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Course Code : CO 0313_T

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Q1 a] TCP is a connection oriented protocol, while UDP is a connection-less protocol.
Since UDP does not have any requirements, it offers a faster connection. TCP, on the other hand is slower but more reliable. If we need speed more than reliability, we prefer UDP over TCP.
In real-time, a user will not / cannot wait for the segments to arrive slowly, so UDP is used over TCP. For eg. DNS it uses UDP over TCP since
i. UDP is much faster than TCP. After all speed matters while loading a webpage.
ii. DNS requests are typically small requests and can be accomodated inside UDP segments (header).
UDP is used for quick response.
Thus, "UDP is more suitable than TCP for real-time traffic.

Given: 06 32 00 0D 00 1C E2 17

1. Source port number = $(0632)_{16}$ or 1586

2. Destination Port number = $(000D)_{16}$ or 13

3. Length of User Datagram = ~~$(1CE2)_{16}$ or~~
$= (001C)_{16}$ or 28 bytes

4. Length of data = 28 - 8 = 20 bytes

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Q1 b]

Static VLAN	Dynamic VLAN
1. These are manually configured VLANs by providing a name, ID (VID) and port assignments	These are formed by loading the hardware addresses of host devices in a database.
2. These are created manually.	These are created by using a software
3. They are easy to configure	They are somewhat complex to configure.
4. It provides simple way to assign a VLAN to a port.	It provides flexibility as well as mobility for end users.
5. It is more secure	It is less secure
6. Comparatively less overhead	Large administrative overhead

Q2 a] i] Association establishment in SCTP

- A connection in SCTP requires a four-way handshake.
- A connection in SCTP is called as an association.
- In four-way handshake process, normally a client wants to establish an association with another

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process, i.e., server, using SCTP transport layer protocol.
- Similarl to TCP, SCTP server must be prepared to receive any association (passive open).
- Association establishment is however initiated by the client (active open).
- No other chunk is allowed to carry packet during an INIT or INIT ACK chunk.
- An COOKIE ECHO or COOKIE chunk can carry a data chunk.

