In a packet switching network, packets are routed from source to destination along a single path having **two intermediate nodes**. If the message size is 24 bytes and each packet contains a header of 3 bytes. Find the optimum packet size ?

Let **bandwidth** of the network = X Bps and 1 / X = a

If Packet Size = 4 Bytes

The entire message is divided into packets of size 4 bytes. These packets are then sent one after the other.

Data Sent in One Packet=Data size = Packet size – Header size = 4 bytes – 3 bytes = 1 byte

Thus, only 1 byte of data can be sent in each packet.

Total data to be sent / Data contained in one packet = 24 bytes / 1 byte = 24 packets

Transmission delay = Packet size / Bandwidth = 4 bytes / X Bps = 4a sec

Time taken by the first packet to reach from sender to receiver = 3 x Transmission delay

= 3 x 4a sec = 12a sec

Time taken by the remaining packets to reach from sender to receiver

= Number of remaining packets x Transmission delay

= 23 x 4a sec = 92a sec

Total time taken to send the complete message from sender to receiver

= 12a sec + 92a sec = 104a sec

Throughput of connection = 24byte / 104a sec = 0.23 /a = 0.23 X Bps = %23 of data rate !!!

Hint: Total time taken when packet size is 7 bytes = 56a sec !!