19BCE245

DC tut-5

1) Distinguish b/w a signal element & data element.

→ Signal Element :
- → Smallest unit of digital signal
- → Really sent
- → Carriers

Data Element :
- → The smallest entity (bit)
- → Wish to send
- → Carried

2.) Distinguish b/w data rate and signal rate

→ Data Rate :
- → Number of data elements transmitted per second.
- → Unit is bps [Bits Per Second]

Signal Rate: [Pulse Rate]
- → Number of signal elements transmitted per second.
- → Unit is baud [Bd]

3.) Define a DC component & it's effect on digital transmission.

→ When the Voltage level in a digital signal is constant for a while, the spectrum creates very low frequencies. These frequencies are called DC components.

4) Calculate the value of the signal rate for each of following case if data rate is 1 Mbps and $c = 1/2$.

1.)	1	Signal element	1	data element
2.)	2	Signal element	1	data element
3.)	1	Signal element	2	data element
4.)	3	Signal element	4	data element

→ (a.) Formula = S (signal rate) $= C \times N \times \frac{I}{r}$

where r = $\frac{\text{number of data element}}{\text{number of signal element}}$.

$\therefore S = \frac{1}{2} \times (1 \times 10^6) \times \underset{\left(\frac{1}{1}\right)}{\frac{1}{1}} = 500$ Kbaud

($\because$ 1 Mbps $= 1 \times 10^6$ bps ; $r = 1/1 = 1$; $C = 1/2$)

b.) $S = \frac{1}{2} \times (1 \times 10^6) \times \underset{\left(\frac{1}{2}\right)}{\frac{1}{1}} = 1$ Mbaud

c.) $S = \frac{1}{2} \times (1 \times 10^6) \times \underset{\left(\frac{2}{1}\right)}{\frac{1}{1}} = 250$ Kbaud

(d.) $S = \frac{1}{2} \times (1 \times 10^6) \times \underset{\left(\frac{4}{3}\right)}{\frac{1}{1}} = 375000$ baud

$= 375$ K baud

5.) Draw the graph of NRZ-L and NRZ-I sheme using each of following streams.

