(1)

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Semester 11 Subject - Data Communication.

Q NO 1:) Frame Relay:- frame relays was
Ans(1) developed to take advantage of high data rates and low error rates on modern wan links.
orginal packet switch network were designed packet switching with data rate to the end user of about 64kbps.
frame relay network are designed to operate efficiently at user data rates of up to 2mbps.

* Asynchronous Transfer mode :-
ATM is a result of elevelopments in Circuit switching and packet switching.
ATM can be viewed as an evolution from frame relay.
ATM uses fixed-length packets, called cells.
As with frame relay, ATM provides little overhead for error control.

Ans(2):-

Signal 500 milliwatts,
Noise 5 microwatts,

$$SNR = \frac{500000\ mW}{10\ mW} = 50000$$

$$SNR_{dB} = 10 \log_{10} 50000 =$$

SNR dB $= 10\log_{10} 10^4 =$

$= 10\log_{10} 50^4 = 67.$

Ans (3):

Highest frequency = 30 Hz

lowest frequency = 10 Hz

$B = f_h - f_l$

$30 = 10$

$$B = \frac{30 - f_l}{30 - 10} = 10 \text{ Hz}$$

Ans (4): A low-pass channel has a bandwidth starting from zero a bend pass channel has a bandwidth that does not start from zero. Baseband is frequently through to be some sort of equivalent to be able to lowpass as non-modulate and opposite to help passband, bandpass, service modulate as well as Rf. Radiowave.

Ans (5)

Bit Rate $= 2 \times 0.001 \times \log_2 2 = 0.001$ 2

Ans(6) When optimizing network performence these are important metrics that must be measured some common matrics used to measure network performance include latency, packet loss indicators jitter, bandwidth and throughput.

Ans(7):- (1) Hub => a distributor that has a lot of ports which connected to computer.

(2) Switches:- like a hub but it transmit packet to it destination

(3) Bridge :- it is used to connect two similar lan

(4) Router :- chose the best path to transmit the packet.

(5) Gateway :- it is used to connect two different LANs and connect different application protocol.

(6) Repeaters: repeats signals that travel via long distance.

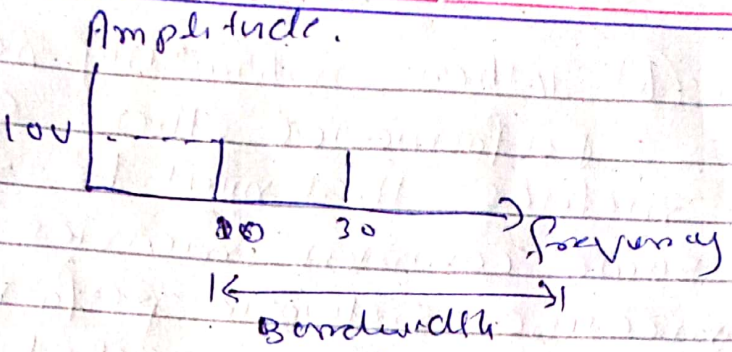
Q NO 2:

Ans(A):- Sol:

Let f_h be the highest frequency. f_l the lowest frequency

$$B = f_h - f_l$$

$$= 30 - 10 \Rightarrow 20 \text{ Hz}$$



$30 - 10 = 20\,Hz$

The Spectrum has only 2 'spikes' at 10, 30 Hz

Q) NO 2 :. (B)

Sol:-

$$10 \log_{10} \frac{P_2}{P_1}$$

$$10 \log_{10} \frac{190w}{200w}$$

$$10 \log_{10} 0.5$$

$$10(-0.3) = -3dB$$

Q) NO2 : (C)

From the given details we know

B (Bandwidth) = 600 Hz

$SNR_{dB} = 7dB$

Suppose C = channel capacity and SNR

Now using decibel formula

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

$SNR = \log^{-1} 0.6$

$SNR = 10^{0.6}$

$SNR = 3.981$

Hence, Signal-to-Noise Ratio (SNR) = 3.981

Now using Shannon equation

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

$C = 600 \times \log_2 (1 + 3.981)$

$C = 600 \times \log_2 (4.981)$

$C = 899.6$ bit per second.