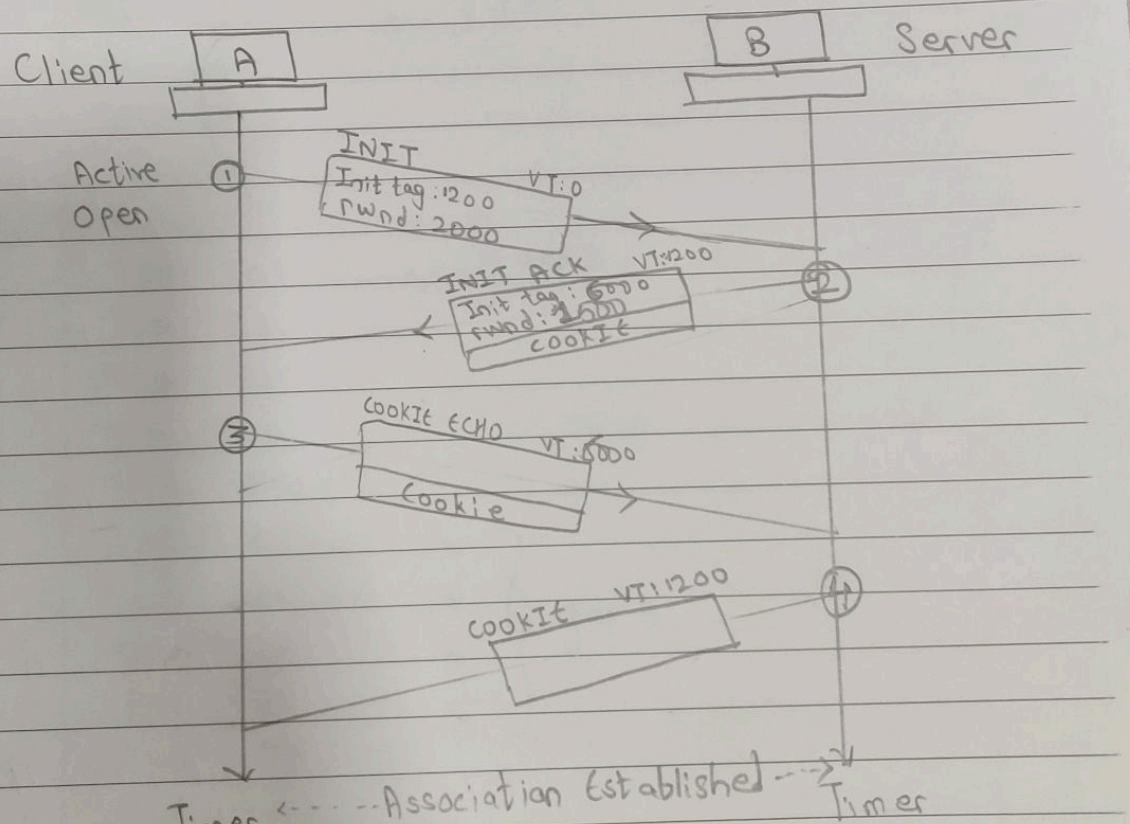

Fig: Four-way Handshaking

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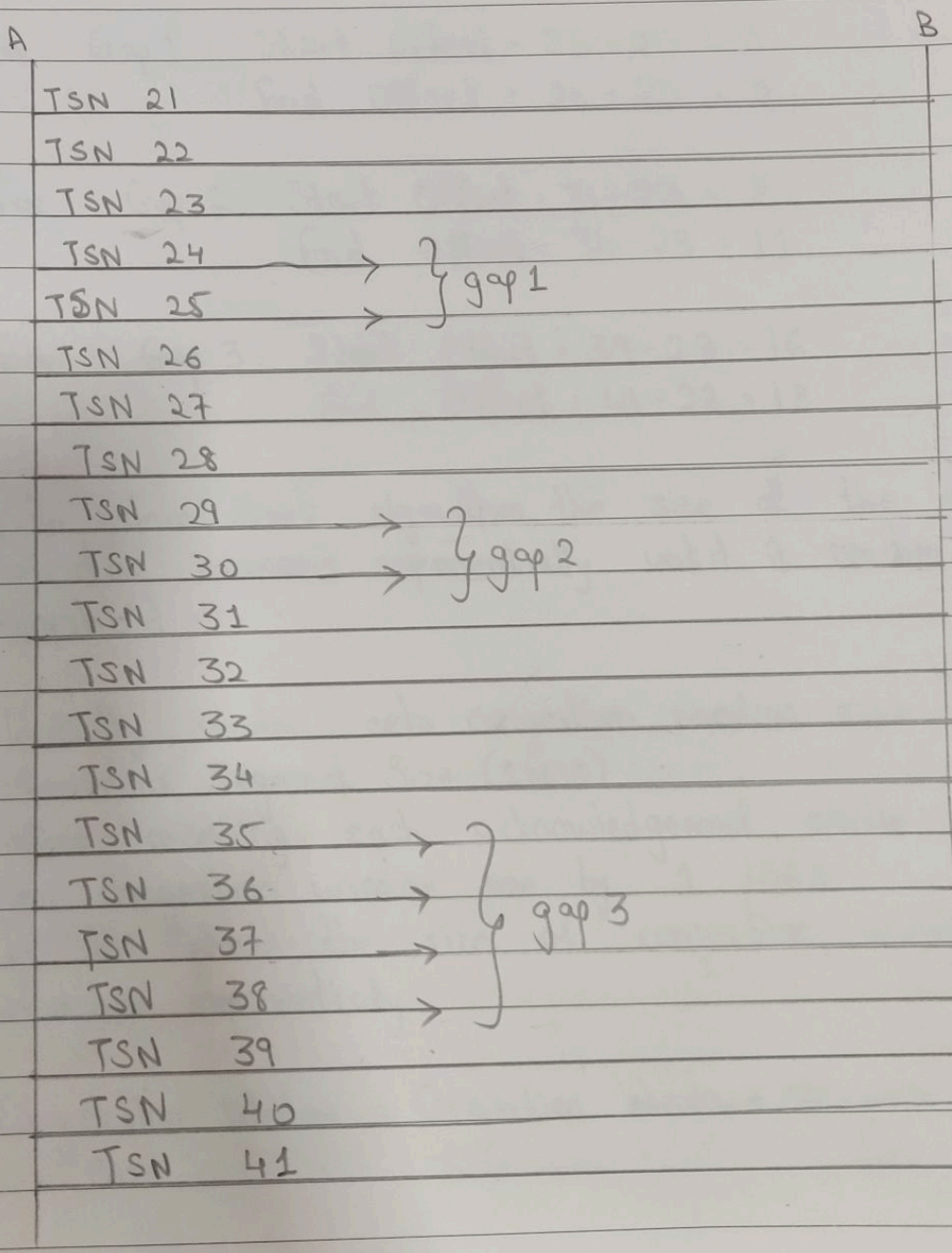
Q2 a] ii] Chunks received : 21, 22, 23, 26, 27, 28, 31, 32, 33, 34, 39, 40, 41

Chunks lost : 24, 25, 29, 30, 35, 36, 37, 38



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i. Number of gaps created = 3