(a.) 00000000

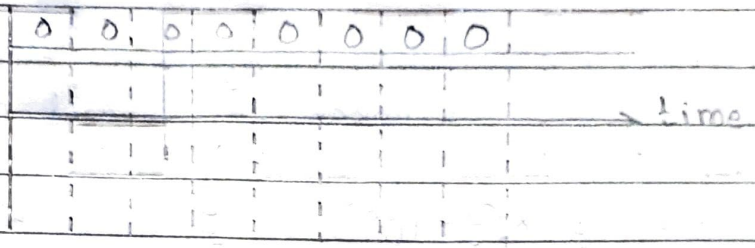
(b.) 11111111

(c.) 01010101

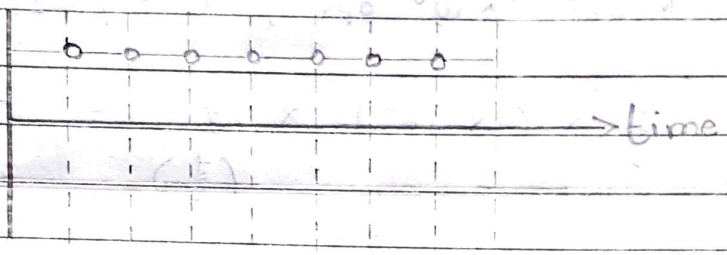
(d.) 00110011

→ (a.) 00000000

(a) NRZ-L

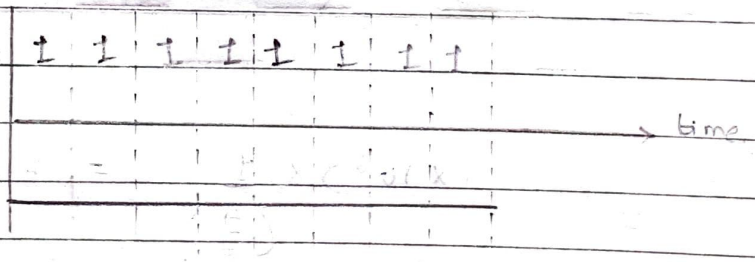


NRZ-I

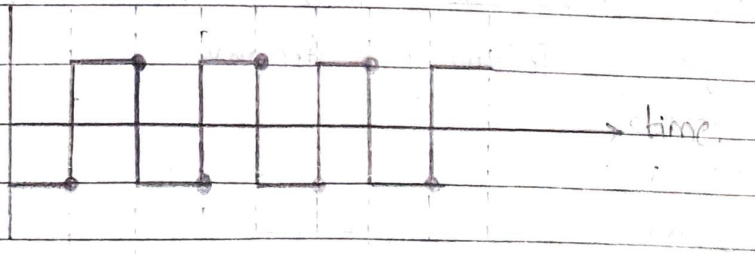


(b) 1 1 1 1 1 1 1 1

NRZ-L

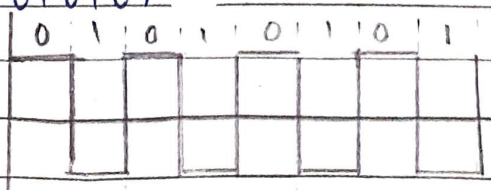


NRZ-I

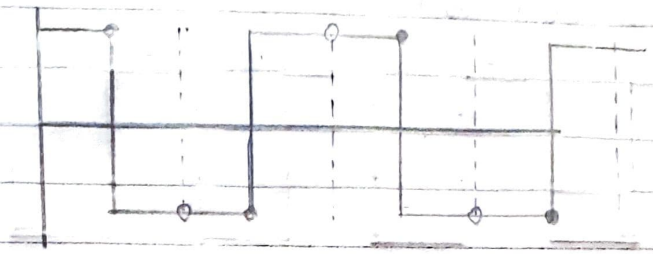


(c) 01010101

NRZ-L

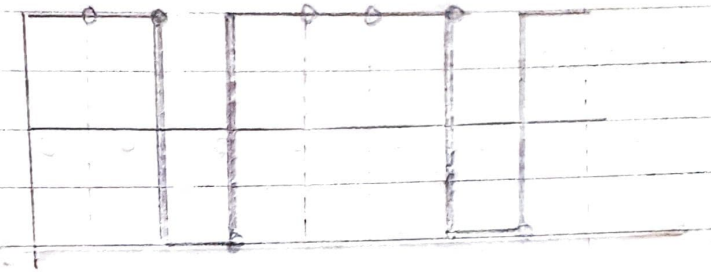


NRZ-I



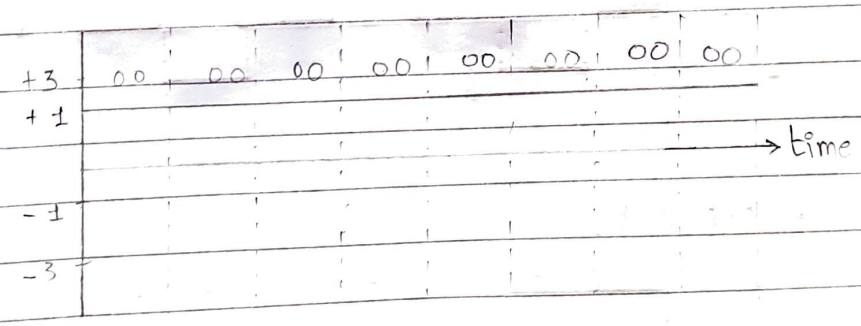
(d) 00110011

NRZ-L

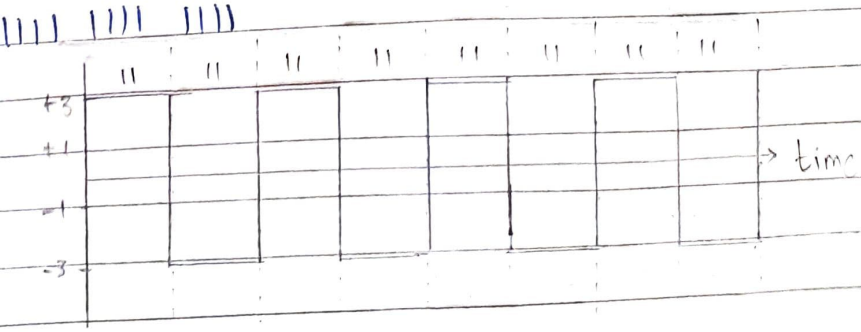


6.) Repeat Exercise 5 for 2B 1Q scheme, using following data streams.

