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Subject ≠ Computer Communication Network

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Question #1.

Part (A).

Answer:-

Most protocols issue a special error message that is sent back to the source in the case. If the packet is the TCP packet, a TCP reset will be sent back. If the packet is UDP datagram, an ICMP Port unreachable message will be sent.

Of course, either the port or the replies might also be filtered, in which case you will simply receive no answer at all.

Question # 2.

Part (A).

Answers -
7

$$\text{SNR}_{\text{dB}} = 10 \log_{10} \text{SNR}$$

$$\text{SNR} = 10^{\text{SNR}_{\text{dB}}/10}$$

$$\text{SNR} = 10^{36} \Rightarrow 3981$$

$$C = B \log_2 (1 + \text{SNR}) \Rightarrow 2 \times 10^6 \times \log_2 3982$$

$$\boxed{= 24 \text{ Mbps.}}$$

Ans.

Question #2.
part (b).

Answer:-

(a) A signal in which 1 bit last 0.001 s.

Solⁿ:-
As bit rate = $\frac{\text{no of bits}}{\text{second}}$

$$= \frac{1}{0.001} = 1000 \text{ bps} = 1 \text{ Kbps.}$$

(b) A signal in which 1 bit last 2 ms.

As bit rate = $\frac{\text{no of bits}}{\text{second}}$

$$= \frac{1}{2} = 0.5$$

$$= 500 \text{ bps.}$$

(c) A signal in which 10 bits last 20 s.

As bit rate = $\frac{\text{no of bits}}{\text{second}}$

$$= \frac{10}{20} = 0.5$$

$$= 500 \text{ bps.}$$

Question # 3
Part (A).

Answers- (i)

To be considered effective & efficient, a network must meet a number of criteria. The most important of these are performance, reliability & security.

(i) Performance:- can be measured in many ways including transit time & response time. Transit time is the amount of time required for message to travel from one device to another.

The performance of a network depend on the number of factors, including the number of users, the type of transmission medium, the capability of the connected hardware, and the efficiency of the software.

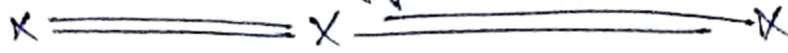
(ii) Reliability:- In addition to accuracy of delivery of network reliability is measured frequency of failure, the time it take a link to recover from a failure, and the network's robustness in catastrophe

(iii) Security:- Network security issues include protecting data from unauthorized access and viruses.

Answer # (ii):- A full-duplex device is capable of bi-directional network data transmissions at the same time. Half duplex devices can only transmit in one direction at one time. With half duplex mode, data can move in two directions, but not at the same time.

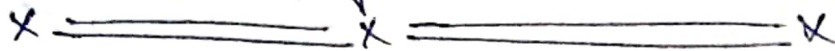
Answer # iii :-

$\frac{n(n-1)}{2}$ cable links are required for mesh.
 n for ring, $n-1$ cable link for bus, and n cable link for star topology.



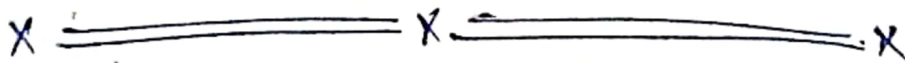
Answer # (iv) :-

The physical layer is concerned with actual transfer of data bits across a transmission medium b/w two devices. The physical layer coordinates the function required to carry a bit stream over a physical medium.



Answer (v) :-

The application layer enable the user, wheather human or software, to access network. It provides user interfaces & support for services such as electronic mail, remote file access & transfer, shared database management, & other types of distributed information services, directory services.



Answer (vi) :-

The TCP/IP protocol suite was developed prior to the OSI model, therefore, the layer in the TCP/IP protocol suite donot exactly match those in the OSI model. The original TCP/IP protocol suite was define as having four layers: host-to-network, internet, transport & application. However, when TCP/IP is compared to OSI, we can say that the host to network layer

is equivalent to the combination of the physical data link layer. The internet layer is equivalent to the network layer, and the application layer is roughly doing the job of session, presentation & application layer with the transport layer in TCP/IP protocol suite is made of five layers. physical, data link, network, transport & application. The three topmost layers in the OSI model, however, are represented in TCP/IP by a single layer called application layer.

Answers- (vii) :-

The amplitude of a signal measure the value of the signal at any point. The frequency of a signal refers to the number of periods in one second. The phase describes the position of the waveform to time zero.

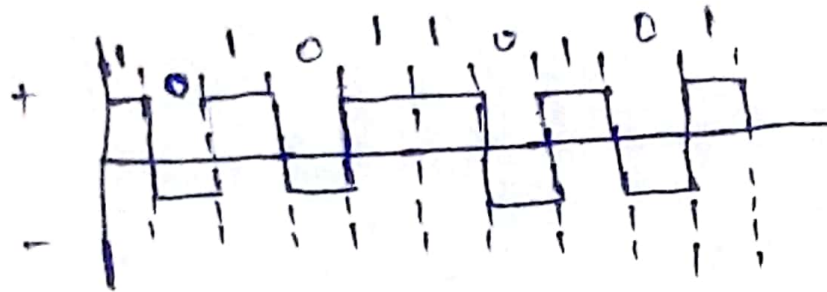
————— X ————— X —————

Question # 4
Part (a)

