Branch : CSE & IT **Batch : Hinglish**

Computer Networks

IPv4 Header & Fragmentation

DPP 02

[NAT]

1. An IP router with a maximum transmission unit (MTU) of 1000 bytes has received an IP packet of size 3980 bytes with an IP header of 20 bytes. What will be the value of payload in the second last fragment in bytes.

[MCQ]

2. If the 'fragment offset' field in the IP header has a value of 200 then how many bytes are there before this fragment.

(a) 400 bytes (b) 800 bytes

(c) 1600 bytes (d) 2000 bytes

[NAT]

3. The fragment offset are given as 0, 40, 80, 120. IP header is given as 20 bytes all fragments are of equal size. Calculate the packet size. (in bytes)

[MCQ]

4. An IP datagram of size 2000 bytes arrives at a router. The router than forward this packet on a link with MTU 400 bytes. If the IP header is of size 20 bytes then in how many fragment the packet will get divided ?

(a) 5 (b) 6

(c) 7 (d) 8

[MCQ]

5. In a IP datagram a TCP segments is present header length field of IP datagram is 5 total length of IP datagram is 1000 byte. Header length field in TCP header is 7, then what is the size of TCP data present in the datagram.

(a) 988 (b) 952

(c) 964 (d) 900

Answer Key

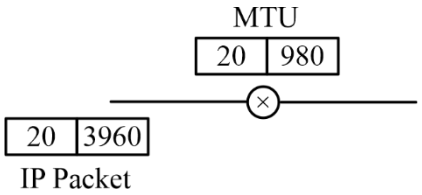
1. **(980 to 980)**
2. **(c)**
3. **(1300 to 1300)**
4. **(b)**
5. **(b)**

Hints & Solutions

1. (980)

MTU = 1000 bytes

Packet size = 3980 bytes



No. of fragments = $\left\lceil \frac{3960}{980} \right\rceil = \lceil 4.04 \rceil = 5$

I[st] fragment	20	980
II[nd] fragment	20	980
III[rd] fragment	20	980
IV[th] fragment	20	980
V[th] fragment	20	40 + 8 → Padded bytes

Payload size in IV[th] (second last) fragment = 980 bytes.

2. (c)

Fragment offset field uses scaling factor of 8.

Fragment offset field value = 200

Fragment offset = 200 × 8 = 1600

Hence, 1600 bytes are ahead of this fragment.

3. (1300 to 1300)

Fragment offset

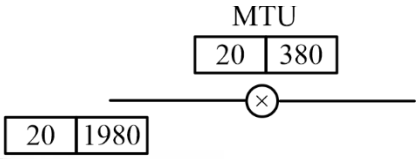
0 – 39 40 – 79 80 – 119 120 – 159

Payload = 40 × 8 = 320 bytes

IP Packet size = 320 × 4 + 20 = 1300 bytes.

4. (b)

IP datagram = 2000 bytes



Number of fragments = $\left\lceil \frac{1980}{380} \right\rceil = \lceil 5.21 \rceil = 6$

5. (b)

Total length of IP datagram = 1000 bytes

Header length field of IP datagram = 5

Size of IP header = 5 × 4

= 20 bytes

TCP header = 7

TCP header size = 7 ×4

= 28 bytes

TCP data = 1000 – (20 + 28)

= 952 bytes

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