

University of Asia Pacific
Department of computer science and Engineering
Mid term Examination : spring - 2020

24

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Roll No: 45

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Course code: CSE-303

Course Title: Data Communication

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①

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Ans. to the Q. no-1

b) I will ~~the~~ choose Full duplex. Because I have enough bandwidth. If I want to communicate with a friend then I have to send the message ⁱⁿ proper time.

Advantages:-

Half duplex:- Whole bandwidth can be utilized as at a time.

Full duplex:- No delay in communication as both can send or receive data.

Disadvantages:-

Half duplex:- Other device cannot send data until receive the data

Full duplex:- No proper utilization of bandwidth.

②

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Ans. to the Q. no-2

b) Flow control:-

Like Data link layer, Transport layer is also responsible for flow control

Flow control is performed end to end rather than across a single link.

Error control:- Like data link

2
layer, Transport layer is responsible for the Error control.

Error control is performed end-to-end

This layer makes sure that entire message reaches Rx Transport layer w/o error.

3

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Ans. to the Q. no-1

a) $x = 5 + 1 = 6$

$y = 4 + 1 = 5$

Let say we have x devices in the network then each device must be connected $(x-1)$ devices

of the network. Number of link in a mesh topology of x devices would be $\frac{x(x-1)}{2}$.

Here,

$x=6$ then, $\frac{6(6-1)}{2} = \frac{6 \cdot 5}{2} = \frac{30}{2} = 15$

Star Topology:-

1. In star topology, the nodes are connected to the central hub or route.

④

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2. There are N links in Star topology if there are N nodes.

3. The Cost of Star topology is less.

~~4.~~

The complexity of Star topology is quite a simple.

Mesh topology:-

1. If n mesh topology the nodes are connected to each other completely via dedicated link.

2. There are $n(n-1)/2$ links in mesh topology if there are N nodes.

5

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3. The complexity of Mesh topology is complex.

2

4. In mesh topology, the information is travel from nodes to nodes.

Ans. to the Q. no-3

b) Shannon Capacity :- Claude Shannon discovered an equation that gives the highest possible channel capacity of a communication system that can be achieved in the presence of noise.

$$\text{shannon capacity } C = B \cdot \log_2 (1 + \text{SNR})$$

Nyquist formula :- Now consider the Nyquist formula which tells us the digital channel capacity.

⑥

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Nyquist's equation is -

$$C = 2B \times \log_2(M)$$

Equation of two channel capacity -
 of Nyquist & Shannon -
~~2B~~

$$2B \times \log_2(M) = B \times \log_2(1 + \text{SNR})$$

$$2B \times \log_2(M) = B \times \log_2(M^2)$$

$$= B \times \log_2(1 + \text{SNR})$$

$$2^{\log_2(M^2)}$$

$$= 2^{\log_2(1 + \text{SNR})}$$

2

$$M^2 = 1 + \text{SNR} \text{ or } M = \sqrt{1 + \text{SNR}}$$

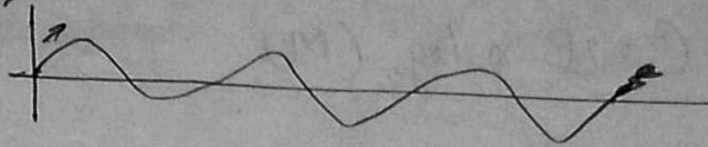
7

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Ans to the Q no-3

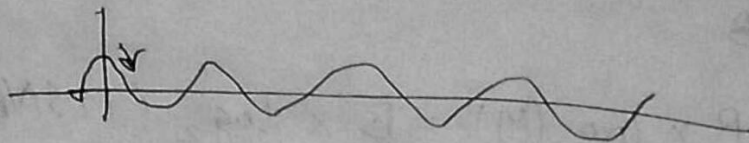
(c) Phase:-

(i)

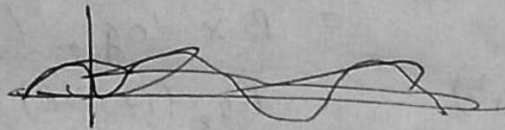


0 degree

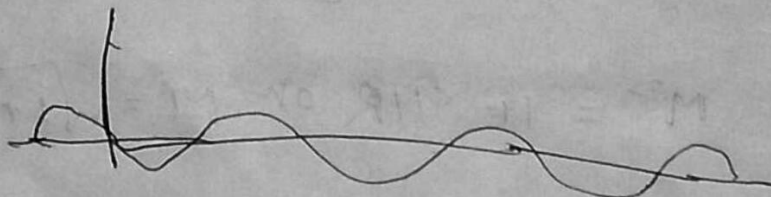
(ii)



90°



(iii)



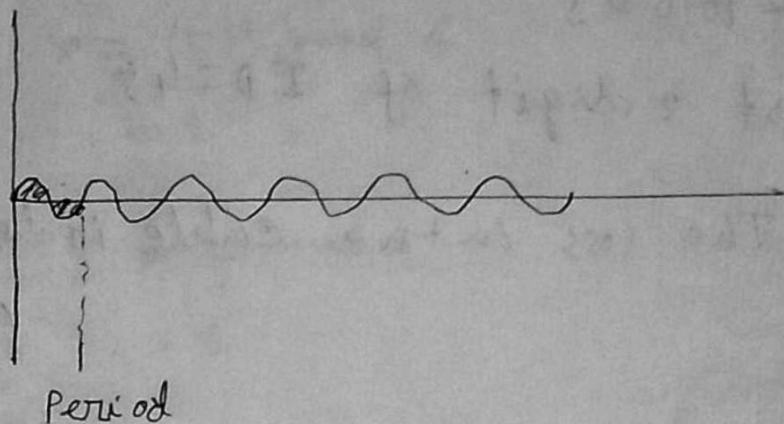
180°



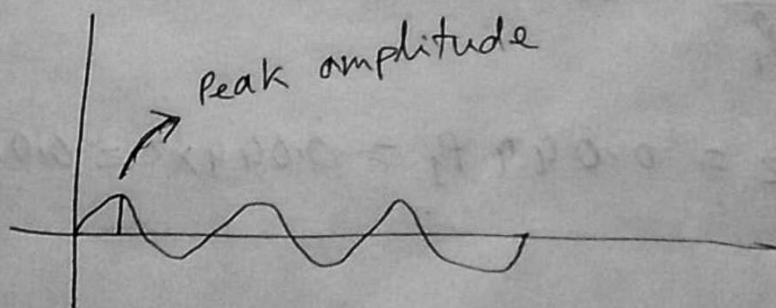
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frequency:



amplitude:-



9

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Ans. to the Q. 3

a) 17101045

Last 2 digit of ID = 45

The loss in the cable in decibels -

$$(45 \times -0.3)$$

$$= -13.5$$

We calculate ~~Power~~ Power,

$$dB = 10 \log_{10} \frac{P_2}{P_1} = -13.5$$

$$\frac{P_2}{P_1} = 10^{-1.35} = 0.044$$

$$P_2 = 0.044 P_1 = 0.044 \times 2 = 0.088 \text{ mW}$$


Ans

10

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Ans. to the Q. - 2

$$\begin{aligned} a) \quad x &= (5)^2 \bmod 6 \\ &= 1 \end{aligned}$$


$$\begin{aligned} y &= 2 \bmod 6 \\ &= 2 \end{aligned}$$

