the data packets.
- The Router divides the broadcast domains of hosts connected through it.

\* Switch :-

- A Switch is a multipoint bridge with a buffer and a design that can boost its efficiency and performance.
- A switch is a data link layer device. The switch can perform error checking before forwarding data.

→ Switch divides the Collision domain of hosts, but the broadcast domain remains the same.

### \* Hub :-

- A hub is a basically Multi-Port repeater. A hub connects multiple wires coming from different balances. For example, the connector in star topology which connects different stations.
- Hubs cannot filter data, so data packets are sent to all connected devices.
- In other words, the collision domain of all hosts connected through hub remains one.

(Q) Describe Router and Switch connection in LAN.

- All of the devices you will connect to the switch are powered off.

- Connect an ethernet cable to one of the numbered ports on the switch, then connect the other end to a wired device such as a computer, a gaming console or to another switch.
- Connect additional device. In this example, we will be connecting devices from port 1 to 4.
- Connect an ethernet cable to one of the ports at the back of the switch. Then connect the other end to one of the ethernet ports at the back of the router.
- Connect the supplied power adapter to the power port on the switch, then connect the other end into an electrical outlet.
- Power ON the devices connected to the switch.
- Depending on your type of switch there is a LED corresponding to each port that will indicate its connectivity status.

11) Type of Cable - explain types of Ethernet and Speed.

- Coaxial cables.
- Twisted Pair Cables.
- Fibre optics.
- USB Cables.
- Serial and Parallel Cables.
- Ethernet cables.

\* Types of Ethernet and Speed

<u>Types</u>	<u>Speed</u>
Standard Ethernet	- 10 Mbps
Fast Ethernet	- 100 Mbps
Gigabit Ethernet	- 1 Gbps
Ten-Gigabit Ethernet	- 10 Gbps.

12) Explain TCP/IP - List of Protocol and Port Number.

- TCP/IP stands for Transmission Control Protocol / Internet Protocol and is a suite of communication protocols used to interconnect network device on the internet.
- TCP/IP is also used as a communication protocol in a private computer network.

## Protocol

## Port Number

http	80
ftp	20, 21
email - Simple	
Non-encrypted	25
Secure (TLS)	587
Secure (SSL)	465
POP 3	
Non- encrypted	110
Secure (SSL)	995
Telnet	23
SSH	22

(3) Explain Node (backbone) and Physical layer.

→ backbone

→ A backbone is a Component of the computer network infrastructure that connects multiple networks and provides a conduit for data flow between them.

→ A backbone may connect different Local area networks in Workplaces, Campuses, our buildings.

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- A backbone is a series of passageways that other significant networks connect to for long distance communication on a massive scale.
  - Various networking technologies collaborate as connecting points or nodes.

Two types of backbone.

- Distributed
- Collapsed backbone.

## Physical Layer.

- The physical layer is the first and lowest layer of the open systems interconnection communication model.
- The Physical layer's function is to transport data using electrical, mechanical or procedural interfaces.