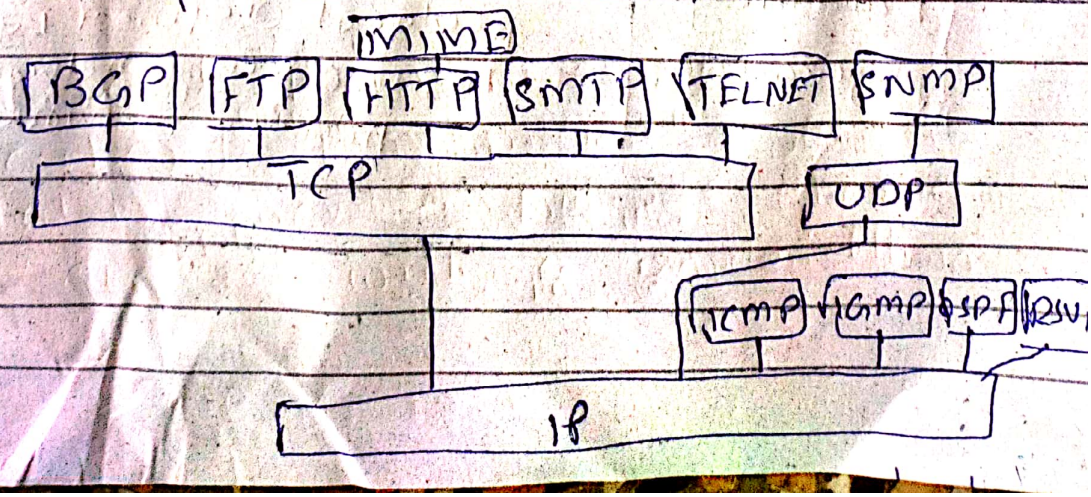
Therefore, the channel capacity for telephone channel is 899.6 bit per second.

Q NO3: (A) TCP/IP protocol suite

Ans: The TCP/IP protocol suite is a hierarchical protocol, made of five layers.

- Physical layer
- Data link layer
- Network layer
- Transport layer
- Application layer

