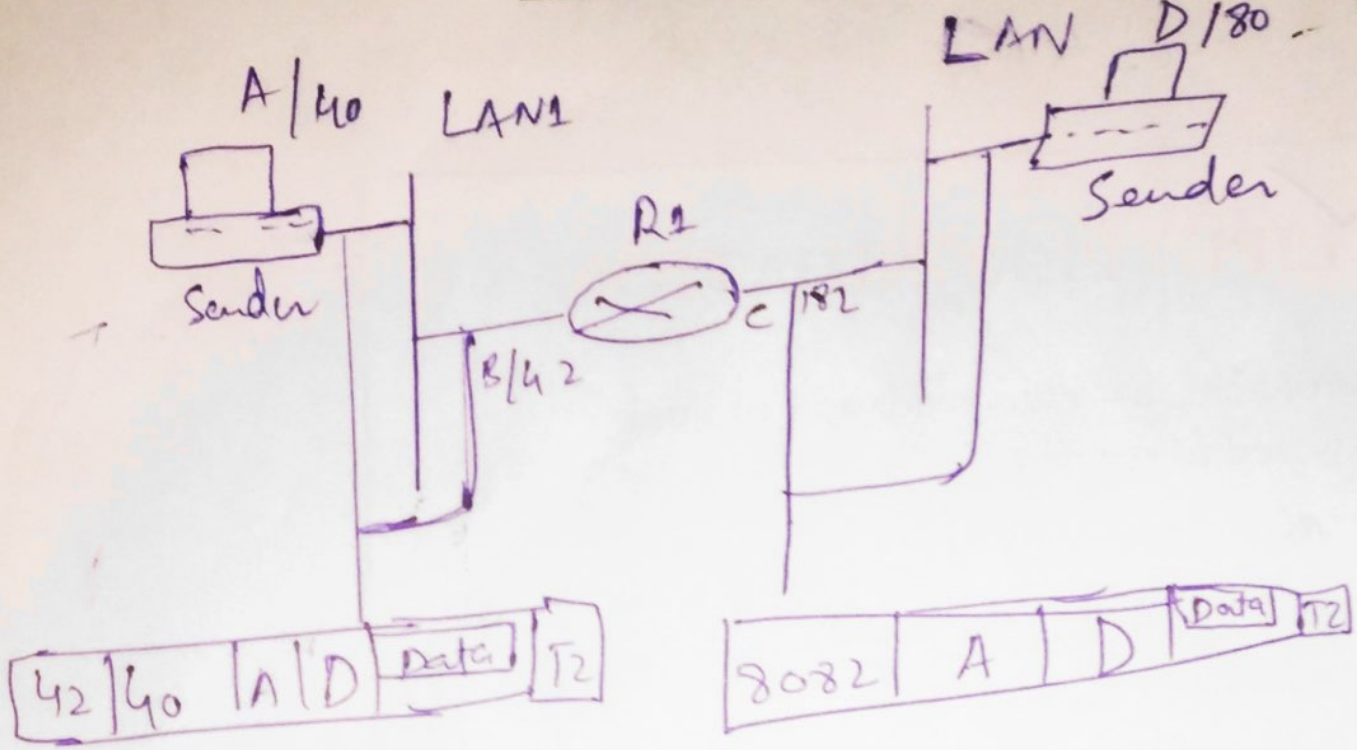
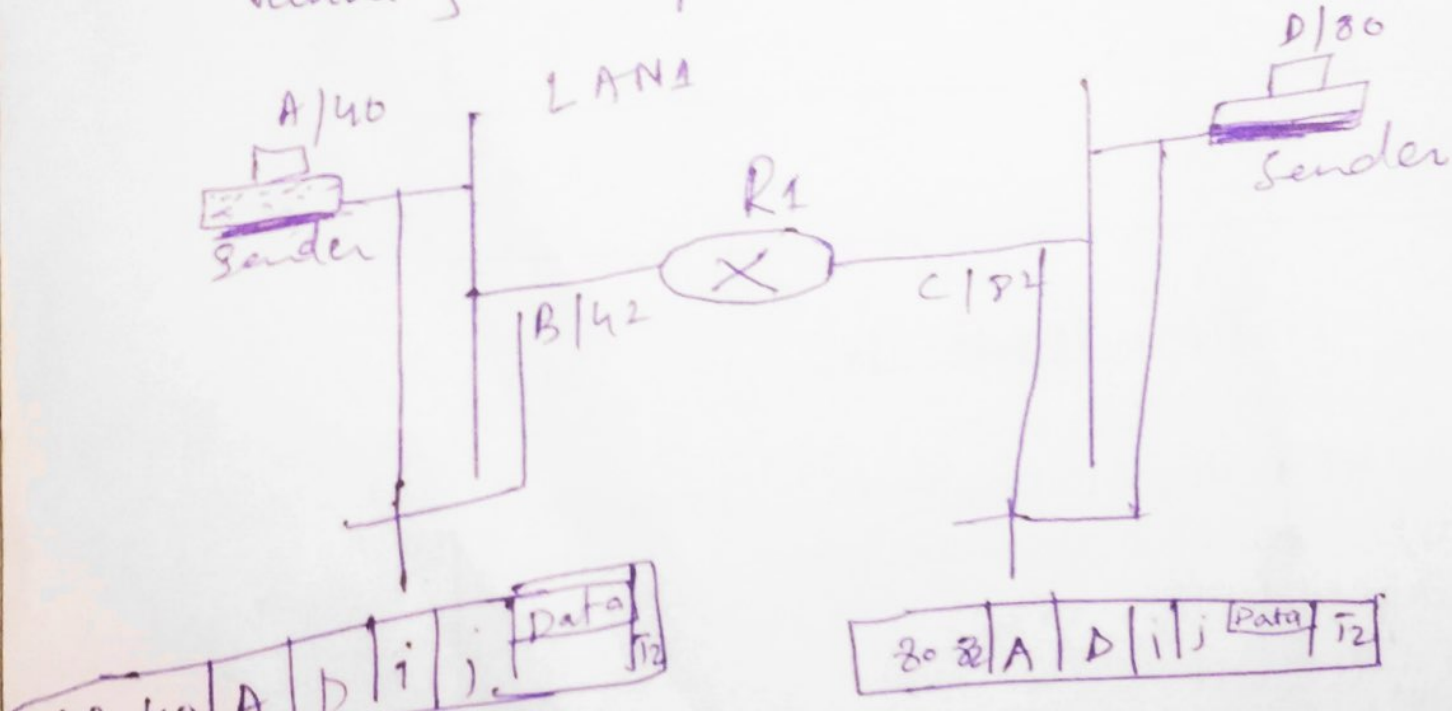
Question NO ⇒ 01 (A)



