



CS & IT ENGINEERING

Computer Network

1500 Series

Lecture No.- 04



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Recap of Previous Lecture



Topic

One topic

Topic

Two topic

Topics to be Covered



Topic

The transport layer

Topic

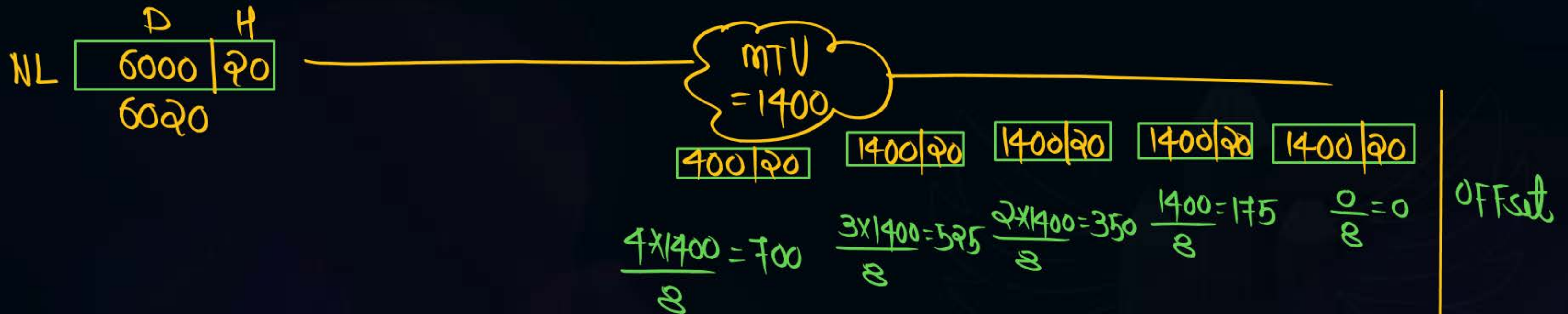
#Q. Suppose a TCP message that contains 1024 bytes of data and 20 bytes of TCP header is passed to IP for delivery across two networks interconnected by a router (i.e., it travels from the source host to a router to the destination host). The first network has an MTU of 1024 bytes; the second has an MTU of 576 bytes. Each network's MTU gives the size of the largest IP datagram that can be carried in a link-layer frame. Find the sum of offset value of all the fragments. Assume all IP headers are 20 bytes.

(P.S.D)

#Q. The transport layer passes a packet size of 4228 to network layer. The size of header at network layer is 20 bytes and maximum transmission unit (MTU) at underlying layer (DDL) is 1400 bytes excluding header. Find number of fragments and offset value of last fragment at IPv4 packet?

#Q. An IP datagram of size 2000 bytes arrives at a router. The router has to forward this packet on a link whose MTU is 300 bytes. Assume size of IP-Header is 20 bytes. The number of fragments that IP datagram will be divided into transmission is _____?

#Q. Suppose an IP Packet of size 6020 bytes with IP Header size of 20 bytes. Assume maximum transmission unit (MTU) of underlying layer is 1400 bytes without header. What is the sum of offset value of all fragments received_____?



$$700 + 525 + 350 + 175 = 1750$$

#Q. A datagram of 4000 bytes (20 bytes of IP Header + 3980 bytes of IP payload) arrives at a router and must be forwarded the link with MTU of 1500 bytes including header size of 20 bytes then at what byte the 2nd fragment is ended?

A 2960

B 1480

C 2959

D 1479

Common Data question

Consider the go back N protocol with a sender's window size of 'n'. Suppose that at time 't', the next in order packet the receiver is expecting has a sequence number of 'p'. Assume that the medium does not reorder messages.

$$GB-N, \quad W_S = N$$

[MCQ]