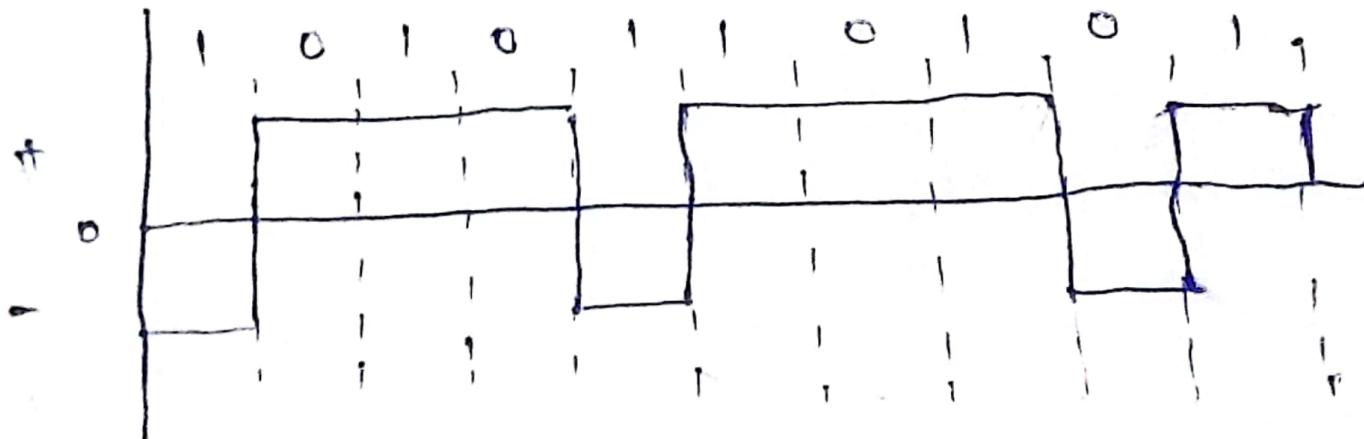
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convert the bit stream 1010110101.

(a) NRZ-S.

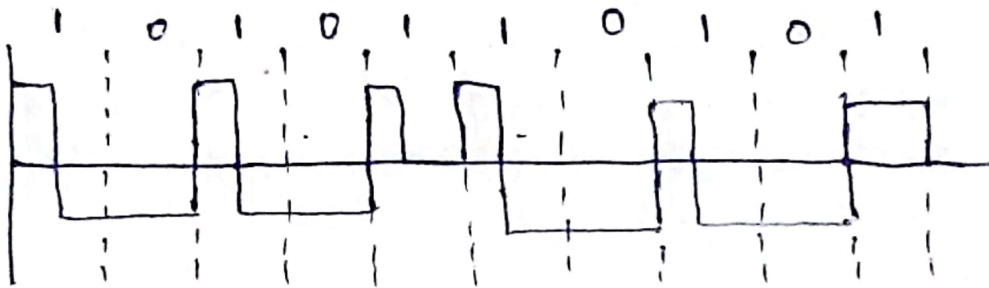


(b) NRZ-S.

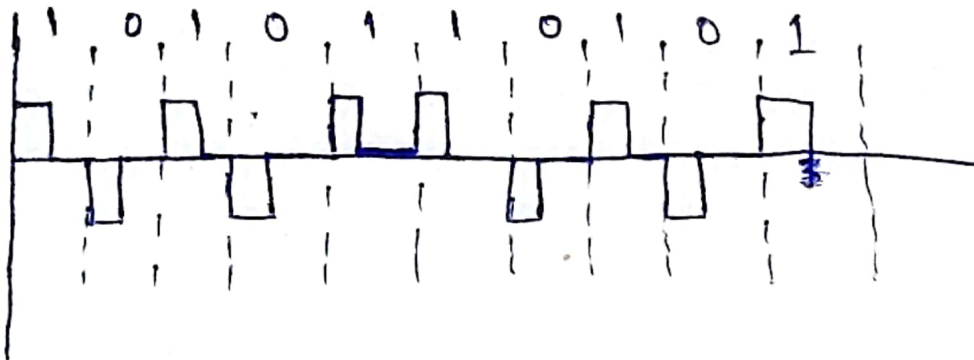


(8)

(c) Unipolar-RZ.



(d) Bipolar-RZ.



Question # 4.
part (b)

(9)

Answer:-

7

$$\begin{aligned} \text{Propagation time} &= \text{distance} / \text{propagation speed.} \\ &= 2000 \text{ km} / 2 \times 10^8 \text{ m/s} = 10 \text{ ms} \end{aligned}$$

$$\begin{aligned} \text{Transmission time} &= \text{Message Size} / \text{Bandwidth} \\ &= 5 \times 10^6 \text{ bits} / 5 \text{ Mbps} = 1 \text{ s} \end{aligned}$$

$$\text{Queuing time} = 10 \text{ routers} * 2 \mu\text{s} = 20 \mu\text{s}$$

$$\text{Processing Delay} = 10 \text{ routers} * 1 \mu\text{s} = 10 \mu\text{s}$$

$$\text{Total delay (latency)} = 10 \text{ ms} + 1 \text{ s} + 20 \mu\text{s} + 10 \mu\text{s}$$

$$\underline{\underline{= 1.0103}}$$

$$= 1.0103 \text{ ms} \Rightarrow$$

$$= 1.01003 \text{ sec.}$$

Ans 1