Name : AliRaza

ID # 14989

Subject : Data Communication And Networks

Dept # BS(cs) 4th semester

Submitted To Engr. Ghassan Husnain.

Q NO(1) (A) part

Answer (A) is

For 10 channels, we need at least 9 guard bands. This means that the required bandwidth is at least.

$10 \times 4 + 0.5 \times 9 = 44.5$ kHz.

Q NO(1) sec (B)

Answer (B):-

In case $r = 4$, $S = 3000$ and N is unknown. lets find the value of N from below formation

$$S = N \times \frac{1}{r} \quad \text{or} \quad N = S \times r$$

$$N = 3000 \times 4$$

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

Q NO 1:- (c)

Ans:-

Data Element and signal Elements

- 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.

(i) NO1 :- (D) part

Answer:

- Link refers to the physical path while channel refers to the portion of a link that carries a transmission between a given pair of lines.
- One Link can have many (n) channels.

(j) NO(1) :- (D) (E)

Answer :- (E)

The three different Techniques in serial trasmission are:

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

(2) Synchronous - In this we, send bits in a serial order with

out any gaps. ie regular intervals.

(iii) isynchronous

it sends a block of data asynchronously.

(4) (a) part

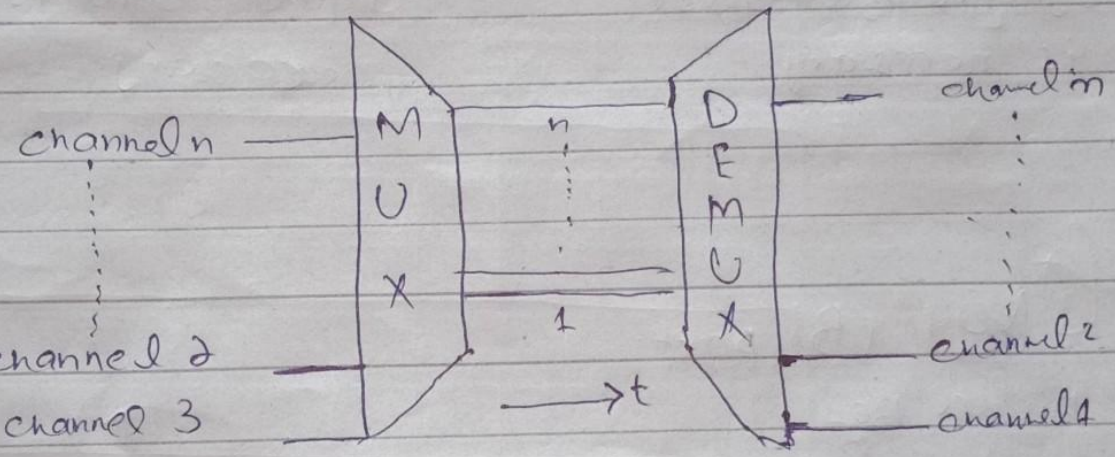
Ans:

Concept and process:

In FDM, the total bandwidth is divided to a set of frequency bands that do not overlap. Each of these bands is a carrier of a different signal that is generated and modulated by one of the sending devices. The frequency bands are separated from one another by strips of unused frequencies to overlapping of signals.

The modulated signals are combined together using a multiplexer (MUX) in the sending end. The combined signal is transmitted over the communication channel, thus allowing

multiple independent data streams to be transmitted simultaneously. At the receiving end, the individual signals are extracted from the combined signal by the process of demultiplexing (DEMUX)



TDM	FDM
(1) TDM stands for Time division multiplexing TDM works	(1) FDM stands for for frequency division multiplexing - while FDM work with only analog signals.
(2) signals as well as analog signals	while FDM it has high conflict
(3) TDM has low conflict	

wiring or chip	while it has
(4) of TDM is simple	wiring or chip is complex rather than simple
(5) TDM is efficient	FDM is inefficient.
(6) Sharing time take place	while in this, frequency sharing takes place
(7) In TDM Synchronization phase is necessary	while in it Guard band is necessary.

