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Paper: Data Communication and Networks

∴ Question / Answer :-

Question 1:-

Part A:-

Solution:-

In this case

$r = 4$

$S = 1000$ and

$N = ?$

We can find the value of N form

$$S = N \times 1/r$$

OR

$$N = S \times r$$

Puting value

$$N = 1000 \times 4$$

$$\boxed{N = 4000 \text{ bps}}$$

Part "b"

Solution:-

In this case.

$b = 4$

$S = 3000$

$N = ?$

We can find the value of N

$$S = N \times 1/b$$

or

$$N = S \times b$$

$$N = 3000 \times 4$$

$$\boxed{N = 12000 \text{ bps}}$$

Part "C"

Answer:

Signal Element and Data Elemen

A Data Element is the smallest entity that can represent a piece of information (a bit).
A Signal element is the shortest unit of a digital signal.

Data Element are what we need to send.
Signal Element are what we can send.

Data elements are being carried.
Signal elements are the carriers.

Part "D"

∴ Answer:-

"In multiplexing, the word link refers to the physical path. The word channel refers to the portion of a link that carries a transmission between a given pair of line. One link can have many (n) channels.

Part "E"

∴ Answer:-

There are three different technique in serial transmission

① Asynchronous:-

In this we send 1 start bit at the beginning and 1 or more stop bits at the end of each byte. i.e irregular intervals

② Synchronous:-

In this we send bits in a serial order without any gaps i.e regular intervals

(iii) Isynchronous:-

it sends a block of data asynchronously.

:Question 3:-

:Part :A:-

Answer: Differential Manchester =>

=> 11000 1000

:Part b:-

Answer:-

Part "C"

Answer

$f_{max} = 450 + 950\ kHz$

$\Rightarrow 1400\ kHz$

Nyquist Sampling Rate $\Rightarrow$

$\Rightarrow 2 \times 1400\ kHz$

$\Rightarrow \boxed{28\,00000}$ Simple Per second

:- Question 3 :-

:- Part A :-

Solution:-

The middle of the bandwidth is located at 650 kHz. This means that our carrier frequency can be at f_c = 650 kHz.

formula of bandwidth to find the bit rate

$\alpha = 1$

$r = 1$

$f_c = 650$

$B = (1 + \alpha) \times S$

$\Rightarrow 2 \times N \times \frac{1}{r}$

$\Rightarrow 2 \times N = 300 \text{ kHz}$

$\Rightarrow N = 150 \text{ kHz}$.

Part "b"

Answer:-

Binary Amplitude Shift Keying:-

Although we can have several levels (kinds) of signal elements each with a different amplitude ASK is normally implement using only two levels.

This is referred to a 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.

Question : 4 :-

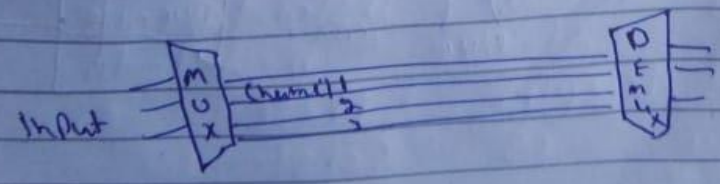
Part A :-

FDM :-

- Frequency-division multiplexing is an analog technique that can be applied when the bandwidth of a link (in hertz) is greater than the combined bandwidths of the signals to be transmitted.

- In FDM signals generated by each sending device modulate different carrier frequencies.