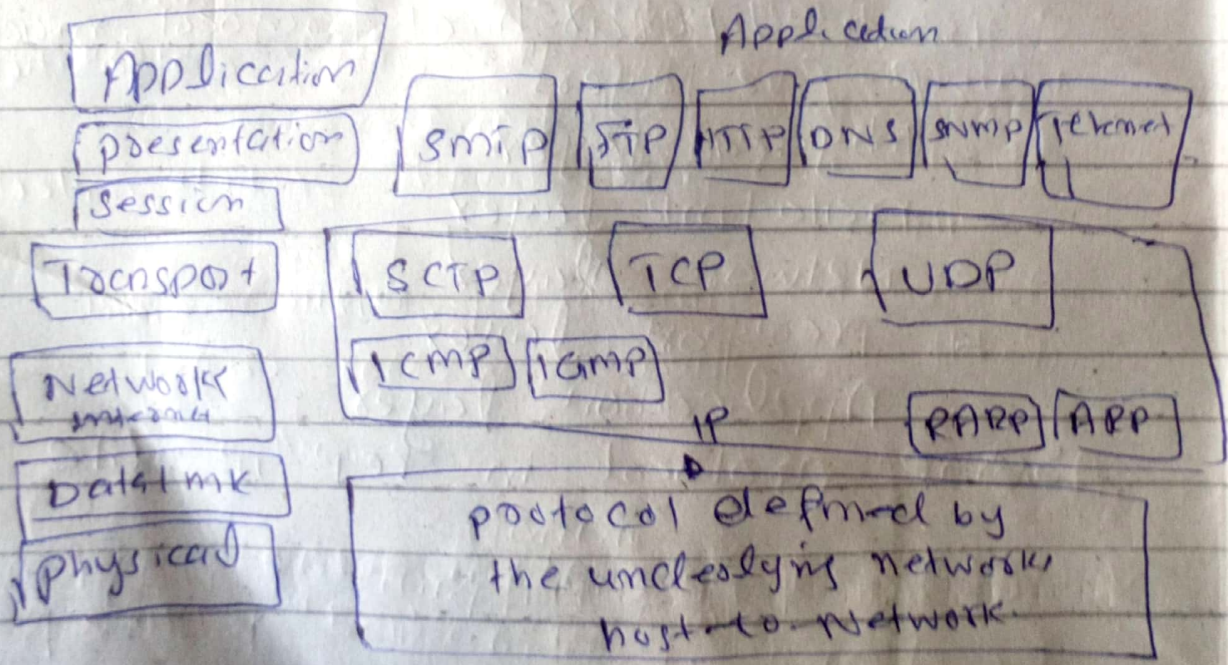
Some protocol in TCP/IP suite



TCP/IP protocol suite

The layers in the TCP/IP protocol suite do not exactly match those in the OSI model. The orginal TCP/IP protocol suite was defined as having four layers: host-to-network, internet, transport and application. However, when TCP/IP is compared to OSI, we can say that the TCP/IP protocol suite is made of five layers: physical, data link, network, transport and application.

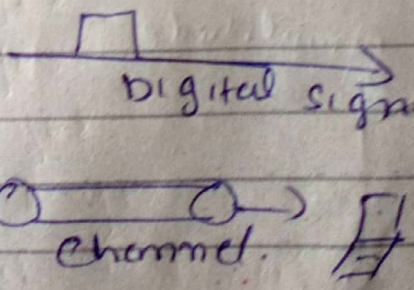
TCP/OSI model



Addressing:- four levels of addresses are used in an internet employing the TCP/IP protocol: physical address, logical address, port address and specific address.

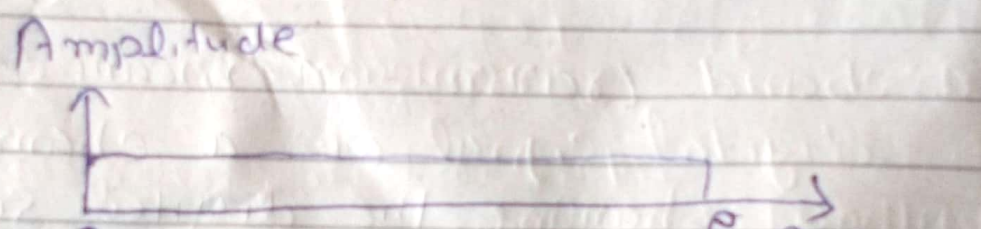
Q NO 3 (B) Ans: we can transmit a digital signal by using one of two different approaches
(1) baseband transmission
(2) broadband transmission (using modulation)

Baseband transmission means sending a digital signal over a channel without changing the digital signal to an analog signal.

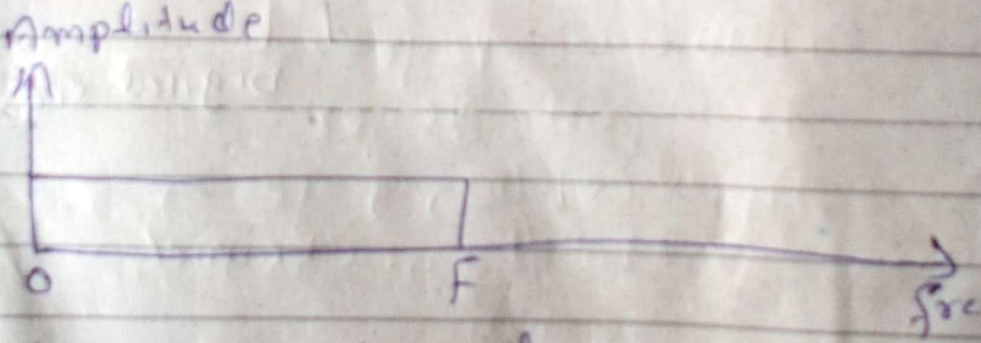


* Baseband Transmission:-
Baseband transmission requires that we have a low-pass channel a channel with a bandwidth

