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Ans. to Q.no. 2

The Nyquist Bit Rate formula is for idealistic noiseless scenarios where the maximum bit-rate is calculated

The formula is

$N_{max} = 2 \times B \times \log_2 L$ where B is Bandwidth. L is no. of signal levels

It gives us the theoretical highest bit rate.

Given, highest and lowest signal is 4 Hz and 3 Hz.

So, bandwidth = $(4 - 3) = 1$ MHz

$SNR_{DB} = 24$ dB

But, $SNR_{DB} = 10 \log_{10} SNR$

$\Rightarrow 24 = 10 \log_{10} SNR$

$\therefore SNR = 10^{2.4}$

$= 251.19$

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

$= 1 \times 10^6 \times \log_2 (251.19 + 1)$

$= 7.98$ Mbps

Now, $7.97 = 2 \times B \times \log_2 L$

$\Rightarrow \frac{7.97}{2 \times 1} = \log_2 L$

$\Rightarrow \log_2 L = 4$

$\therefore L = 16$ (Ans.)

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Ans. to Q.no. 1

(i)

The scrambler manipulates the data stream before transmission. Scrambling is the procedure by which these sequence of data is manipulated and undesirable sequences are removed.

(ii)

~~Bandwidth delay product is the product of data~~

(iii)

Jitter is the time difference of data packets getting received. ~~Sometimes Data packets~~

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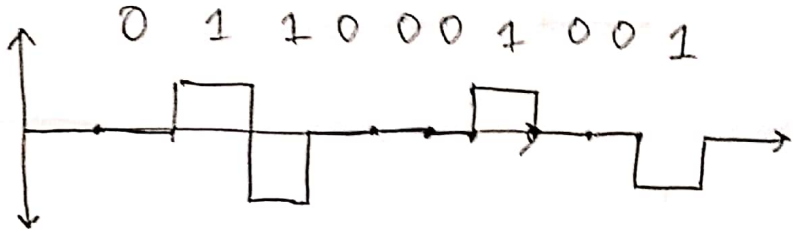
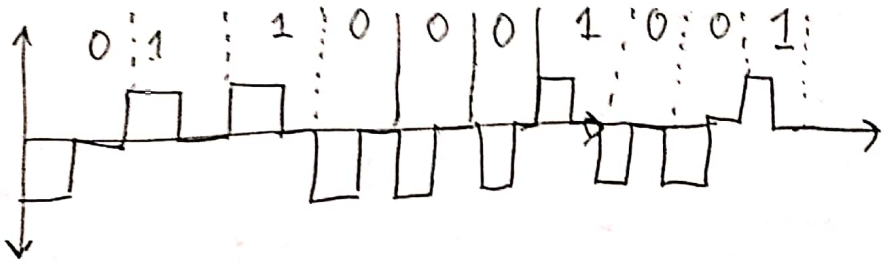
Ans to Q.no (1)

AMR



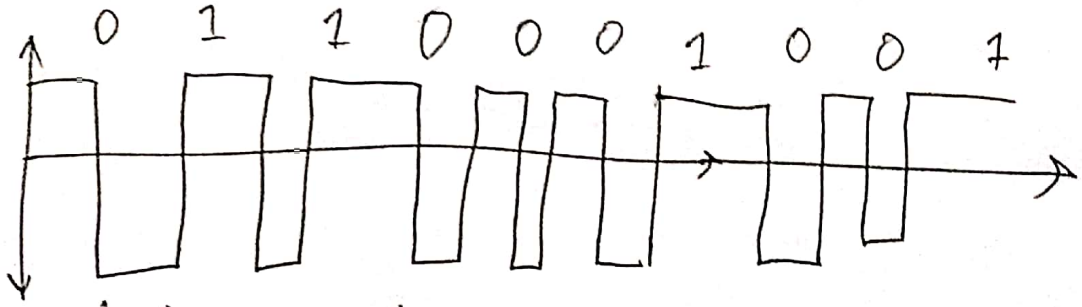
Bandwidth requirement is $N/2$

Polar RZ



Bandwidth requirement is N

Manchester



Bandwidth is N

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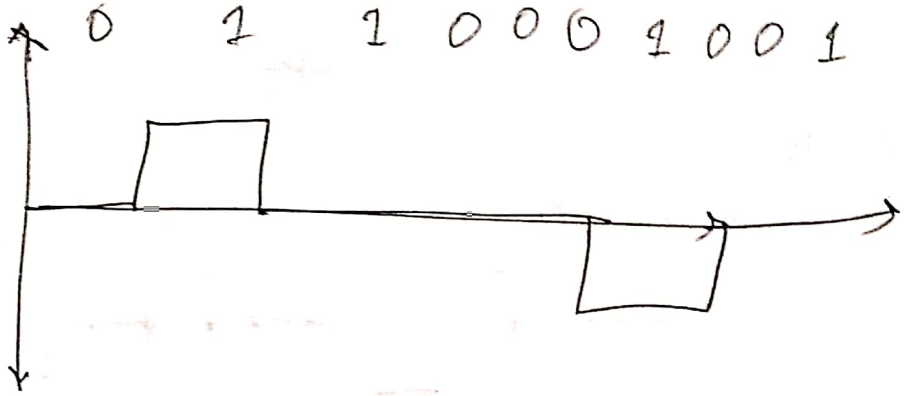
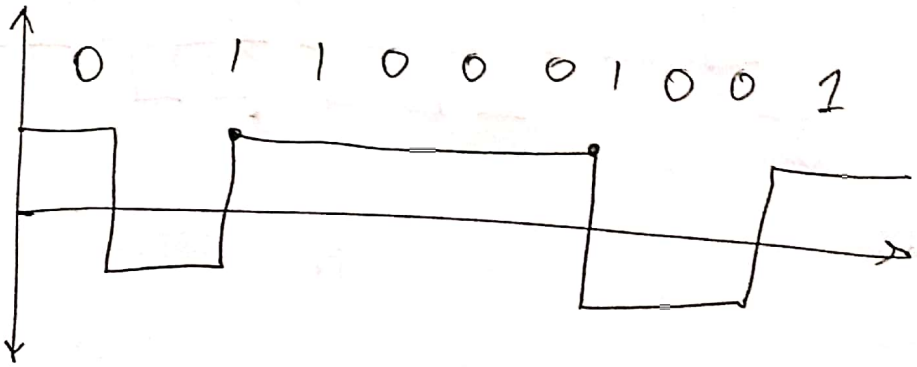
MLT-3



Bandwidth = N/3

NRZ-PI



Bandwidth = N/2

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