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Dept BS(CS) 4th semester

Subject Communication & Networks

Assignment Final Term

Q1

Ans (a) Bandwidth = 4 KHz = 4000 Hz

Number of voice channel = 10

Guard bands = 500 Hz using FDM

For 10 channel we will need ~~10-1=9~~
10 - 1 = 9 guard channels

Bandwidth used by guard channels =

~~xxxx~~ 9 × 500 = 4500 Hz

Bandwidth 10 channel = 10 × 4000 = 40000

Total bandwidth required = 4500 + 40000

45500 Hz

OR

45.5 KHz Ans

Ans 5 (b)

In case $r=4$, $S=3000$

and N is unknown let find

the value of N form below function

$$S = N \times \frac{1}{r}$$

OR

$$N = Sr$$

$$N = 3000 \times 4 = \boxed{12000 \text{ bps}}$$

Ans 5 (c)

Data Element & Signal Element

A data element is the smallest piece of information to be exchanged the bit.

A signal element is the smallest unit of a signal that is constant.

Ans 5 (a) A link refer to the physical path while channel refer to the portion of a link that carries a transmission between a given pair of lines.

One link can have many (n) channels.

Ans 5 (e) The three different Techniques in serial transmission are.

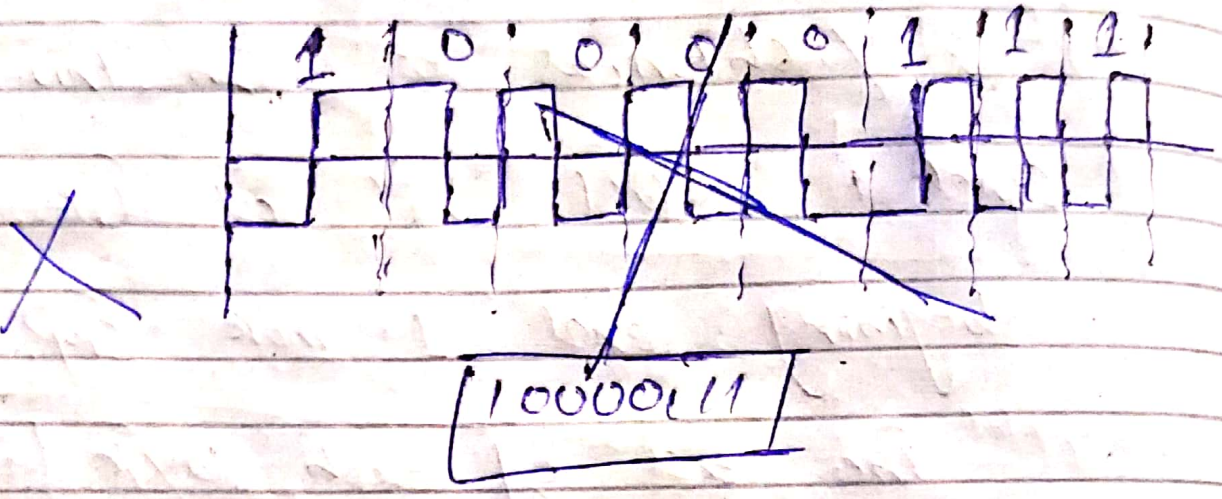
(i) Asynchronous :- In this, we send 1 start bit at the begining and 1 more stop bit at the end of each byte (i-e) irregular intervals.

(ii) Synchronous :- In this, we send bits in a serial order with out any gaps (i-e) regular intervals.

(iii) Isynchronous :- It send a block of data asynchronously.