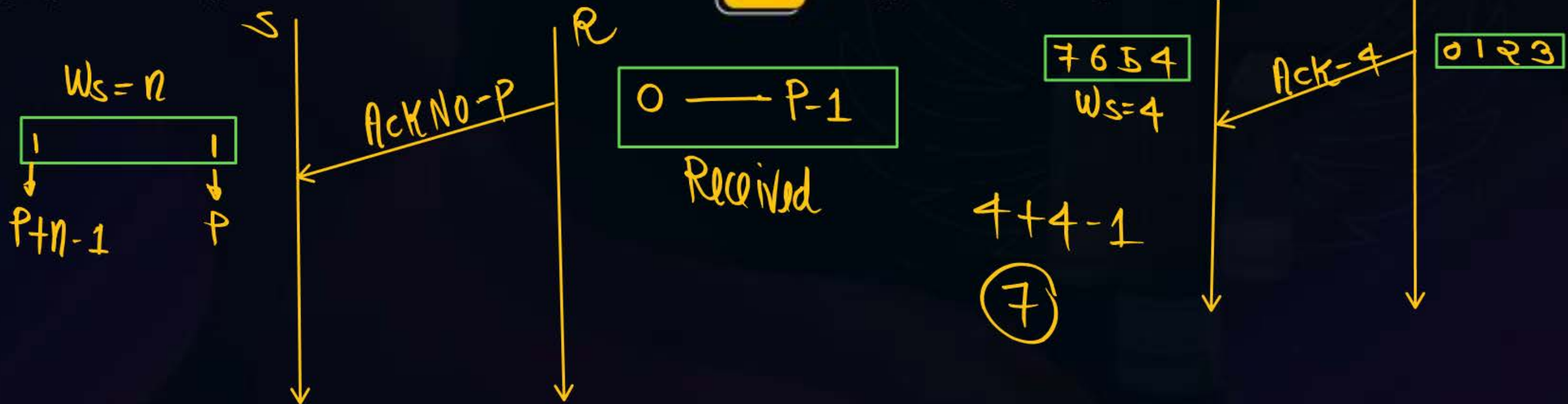
#Q. What are the possible sets of sequence numbers inside the sender's window at time 't'. Assume the sender has already received the ACKs.

A $[p - 1, p + n - 1]$

B $[p, p + n - 1]$

C $[p, p + n + n]$

D $[p + n, p + 1]$



[MCQ]



#Q. If acknowledgements are still on their way to sender, what are all possible values of the ACK field in the message currently propagating back to the sender at a time 't'?

A $[p - n, p - 1]$

C $[p, p - n]$

B $[p - 1, p - n]$

D $[p - 1, p + n]$

$0 \dots p-1$

Received

$(P-1)^{th} \text{ PKT} \xrightarrow{\text{AckNo}} P$
 $(P-2)^{th} \text{ PKT} \xrightarrow{\text{AckNo}} (P-1)$
 $(P-3)^{th} \text{ PKT} \xrightarrow{\text{AckNo}} (P-2)$
 $(P-4)^{th} \text{ PKT} \xrightarrow{\text{AckNo}} (P-3)$
 \vdots
 $(P, P-n)$

#Q. In an IPv4 datagram, the value of total-length field is $(00A0)_{16}$ and the value of the header-length (HLEN) is $(5)_6$. How many bytes of payload are being carried by the datagram? What is the efficiency (ratio of the payload length to the total length) of this datagram?

#Q. Can each of the following be the value of the offset field in a datagram?

A 8

B 31

C 73

D 56

[NAT]



An IP packet originally has a size of 7000 bytes including 20-byte header and 6980-bytes payload. To reach the destination, the route goes through three networks, A, B, and C. Network A is the one where the sender is directly connected, and Network C is where the receiver is directly connected. Network A has an MTU of 5000 bytes. Network B has an MTU of 3000 bytes. Network C has an MTU of 1000 bytes. How many fragments of original IP packet are received by the receiver? _____



[MCQ]



In IPv4 packet format, the value of HLEN is 10 and offset value is 200. The total length of packet is 300 bytes. Find first and last byte number of payload/ data packet?