that start from zero.
This is the case if we have a dedicated medium with a bandwidth constituting only one channel.
for example the ~~exam~~ entire bandwidth of a cable connection two computers is one signal channel.
As another example, we may connect several computers to a bus, but not allow more than two station to communicate at a time.
figure



(a) low-pass channel wideband

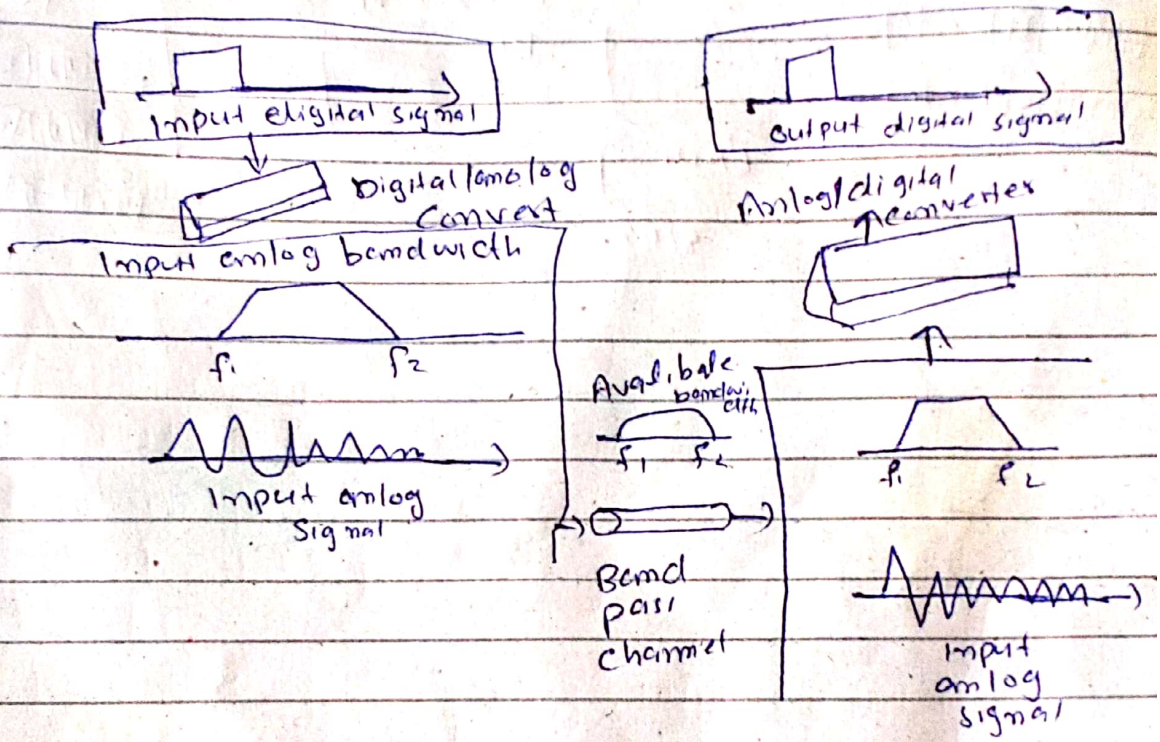


(b) low-pass channel, narrow bandwidth.

* Broadband transmission:-

If the available channel is a bandpass channel, we cannot send the digital signal directly to the channel.

we need to convert the digital signal to an analog signal before transmission.



(Q NO 3 C)

Ans

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NO (3) ANS (C)