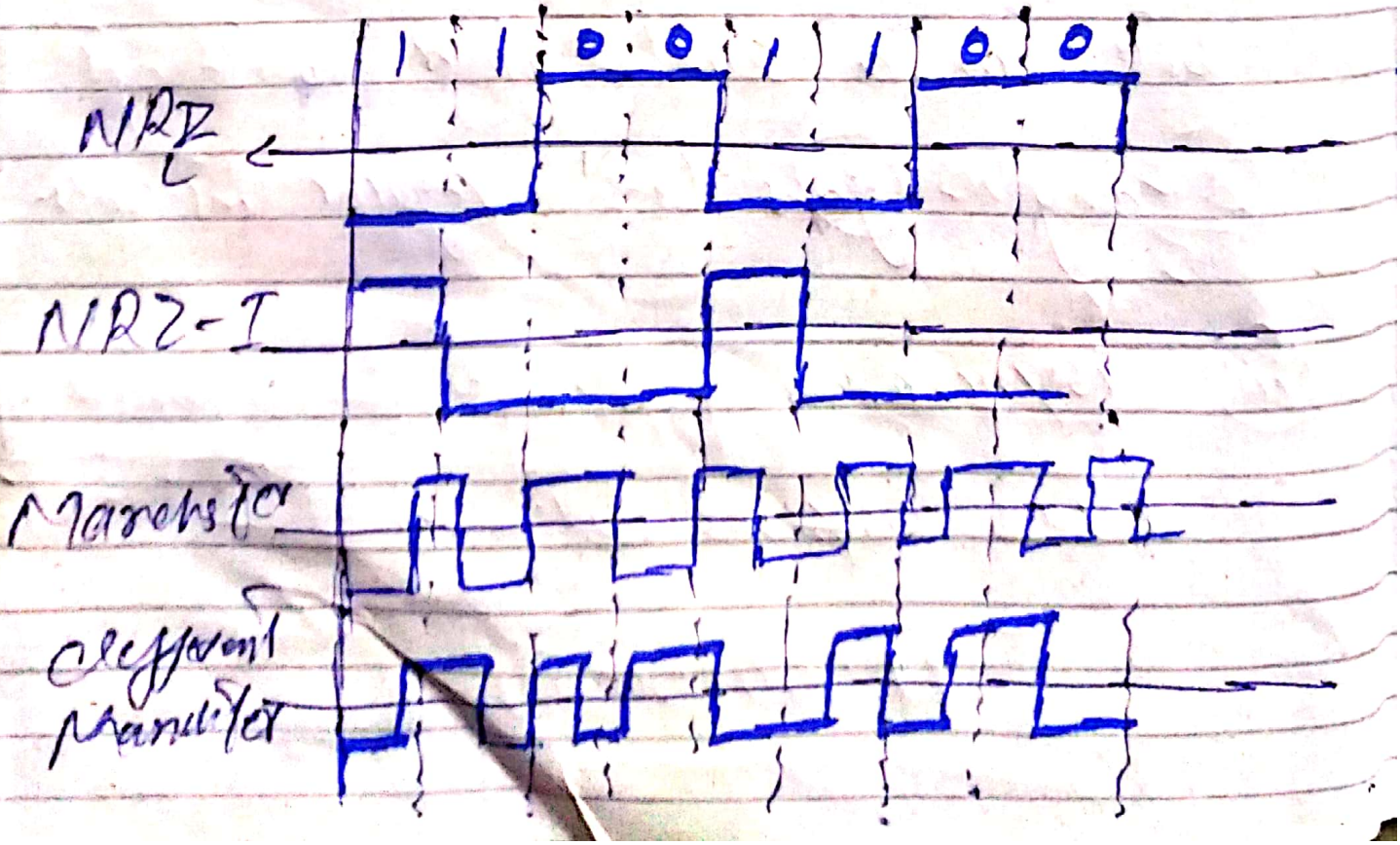
Q2
5

Ans (a)