⇒ Assume that the running computer. Running computer D ---- Port address j



Q1 Part (B)

Discuss briefly the main responsibilities of each Layer of OSI-Model?

Ans

① Physical layer

→ It is the responsible for movements of Individual bits from one hope (node) to the Next

→ Physical characteristics of Interface & medium:
- → Pin assignment, connector, cable
- → Representation of bits, encoding
- → Data rate
- → Synchronization of bits
- → line configuration: point to point, Multipoint
- → Physical topology
- → Transmission mode:
  - i- Simple duplex
  - ii- half-duplex
  - iii- Full duplex

② Data Link layer

It is the responsible for moving Frames from one hop (node) to the next.

- Framing
- Physical addressing
- Flow control
- Error control
- Access control.

③ Network layer

It is responsible for the delivery of individual Packets from the source host to the destination host.

→ logical addressing

→ Routing

④ Application layer

It is responsible for Providing Services to the use

(5) Transport Layer

It is the responsible for the delivery of a message from one process to another.

- Service point addressing
- segmentation and reassembly
- Connection control
- Flow Control
- Error control

(6) Session layer

It is responsible for dialog control and synchronization

(7) Presentation layer

It is responsible for translation, compression and encryption

QNo2 Part (A)

→ effective noise temperature ~~of~~ 11000 K

→ bandwidth = 12 MHz

Thermal noise level = ? (dBW)

1 MHz = 10^6 Hz

B = 11 × 12 Hz

B = 10^{1+6} H $(a^m \times a^n = a^{m+n})$

B = 10^7 Hz

K = Boltzmann's constant = 1.38×10^{-23} J/K

Question (2(B))

Bandwidth = 450 Hz

(SNR) Signal to noise ration = 6dB

$SNR = 10 \log \frac{P_s}{P_n}$

channel capacity = ?

where is the noise is white thermal noise

→ Now using decibel Formula

$SNR_{db} = 10 \log (SNR)$

That means

$6 = 10 * \log (SNR)$

$SNR = 10 \log (0.6) = 3.990$

Q2 (B)

Now using Shannon's equation

$$C = B * \log_2(1 + SNR)$$

$$C = 450 * \log_2(1 + 3.990)$$

$$C = 450 * \log_2(4.990)$$

$$C = 778.990$$

Q NO2 (Part C)

C = Intented capacity = 22Mbps

B = bandwidth = 4 ~~Mbps~~ MHZ

SNR capacity = ?

Solve

$$C = B \log_2 (1 + SNR)$$

$$C = B \log_2 (1 + SNR)$$

$$SNR = 2^{\wedge}(C/B) - 1$$

Puting value

$$SNR = 2^{\wedge}\left(\frac{22\,Mbps}{4\,MHZ}\right) - 1$$

SNR = 24 Mbps

Question No ⇒ 03 (A)

A digital signalling system is required to operate at 900 bps. If a signal element encodes a 8-bit words. what is the minimum required bandwith of a channel?

Ans:-

$$C = 2B \log_2 M$$

$\log_2 M = 8$ (because a signal element encoads a 8-bit word)

M is No of levels = 16

So

$C = 2B * 8 =$

$900 = 2B \times 8$

$$B = 56.2$$

$C = 2(56.2) \times 8 = 900$

Q No 3 (Part A)

$C = 2B \log_2 M$

$\log_2 M = 8$ (because a signal element encodes a 8 bit words)

Therefore

$C = 9600 = 2B \times 4$ and

$B = 1200 Hz$

$9600 = 2B \times B$ and $B = 600 Hz$

QNO3 Part B

$\frac{Eb}{No}$ for a link transmitting 2600bps =?

receiving signal level for a

Particular digital system = −150dBw

temperature = 1700k

solve

$\frac{Eb}{No}$ = 150dBw − 10 log 2600 − log 170

+ 228.6 = 14 dBw ANS

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