- ☐ A 200, 460
- ☐ B 200, 459
- ☐ C 1600, 1860
- ☐ D 1600, 1859

[NAT]



An IPv4 packet has the first few Hexa decimal digit as shown below

4500005C0003000059060000F22F1582

VER HL
Services TL

What is first octet of Source IP Address (in decimal) 242?

$$(F2)_{16}$$
$$16^1 16^0$$

$$15 \times 16^1 + 2 \times 16^0$$

$$240 + 2 = 242$$

$$(2F)_{16}$$
$$16^1 16^0$$

$$2 \times 16 + 15 \times 16^0$$

$$47$$

$$(15)_{16}$$

$$1 \times 16 + 5$$

$$21$$

$$(82)_{16}$$

$$8 \times 16 + 2 = 130$$

$$\text{S.I.P} = \underline{242} \cdot 47 \cdot 21 \cdot 130$$

The transport layer passes a packet size of 4228 to network layer. The size of header at network layer is 20 bytes and maximum transmission unit (MTU) at underlying layer (DDL) is 1420 bytes. Which of the following options is/are TRUE?

- A** Number of fragments are 3
- B** Offset value of last fragment at IPv4 packet is 350
- C** Data Size of last fragmented is 28 bytes.
- D** Sum of offset value of all fragments is 1050.

[NAT]



$$\begin{array}{r} 56 \\ \times 41 \\ \hline 2296 \end{array}$$

An IPv4 datagram is received by an IPv4 Router, Header length (HLEN) field contains value 10 and total length field contains value 2340, MTU of the link is 100 bytes. Then total number of IP fragments after fragmentation (41)

$$HLEN = 10$$

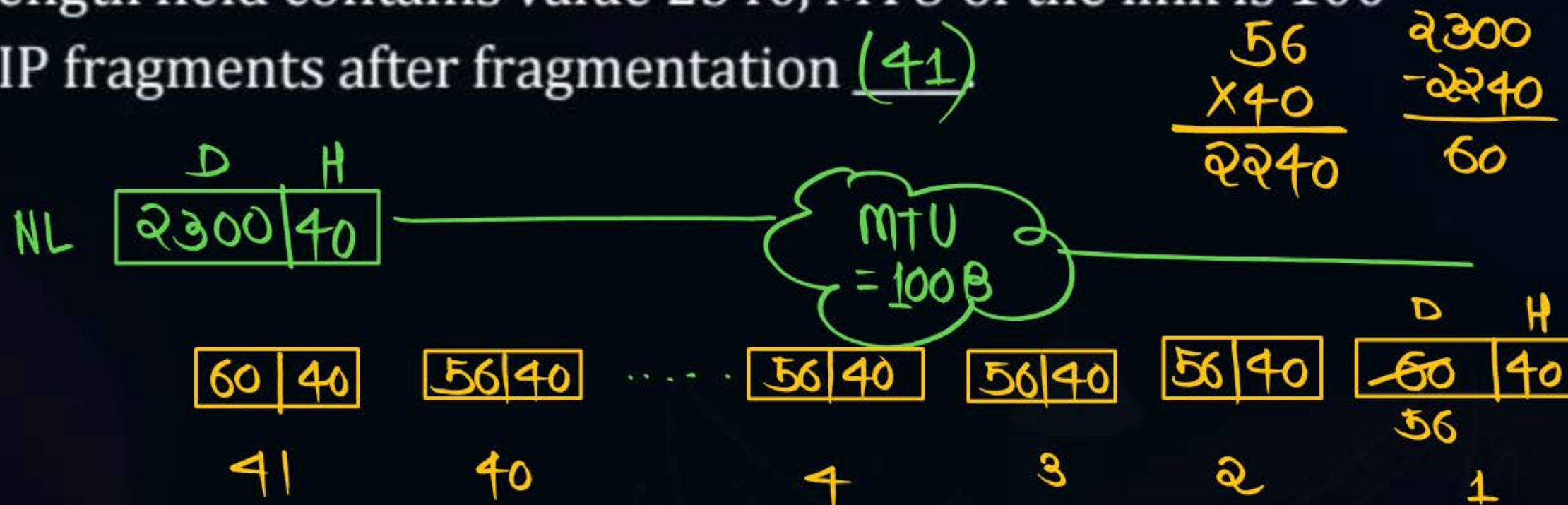
$$\text{Header size} = 10 \times 4 = 40B$$

