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Ans to Question-4

(a)

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$$x = 5 + 1 = 6$$

$$y = 2 + 1 = 3$$

Firstly, we calculate Shannon formula for finding the upper limit,

$$\begin{aligned} C &= B \log_2 (1 + \text{SNR}) \\ &= 10^6 \log_2 (1 + 900) \\ &= \cancel{10^6} 10^6 \log_2 901 \\ &= 10^6 \frac{\log_{10} 901}{\log_{10} 2} \end{aligned}$$

$$= 9815383.296 \text{ bps}$$

$$= 9.81 \text{ mbps.}$$

$$B = x = 6 \text{ MHz}$$

$$\text{SNR} = \cancel{10^4}$$

$$= 10 \times 3 \times 30$$

$$= 900$$

Shannon gives us upper limit, for better result we take something lower like 8 mbps for example. So we use Nyquist formula for finding the number of signal levels.

$$\text{BitRate} = 2 \times B \times \log_2 L$$

$$\Rightarrow 8 = 2 \times 6 \times \log_2 L$$

$$\Rightarrow L = 2^{0.67}$$

$$= 1.59 \text{ levels}$$

Since the result is not a power of 2, we need to either increase the number of levels or reduce the bit rate. So, we take some level that has the power of 2.

(b)

Difference between bandwidth and throughput:

The throughput is a measure of how fast we can actually send data through a network. The bandwidth is a potential measurement of a link but the throughput is an actual measurement of how fast we can send data. If we have a link with a bandwidth of 2 Mbps, but the device handles only 800 kbps. This is the meaning of throughput.

Ans to Question-1
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ID: 25

$x = 5 + 1 = 6 \rightarrow$ mesh topology connection

$y = 2 + 1 = 3 \rightarrow$ star topology connection.

So, first room has 6 computers and they are connected by mesh topology.

$$\begin{aligned} \text{So, in mesh topology, we need} &= \frac{x(x-1)}{2} \text{ links} \\ &= \frac{6(6-1)}{2} \text{ links} \\ &= 15 \text{ links.} \end{aligned}$$

in 2nd room, there are 3 computers and they are connected by star topology. as we know that in star topology there is dedicated point-to-point link only to a central controller (hub/switch). So we need y numbers of links.

As the value of $y = 3$, in star topology we need 3 links.



more secure network

we use here mesh topology and star topology.
I think ~~star~~ mesh topology is secure than ~~mesh~~ star topology. Here the connection is dedicated point to point link and only a one controller. ~~Because there is only~~ if one line is destroy others are not affected, but in mesh topology if one line is destroy others are not affected. But when the hub is some-
how affected in star topology all the systems are destroyed. So, ~~star~~ mesh topology is secure than star topology.

1(b)Advantages of half-duplex:

→ it is a station where each station can both transmit and receive but not at the same time. So, in cases where ~~we~~ no need for communication in both direction we use this

disadvantage of half duplex:

main disadvantage is when one device is sending, the other can only receive and vice versa

Advantages of full duplex

1. Two directional, simultaneously
2. Sender can send and receive data simultaneously.

disadvantages of full duplex

1. No proper bandwidth utilization as the same line is used for sending and receiving data at the same time.

Ans to Question - 2(b)

"Like Data link layer, Error control and Flow control are also performed in Transport layer in end-to-end rather than on single link"

4 we know that both data link layer and Transport layer has Flow control and error control duty. Because in data link layer error control is normally achieved through a trailer added to the end of the frame. So, we see for this trailer add, the data link layer control the error and adding head control the flow. So, data link layer and transport layer have same duty in flow control and ~~data~~ ~~an~~ error control.

2(a)

$$X = (5)^{\sqrt{}} \bmod 6 = 1 \rightarrow PCX$$

$$Y = (1+1) \bmod 6 = 2 \rightarrow PCY$$

	Senden MAC	Receiven MAC	Senden IP	Receiven IP	Port no of Senden	Port no of- receiv	Data	Trailer
PC 1	MAC of 'B'	MAC of 'P10'	IP of 'B'	IP of 'e'	6000	2000	Data	T
PC 2			IP of 'B'	IP of 'e'	6000	2000	Data	F
	MAC of 'B' ✓	MAC of 'P10' ✓	IP of 'B' ✓	IP of 'e' ✓	6000	2000	Data	T
	MAC of 'P11' ✓	MAC of 'P21' ✓	IP of 'B'	IP of 'c'	6000	2000	Data	T
	MAC of 'P21' ✓	MAC of 'c' ✓	IP of 'B'	IP of 'c'	6000	2000	Data	T

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