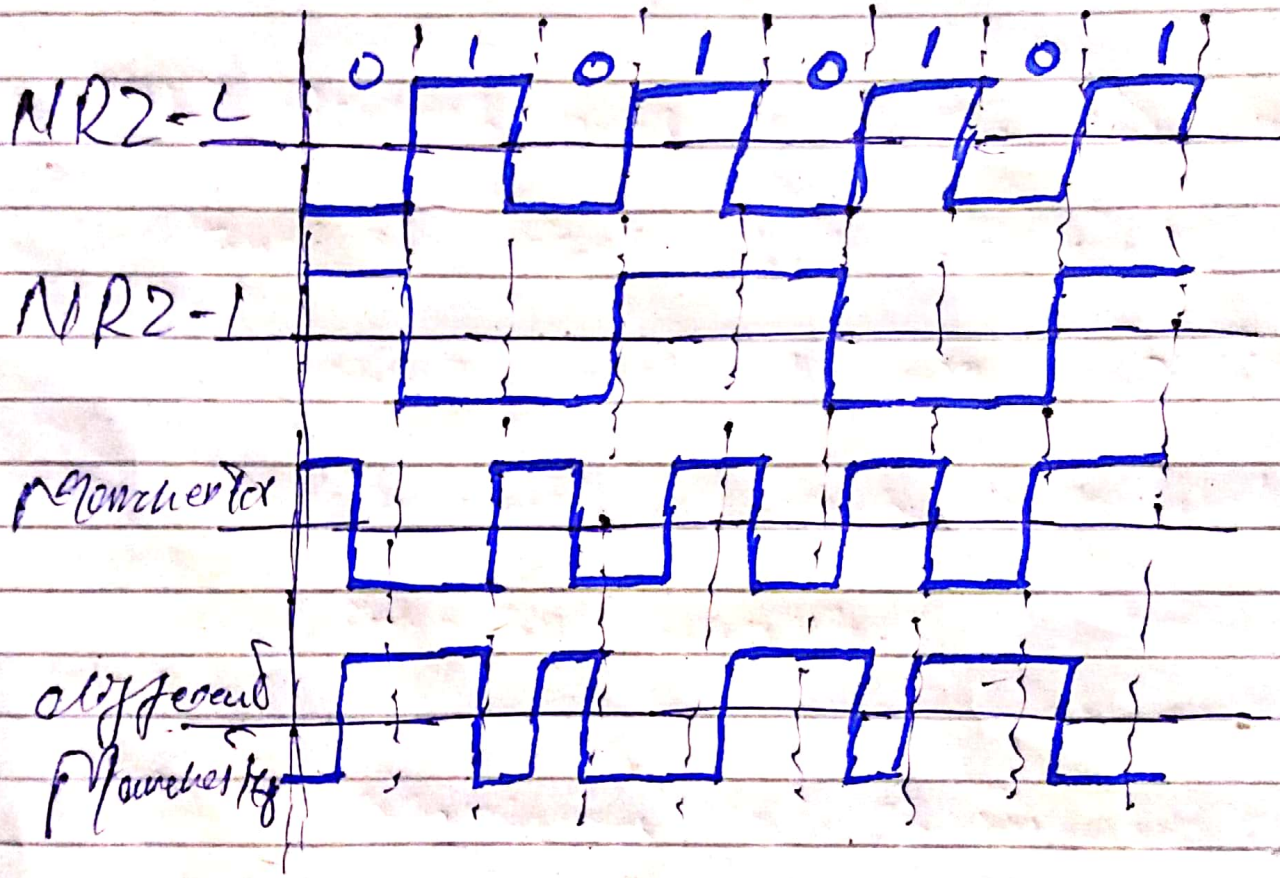


Ans (b)