$$\text{Total length} = 2340$$

$$\text{Data + Header} = 2340$$

$$\text{data} = 2340 - 40 = 2300$$

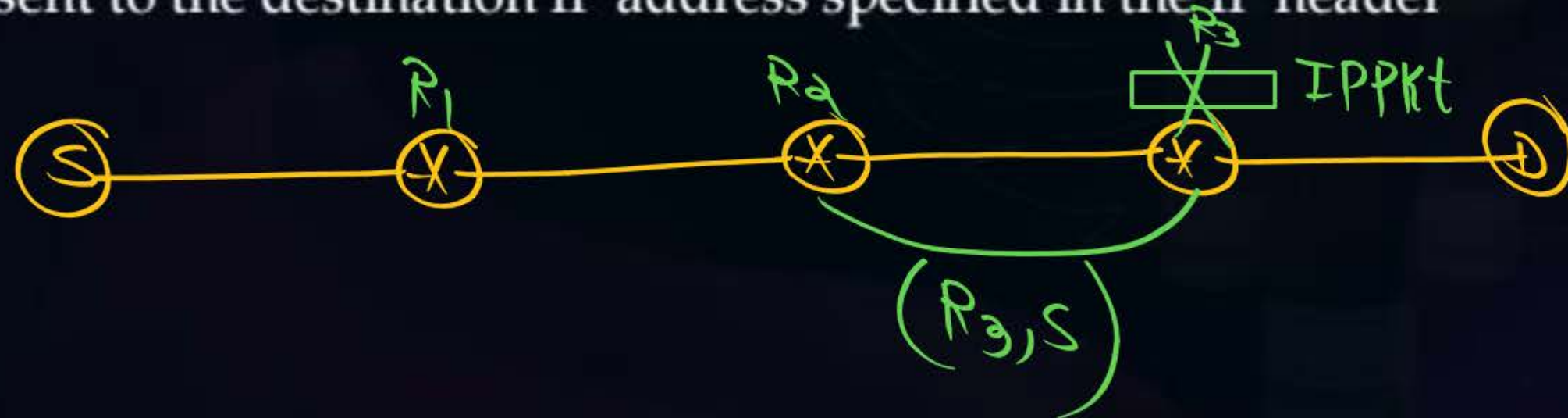
$$\text{No. of Fragments} = \frac{2300}{56} = 41.07 \approx 42 \text{ Fragment}$$



$$\begin{array}{r} 56 \\ \times 40 \\ \hline 2240 \end{array} \quad \begin{array}{r} 2300 \\ - 2240 \\ \hline 60 \end{array}$$

When routers generate ICMP messages, to where do they send them?

- A** The messages are sent to the source port address specified in the TCP header
- B** The messages are sent to the destination port address specified in the TCP header
- C** The messages are sent to the source IP address specified in the IP header
- D** The messages are sent to the destination IP address specified in the IP header



[NAT]



Host A sends an IP datagram to host B. Both A and B hosts uses TCP/IPV4 Network. Assume that no error occurred during the transmission of the datagram. When datagram reaches B some of the IP header field may be different from that of original datagram. Consider the following fields

- (1) VER (Not changed)
- (2) Total length (may be changed)
- (3) TTL (D. changed)
- (4) Fragment offset (may be changed)
- (5) Services (Not changed)
- (6) HELN (may be changed)
- (7) Checksum (changed)
- (8) MF (may be changed)

Assume that among the number of IP header field which will have different values as compare to their original datagram when reached to the destination is x. Then what will be the value of x? (6)



Very Handsome Student Is Fully Fine To Play Hockey

1st row {
V → VER
H → HLEN
S → Services
T → Total length
2nd row {
I → Identification No.
F → Flags
F → Fragment offset

3rd row {
T → TTL
P → Protocol
H → Header checksum
and then SIP, DIP
4th row 5th row



2 mins Summary



Topic

One

The transport layer

Topic

Two

Topic

Three

Topic

Four

Topic

Five



THANK - YOU