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Subject: Data Communication



Q#01

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ANSWER NO # 1

Difference Between Frame Relay and ATM?

Frame Relay is a standardized wide area network technology that specifies the physical and data link layers of digital telecommunication channels using a packet switching methodology while ATM is faster than relay. ATM produces fewer overhead <sup>from</sup> as compared to frame relay technology. ATM provide error and flow control mechanism whereas frame relay does not provide it.



Q

ANS # 02:

Convert signal into watts

$$\frac{200}{1000} = \boxed{0.2 \text{ W}}$$

$$\text{Noise} = 10 \times 2 \times 10^{-6} = 2 \times 10^{-5}$$

Therefore the SNR

= Average Signal Power

Average Noise Power

put values

P.T.O



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$$= \frac{0.2}{2 \times 10^{-5}}$$

$$= 10000$$

Thus

$$\text{SNR db} = 10 \log_{10} (\text{SNR})$$

So

$$\text{In this case } 10 \log_{10} (10000) = \boxed{40}$$

Hence

$$10 \log_{10} (10000) = \boxed{40} \text{ Ans}$$



(4)

ANS #04

a Low pass Channel has a bandwidth starting from zero

while a Band pass Channel has a Bandwidth does not start from zero

Baseband is frequently thought to be

Some sort of equivalent word to be

able to Lowpass or non modulated and

opposite to high passband, bandpass source

Modulated as well as Radio wave



ANS #05:

A signal in which 1 bit

lasts 0.001s

The bit rate =  $\frac{1}{\text{bit duration}}$

=  $\frac{1}{0.001}$

= 1000 bps

1 Kbps = 1000 bps

Hence

The bit rate = 1 Kbps

ANS



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ANS # 06

There are important Metrics that must be Measured

Some Common metrics used to Measure

Network performance include latency, Packet loss indicators, Jitter, Bandwidth

For Network performance Measurement

Throughput is defined in term of The amount of Data or Number of Data packets that can be delivered in a pre-defined Time frame

Bandwidth usually Measured in Bits per Second





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ANS#07

### Router

The main Responsibility of Router is to forwards Data packets between Computer Networks.

Router is also performing the Traffic Direction function on the internet

### Hub

Hub is commonly used to connect Segment of a LAN (Local area Network) Hub contain multiple ports

### Switches

Switches communicate between each other using physical addresses.

To exchange information switches also use broadcasting and ARP Mechanism

### Bridge

A bridge is a Networking device that creates a single aggregate Network from multiple communication Networks. Bridge is Networking Device that connects Network.

### Repeaters

Repeaters are used in Transmission System to Regenerate analog or digital signal distorted by Transmission loss in a Data Network.