ii. Cumulative TSN Ack is 23

For Gap 1 : Start Offset = 26 - 23 = 3
End Offset = 28 - 23 = 5

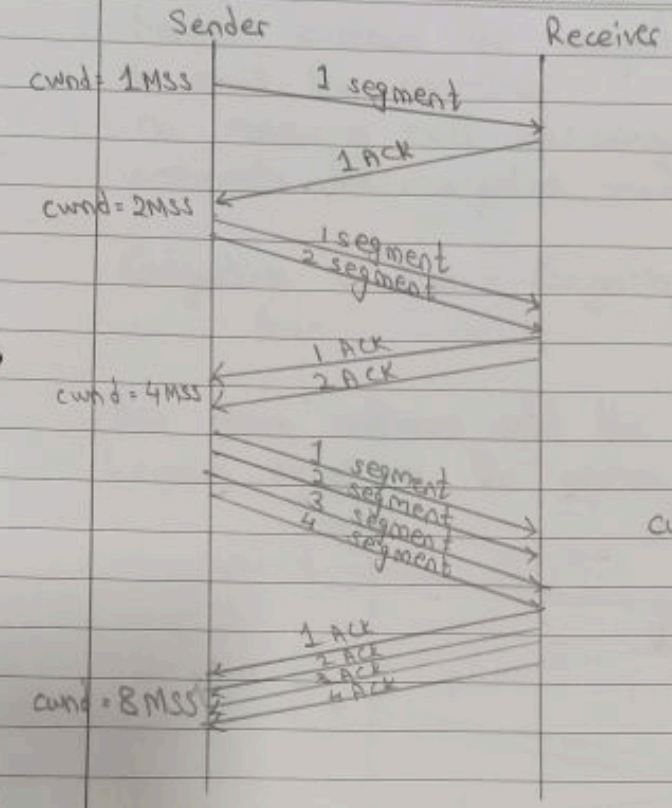
For Gap 2 : Start Offset = 31 - 23 = 8
End Offset = 34 - 23 = 11

For Gap 3 : Start Offset = 39 - 23 = 16
End Offset = 41 - 23 = 18

Q26] a] In slow start algorithm, the size of the congestion window increases exponentially until it reaches a threshold.

- Initially, sender sets congestion window size = Maximum Segment Size (1 MSS)
- After receiving each acknowledgement, sender increases the congestion window size by 1 MSS.
- In this phase, the size of congestion window increases exponentially.

Congestion Window Size = Congestion Window Size + Maximum Segment Size



Initially → cwnd = 1 MSS
After 1 RTT → cwnd = $(2)^1$ MSS
After 2 RTT → cwnd = $(2)^2$ MSS
After 3 RTT → cwnd = $(2)^3$ MSS
After n RTT → cwnd = $(2)^n$ MSS

cwnd = congestion window size

Thus, this phase continues until the congestion window size (which grows exponentially) reaches the slow start threshold.

b] In the congestion avoidance algorithm, the size of the congestion window increases additively until congestion is detected.

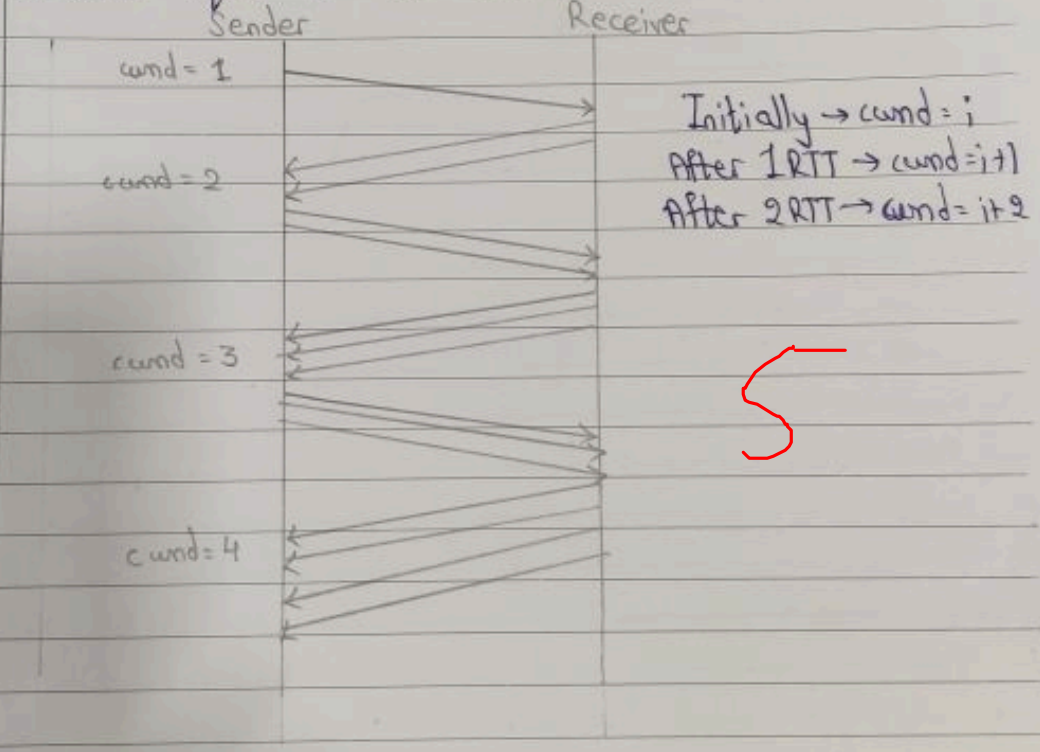
- After reaching the threshold,

i. Sender increases the congestion window size linearly to avoid the congestion.

ii. On receiving each acknowledgement, sender ~~window~~ side increments the congestion window size by 1.

Congestion Window Size = Congestion Window Size + 1

This phase continues until the congestion window size becomes equal to the receiver window size



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