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Ans. to the ques no.(1a)

In mesh topology each device is connected to every other device on the network through a dedicated point-to-point link.

Total number of devices: n = 10.
Total cable are needed: (n*(n - 1)) / 2 = 45.
Total number of ports are needed for each device: (n-1) = 9.

Ans. to the ques no.(1b)

Transport Layer is responsible for delivery of a message from one process to another.

Two functions of transport layer are:

1. Port addressing
2. Segmentation and reassembly

Ans. to the ques no.(1c)

Meaning of the following response status code:

1. **301 (Moved Permanently)**: Requested object moved, new location specified later in this message.
2. **404 (Not Found)**: Requested document not found on this server.

Ans. to the ques no.(1d)

	Decimal	Binary
IP Address	16.5.2.10	00010000.00000101.00000010.00001010
Subnet mask	255.255.255.128	11111111.11111111.11111111.10000000

Here, we can see that there are 25 bits set to 1 in the binary version of the subnet mask.
So, the prefix length will be = 25
IP address (CIDR notation) : **16.5.2.10/25**

Ans. to the ques no.(1e)

IPV4: Loopback addresses: 127.0.0.0 to 127.255.255.255 are reserved. 127.0.0.1, as a special address used by a host to direct traffic to itself.

IPV6: In IPV6, the loopback address has All-0s except the last bit, represented as ::1/128 or ::1.

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Ans. to the ques no.(2a)

Best-effort delivery describes a network service in which the network does not provide any guarantee that data is delivered or that delivery meets any quality of service. In a best effort IP network all IP packets are treated in the same fashion. Some packets may be lost along the way.

2 properties of the best effort service are:

1. **Reduces the overhead of IP:** IP also does not require additional fields in the header to maintain an established connection. This process greatly reduces the overhead of IP.

2. **Does not provide guaranteed packet delivery:** The IP protocol does not guarantee that all packets that are delivered or received. Best effort refers to a network service that attempts to deliver messages to their intended destinations but which does not provide any special features that retransmit corrupted or lost packets. Thus, there are no guarantees regarding delivery.

Another protocol which provides the best effort service is **UDP**.

Ans. to the ques no.(2b)

In TCP, there is no encryption. Cleartext passwords sent into the socket traverse the Internet in cleartext.

SSL (Secure Sockets Layer) is used to provide security. It does the following:

- Encrypted TCP connection
- Data integrity
- end-point authentication
- Encrypted text

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Ans. to the ques no.(2c)

A table with available residential access technologies with advertised downstream rate and upstream rate give below:

Residential Access Technology	Downstream Rate	Upstream Rate
Digital Subscriber Line (DSL)	24 Mbps	2.5 Mbps
Cable Network	30 Mbps	2 Mbps
Fiber To The Home(FTTH)	2.4 Gbps	1.2 Gbps
3G	100 Mbps	50 Mbps
LTE/4G	1000 Mbps	500 Mbps

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Ans. to the ques no.(3)

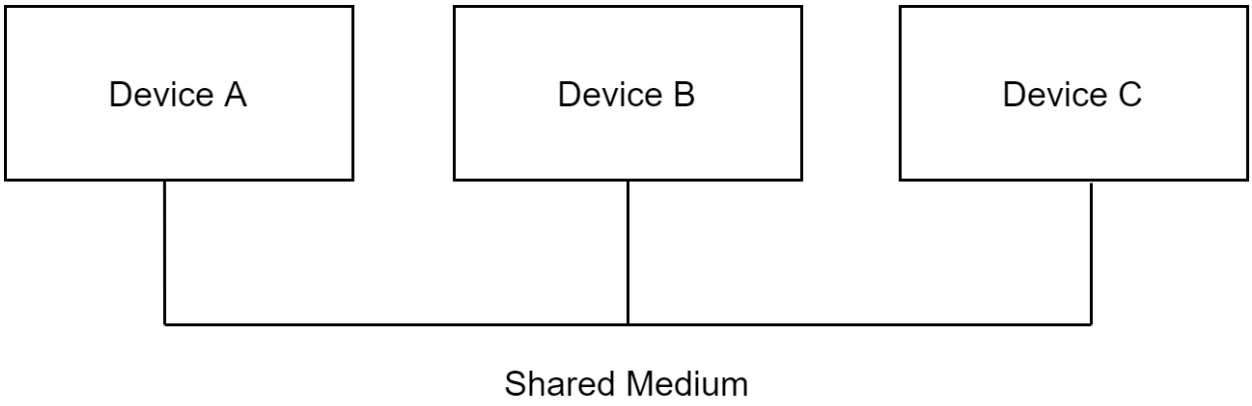
Carrier Sense Multiple Access (CSMA) technology is a method for controlling how the nodes share access.

Yes, frames can collide with csma. The process is described below:

- Used to first detect if the media is carrying a signal
- If no carrier signal is detected, the device transmits its data
- If two devices transmit at the same time - data collision

CSMA/CD is a modification of pure carrier-sense multiple access (CSMA). CSMA/CD is used to improve CSMA performance by terminating transmission as soon as a collision is detected, thus shortening the time required before a retry can be attempted. CSMA / CD resends the data frame whenever a conflict occurs. It is more efficient than simple CSMA.

Wireless connections in a LAN environment still have to take collisions into account.



When device A, B, or C all try to transport data over the same medium at the same time, data collisions occur. These issues are addressed by CSMA/CD.

Carrier Sense Multiple Access / Collision Detection, or CSMA/CD, keeps an eye on the media to see if it's free or busy. If CSMA/CD ends that the medium is free and that no device is using it, the data is transmitted.

However, when indications indicate that another device is transferring data, all devices cease transmission and attempt again later. This approach allows just one device to use media at a time.However, practically all cable connections between devices in a LAN are now full-duplex. As a result, there are no collisions. At the same time, devices can send and receive data. So, the processes of CSMA/CD are not needed for a full duplex medium.