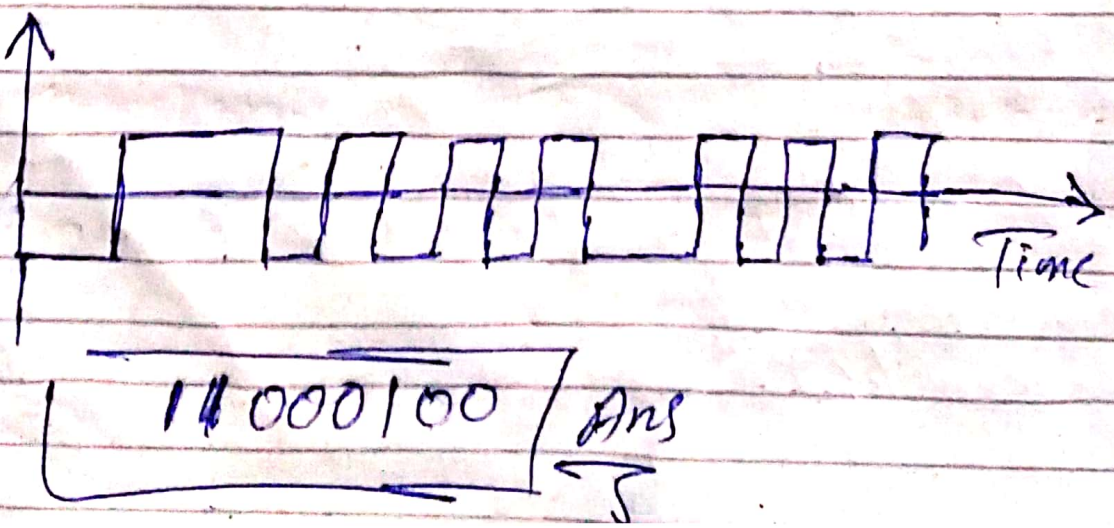
(a) 11001100



(b) 0 1 0 1 0 1



(W2) Ans (a)



Q3
5

Ans (a)

The middle of the Bandwidth is located at 650 kHz This means that our carries frequency can be at $f_c = 650$ kHz.

we can use the formula for Bandwidth to find the bit rate with $\alpha = 1$ →

$B = 300$ kHz

500 to 800 kHz

$B = (1+\alpha)s$

$B = 2s$

$s = N \times \frac{1}{T}$

$B = 2\left(N \times \frac{1}{T}\right)$

$300 = 2\left(N \times \frac{1}{T}\right)$

$N = \frac{300}{2}$

$N = 150$ kbps

Ans

Q.3

Ans (b) Binary amplitude shift keying

* Although we can have several levels of signal elements each with a different amplitude ASK is normally independent using only two levels

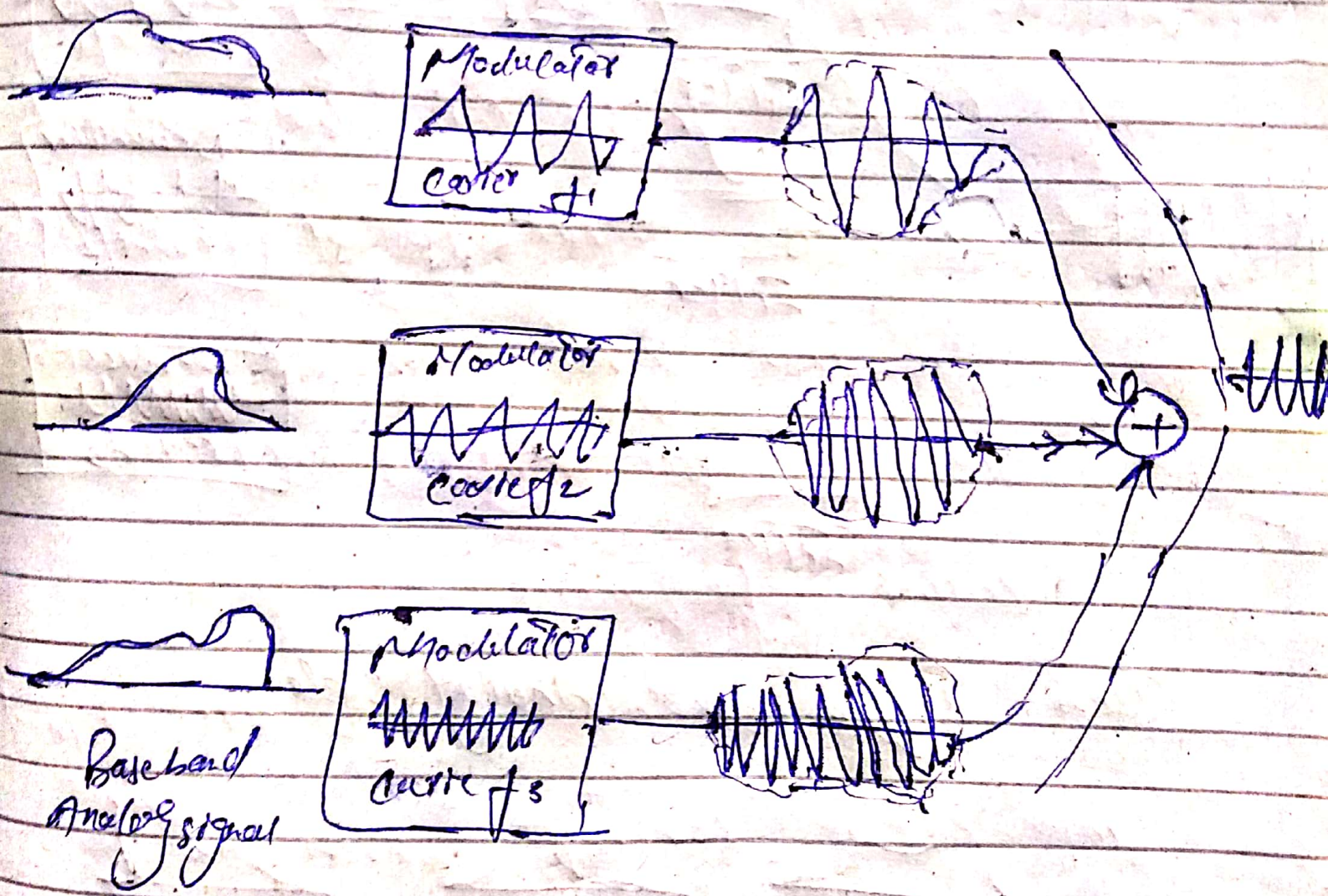
* This is referred to as binary amplitude shift keying or on-off keying (OOK).