(b) NOW (B) part.

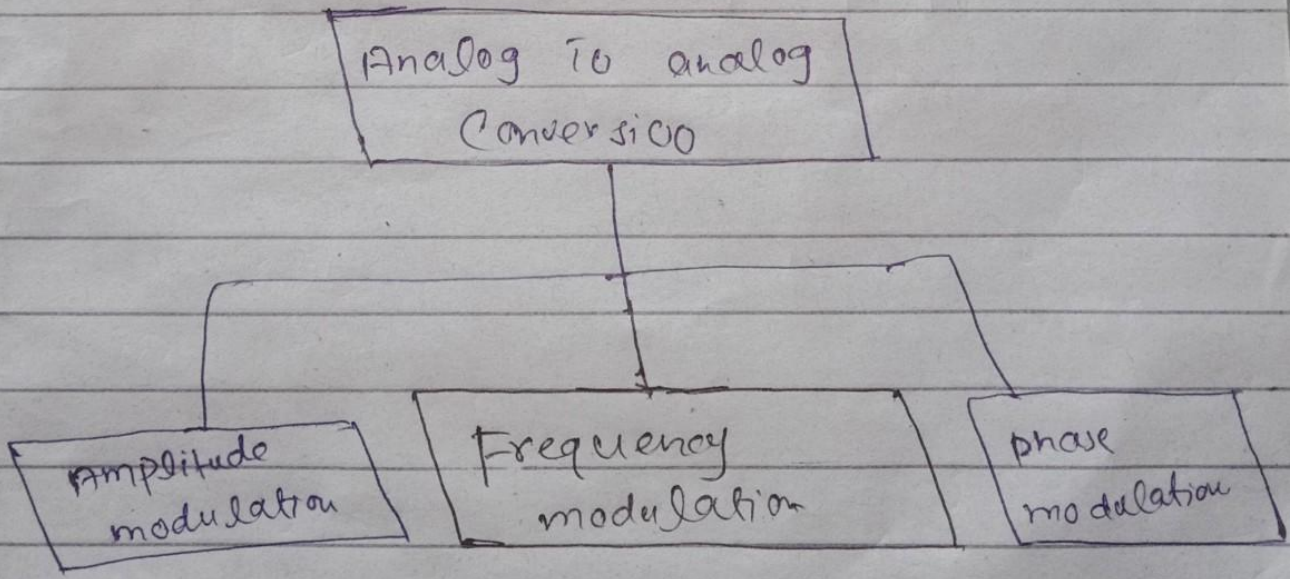
Answer 13 :-

Data To Analog Conversion:

- A since wave is defined by three characteristics: amplitude, frequency, and phase.
- When we vary any one of these characteristics, we create a different version of that wave.
- So by changing one characteristic of a simple electric signal, we can use it to represent digital data.

- Any of the three characteristics can be altered in this way, giving us at least three mechanisms for modulating digital data into an analog signal.
- Amplitude shift keying (ASK),
- Frequency shift keying (FSK),
- Phase shift keying (PSK).