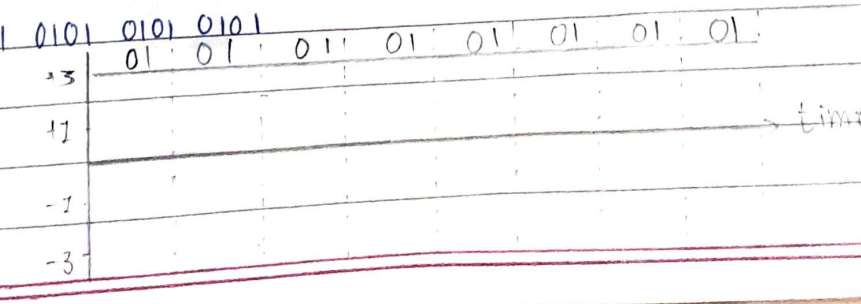
→ a.) 00.00.00.00,00.0.0,0.0.00



(b.) 1111 1111 1111 1111



(c.) 0101 0101 0101 0101



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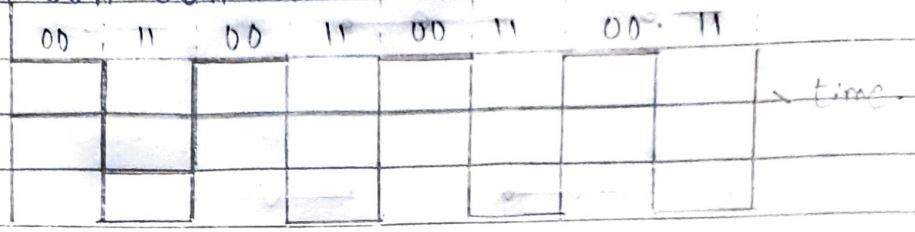
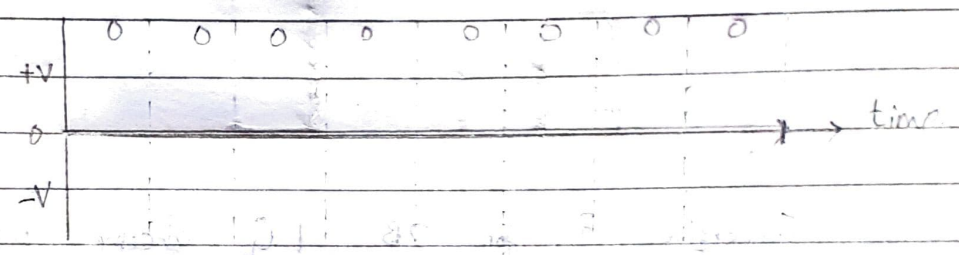
(d.) 0011 0011 0011 0011

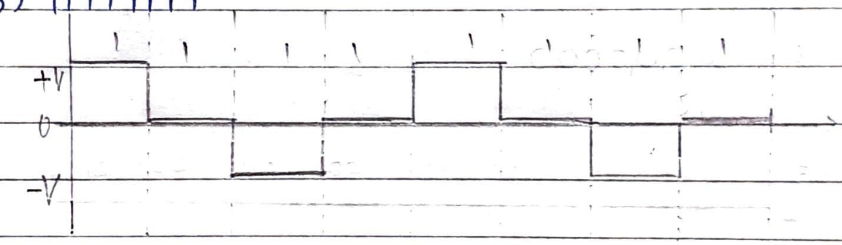


7.) Repeat ex. 5 for MLT-3 scheme, using following data streams.

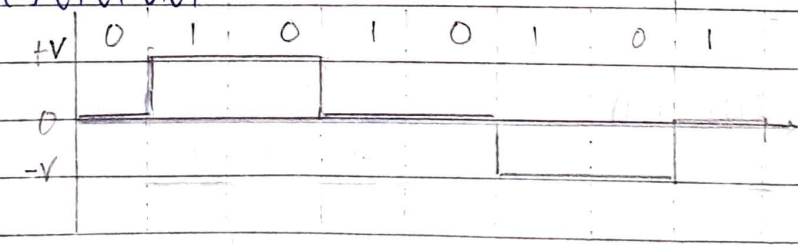
→ a.) 0000 0000



b.) 1111 1111



c.) 0101 0101



d.) 0001 1000