* The peak amplitude of one signal level is 0; the other is the same as the amplitude of the carrier frequency.

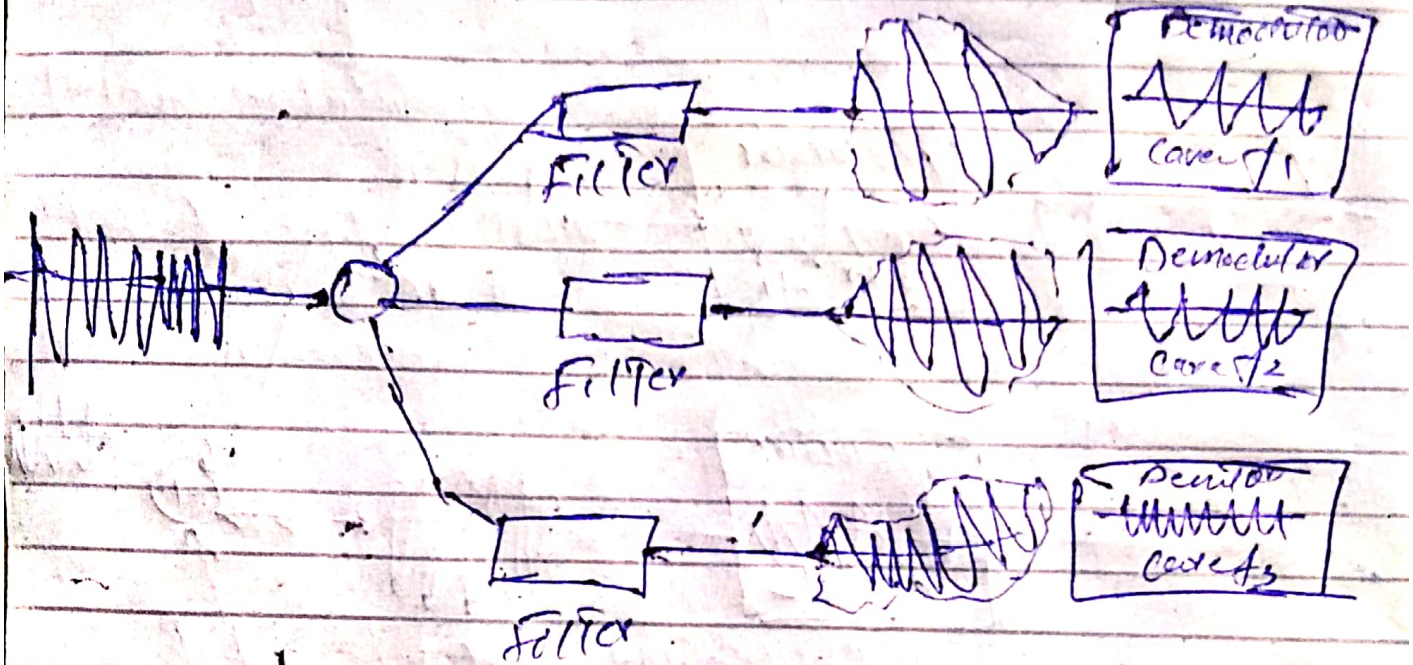
Q4
5

Ans (a) FDM is it is multiplexing
5
Techniques designed for analog signals
it is applied where the bandwidth
of link's greater than the combined
bandwidth the signal to be Transmitted.
In this signal generated modulated
sender device modulate different
carrier frequencies.
Then those modulated signals are formed
into one composite which can be
transmitted through link.
De-Multiplexing Process is these
a series of filter that decompose
the multiplex signal into its orginal

component signal. Each signal are passed a demodulator which apart from carrier and passes them to output lines.



De-multiplexing process



Base band Analog signal

TDM

1) Stand for Time division multiplexing

FDM

1) Stand for Frequency division multiplexing.

2) TDM has low conflict

2) while it has high conflict

3) wiring or chip of TDM is simple

(3) while it ~~has high~~ wiring or chip is complex rather than simple.

4) TDM works with digital signal as well as analog signals

(4) while FDM work with only analog signals

(5) TDM is efficient

(5) while is inefficient

(6) in TDM, Time sharing takes place