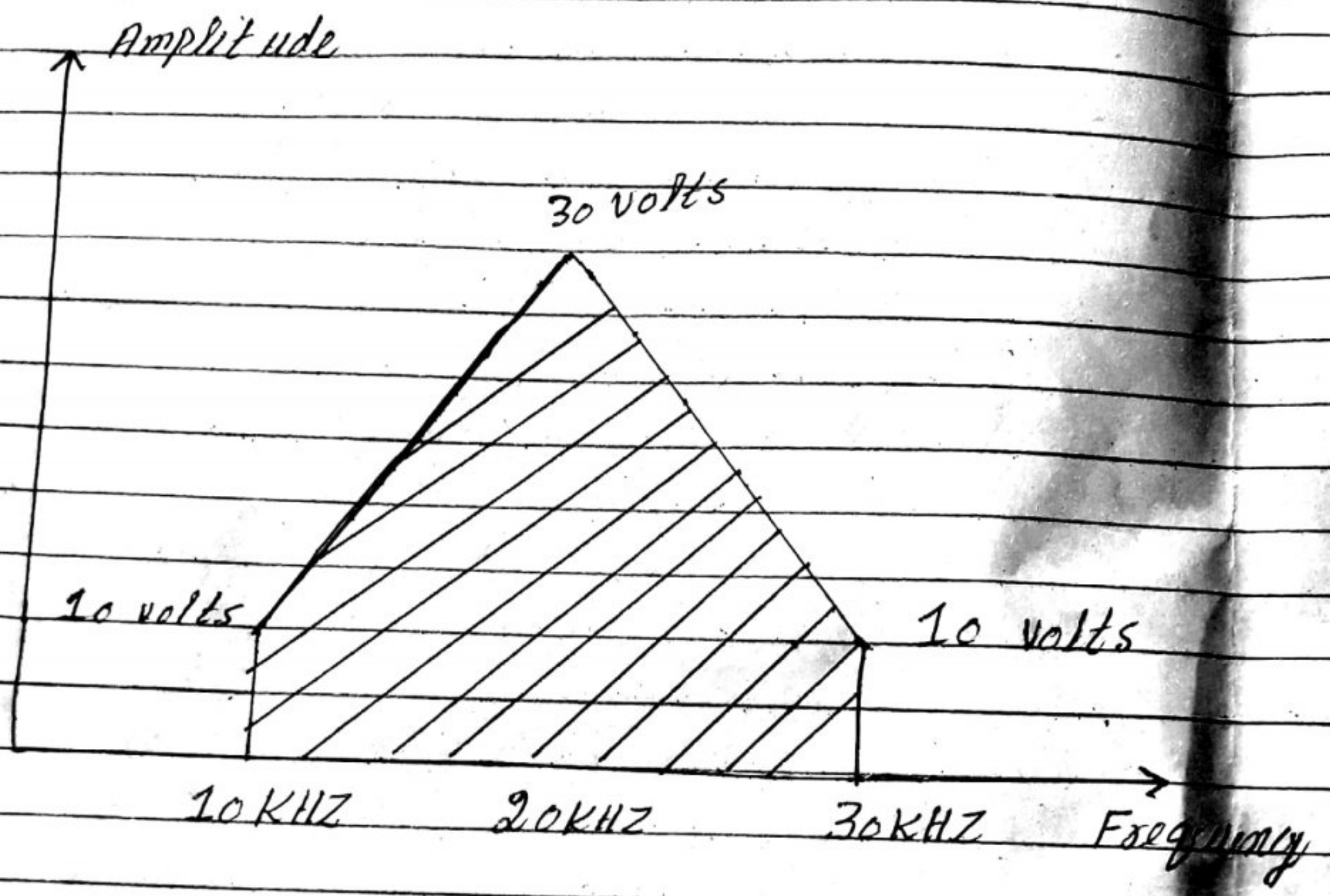
A Repeater can Relay messages B/w Subnetwork



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ANS #02 Sec (A)

The Spectrum is given Below





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ANS #02 (Sec b)

Attenuation of a Signal

$$= 10 \times \log \left( \frac{\text{Input Power}}{\text{Output Power}} \right)$$

Note:

Logarithm is to the base 10.

Here

Power at Point A is Input  
Power = 200 W

Power at Point B is output  
Power = 190 W

Therefore

Attenuation in dB

$$= 10 \times \log \left( \frac{200}{190} \right)$$

$$= \boxed{0.222 \text{ dB}} \text{ Ans}$$



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ANS #02 (sec c):

Soln:

Using Shannon's Equation

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

Put values we get

$$B = 600 \text{ Hz} \text{ and } \text{SNR (in dB)} = 7$$

$$\text{Therefore } \text{SNR} = 10^{0.7}$$

$$C = 600 \log_2 (1 + 10^{0.7})$$

$$C = 600 \log_2 (6.01)$$

$$C = 1552.4 \text{ bps} \quad \text{ANS}$$



ANS#03

Section(a)

The four layers of TCP/IP model are Application layer, Transport layer, Network layer, AND physical layer.

Application layer:-

AT the application layer the payload is the actual application Data

Transport layer:-

while the Transport layer is responsible for maintaining end to end communication across the Network

Network layer:-

Network layer deals with packets and connects independent Network to transport the packets across the Network boundaries

physical layer

physical layer also known as the Network interface layer.

it Operates only on a Link.