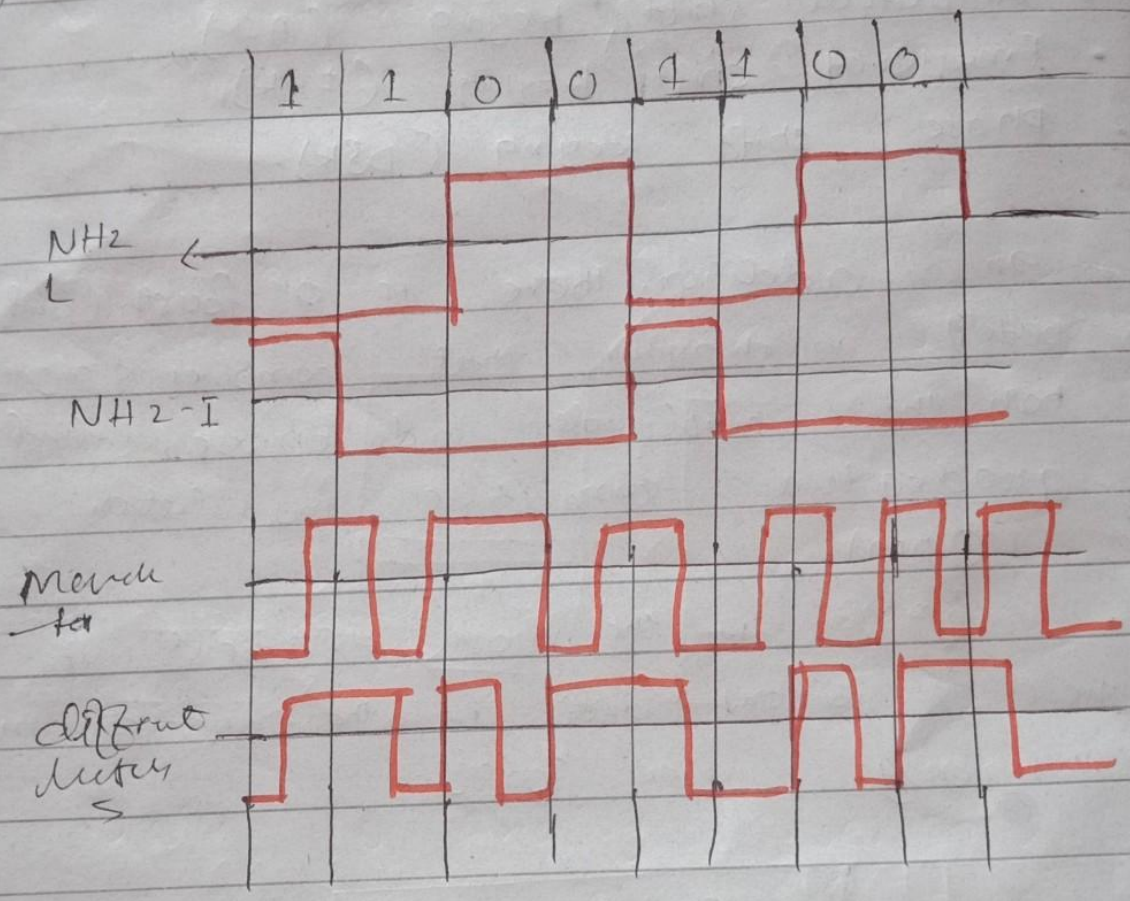
- In addition, there is a fourth (and better) mechanism that combines changing both the amplitude and phase, called quadrature amplitude modulation (QAM).
- QAM is the most efficient of these options and is the mechanism commonly used Today.