(6) while in this frequency sharing takes place.

(7) In TDM synchronization pulse is necessary.

(7) while in it Guard band is necessary.

Ans (b) Analog-to-Analog conversion.

Analog-to-analog conversion or analog modulation is the representation of analog information by an analog signal. One may ask why we need to modulate an analog signal; it is already analog.

Modulation is needed if the medium is band-pass in nature or if only a band-pass channel is available to us. An example is radio. The government assigns a narrow band width to each radio station. The analog signal produced by each

Each station is low-pass signal and in the same range.

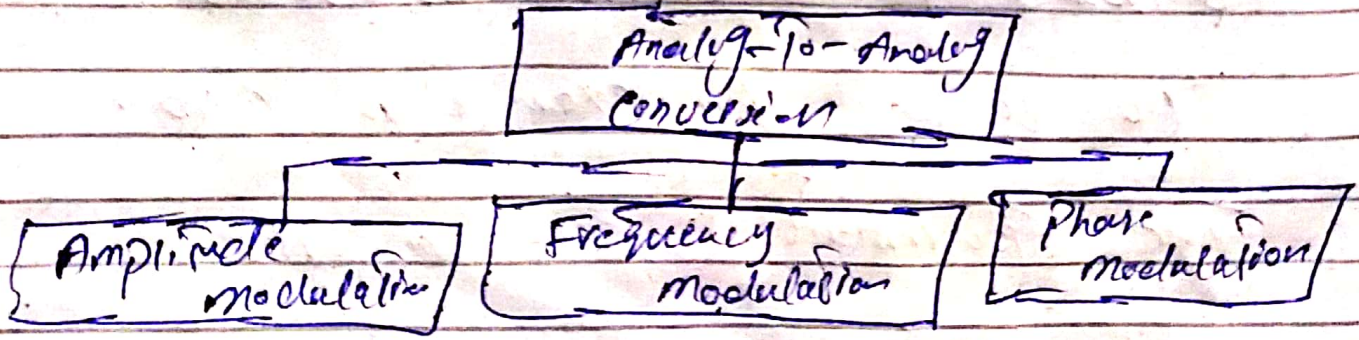
To be able listen to different station the low-pass signal need to be shifted each a different range.

Analog-to-Analog conversion can be accomplished in three ways

Amplitude modulation (AM)

Frequency modulation (FM)

Phase modulation (PM)



Q2

Ans (c)

we know that if the analog signal is band pass then the bandwidth value will be lower than if maximum frequency

$f_{max} \geq 950$ KHz

Nyquist sampling rate

$= 2 f_{max}$

$f_{max} = 950 + 950$ KHz

$= 1900$ KHz

Nyquist sampling Rate $= 2 \times 1900$ KHz

$= 3800000$ samples per second.