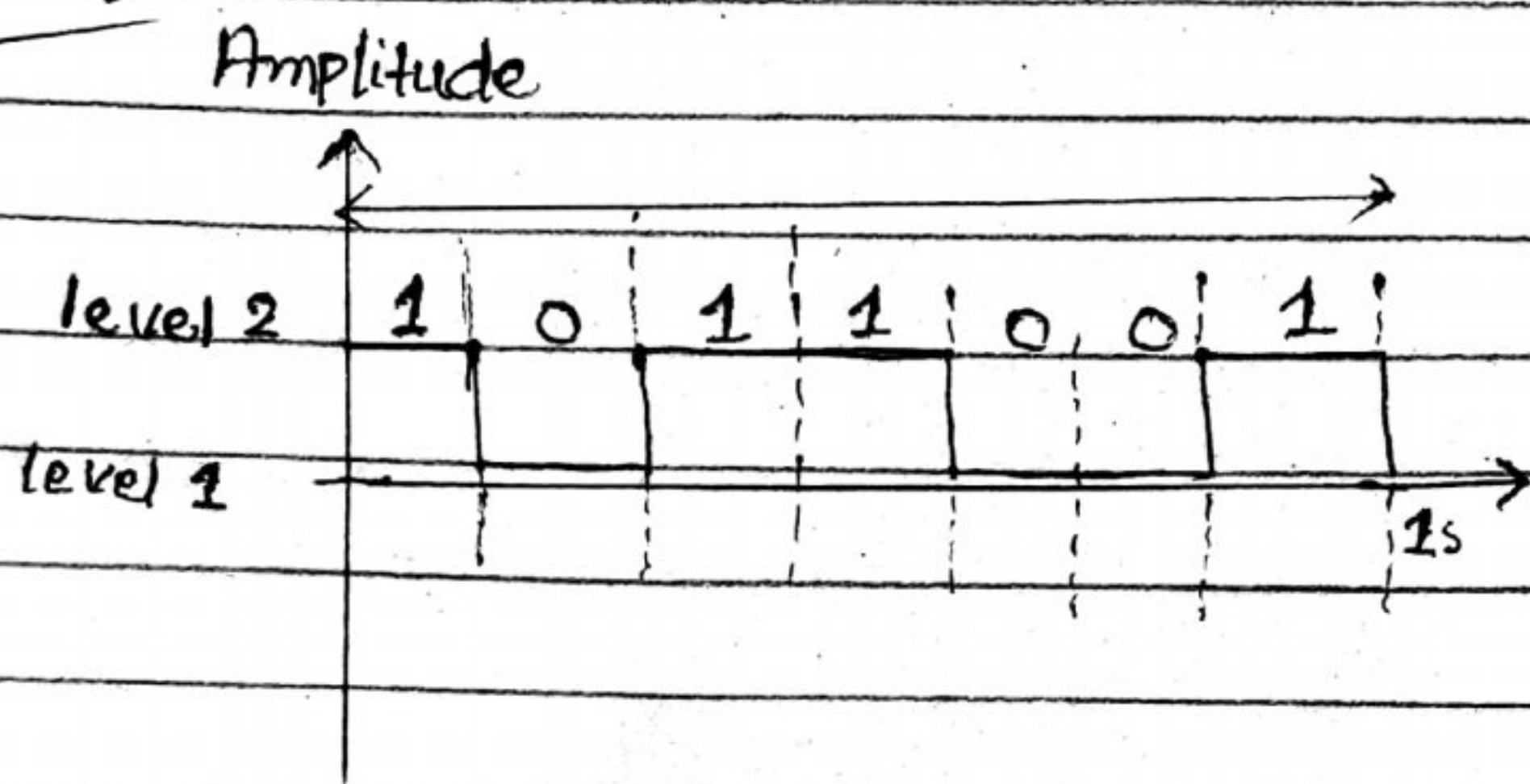
Responsible to interconnects nodes or hosts in the Network.





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Q3 Section B Digital Signal with two level signals.



A digital signal can be transmitted over a dedicated connection between two or more users.

In order to transmit analog data it must be converted into a digital form.

This process is called sampling or encoding.





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ANS # 03 (Sec C)