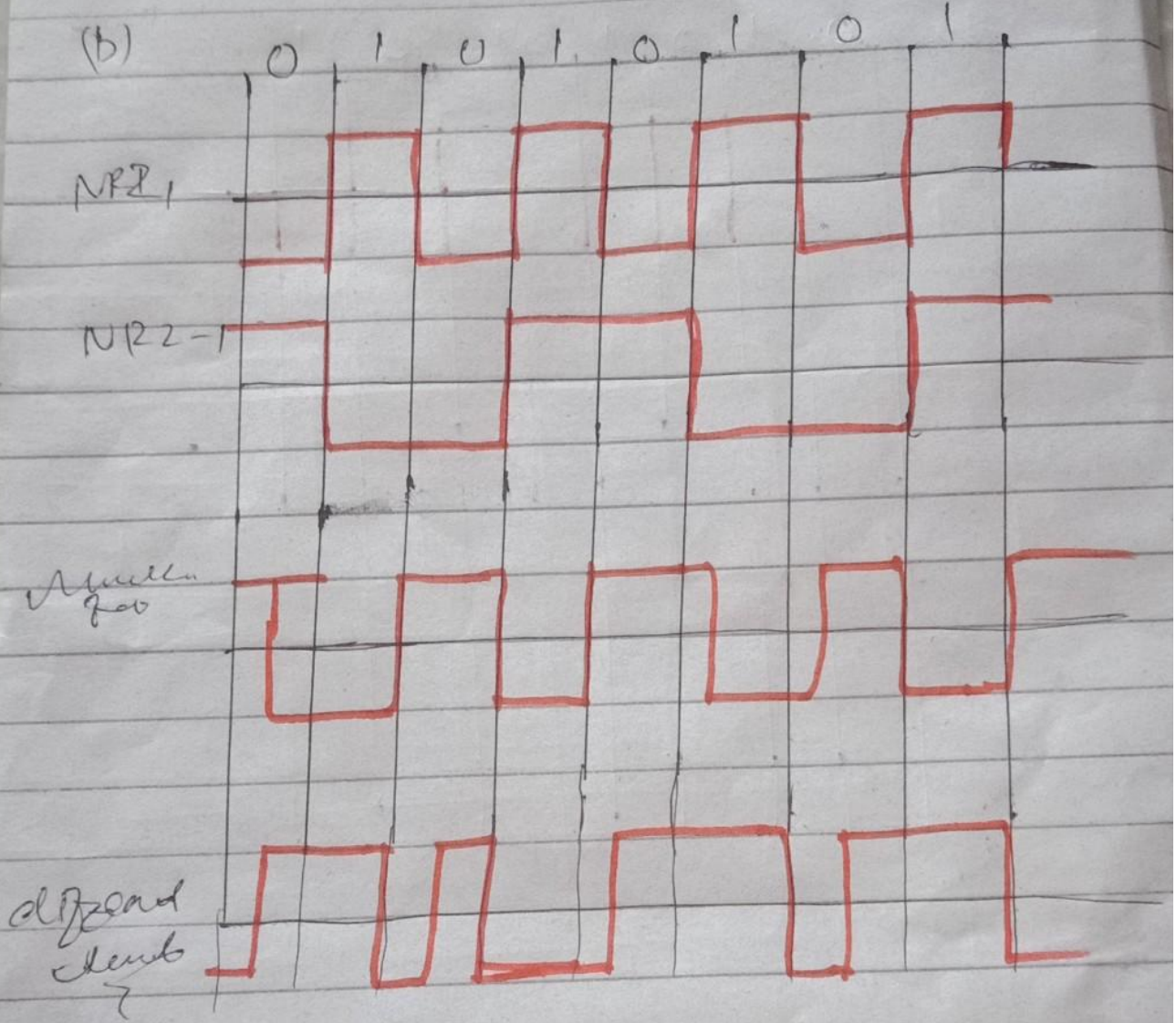
(1) NO(2) (B) part

Answer:-

(a) 11 00 11 00



(b)



Q No 2 part (a)

Answer

Differential Manchester

= 11000100. Answer.

(3)

Q NO3 part (A) (A)

Answer:- part (A)

The middle of the Bandwidth is located at 650 KHz.

This means that our carrier frequency can be set $f_c = 650$ KHz

we can use the formula for Bandwidth to find the bit rate with $d = 1$

R 300 KHz

500 to 800 KHz

$B = (1+d) * S$

$B = 2S$

$B = 2(N \times 1/8)$

$B = 2(N)$

$300 = 2N$

$N = 2/300$

So, $N = 150$ Kbs

Q NO3 part B&

Ans&

Binary Amplitude shift keying&

- Although we can have several levels of signals elements, each with a different amplitude, Ask is normaly implemented using only two levels.
- This is refered 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.

NOW part (c)

Ans:

Bandwidth = Highest frequency - Lowest frequency.

$950kHz = x - 450kHz$

$x = 950 + 450 = 1400 kHz.$

Nyquist sampling rate => should be at ast twice the maximum frequency

Hence,

Nyquist sampling Rate $= 2 * 1400 kHz$

$= 2800 kHz.$