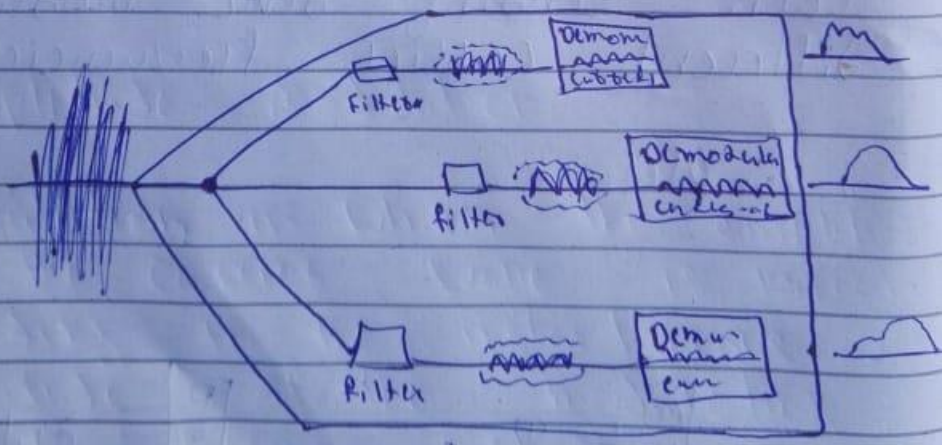
Example :-



De-multiplexing Processor:-

The De-multiplexing Processor uses a series of filters to decompose the multiplexed signal into its constituent component signal

- The individual signal are then passed to a demodulator that separate them from their carries and passed them to them to the output lines.



Different between TDM and FDM:-

TDM:-

① TDM stand for Time Division Multiplexing.

② TDM works with digital signals as well as analog signals

③ TDM has low conflicat.

④ ~~Wiring has less conflict~~

④ Wiring or Chip of TDM is simple.

⑤ TDM is effcient.

FDM:-

① FDM stand for Freqeuncy division multiplexing.

⑪ While FDM works with only analong signals.

③ While it has high confilict.

④ While it is inefficient.

Part: b"

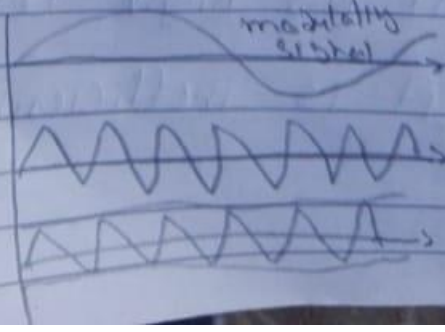
Analog to Analog Conversion:

is the representation of analog information by an analog signal. it is a process by which a characteristic of carrier wave is varied according to the instantaneous amplitude of the modulating signal.

Analog to Analog Conversion can be done in three way.

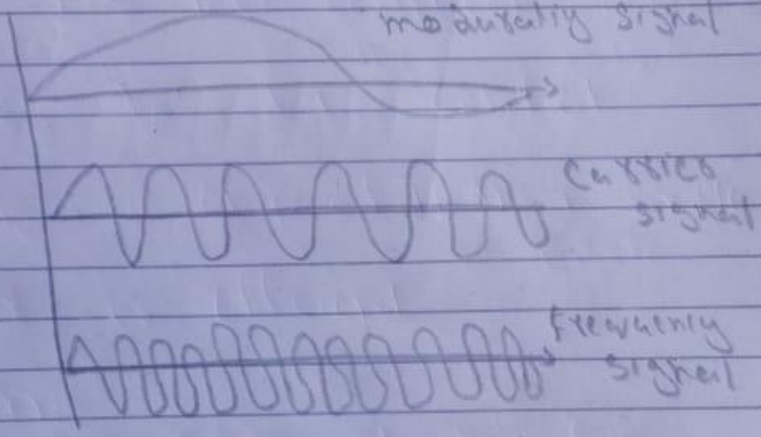
(1) Amplitude modulation:-

The modulation in which the amplitude of the carrier wave is varied according to the instantaneous amplitude of the modulating signal keeping phase and frequency as constant.



(2) FREQUENCY modulation:-

The modulation in which frequency of the carrier wave is varied according to the instantaneous amplitude of the modulation signal keeping phase and amplitude as constant.



(3) PHASE Modulation:-

in which the phase of the carrier wave is varied according to the instantaneous amplitude of the modulating signal keeping amplitude

and frequency as constant