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Ans. to the ques no- 1(a)

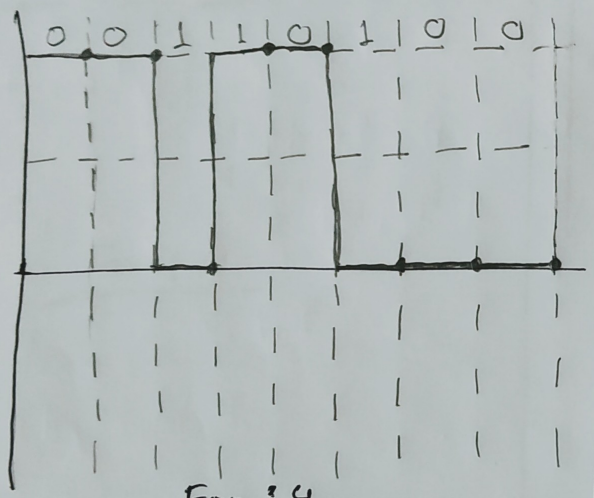
E = 4

ASCII value of 4 = 00110100

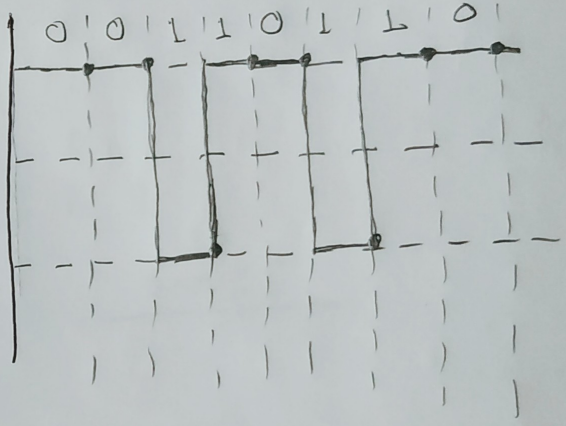
F = 6

ASCII value of 6 = 00110110

NRZ-I

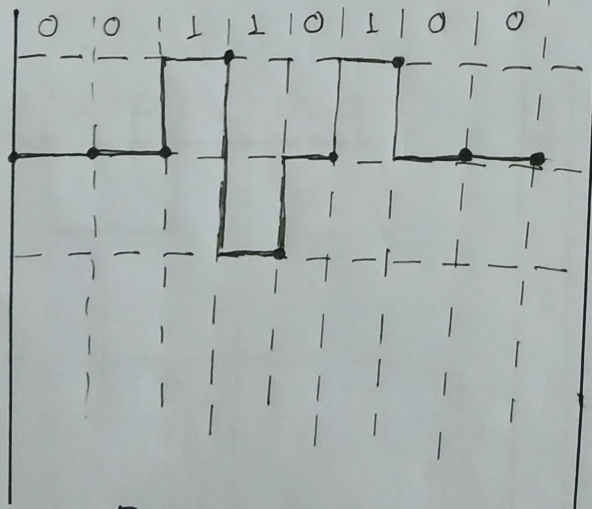


Fon: 4

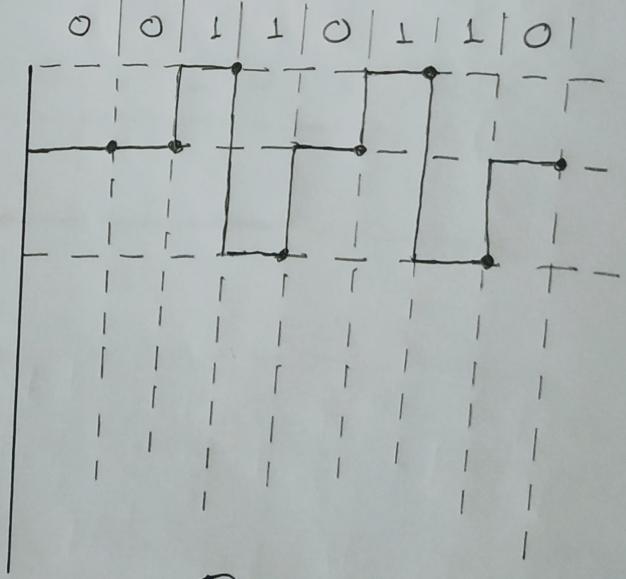


Fon: 6

AMI



Fon - 4



Fon - 6

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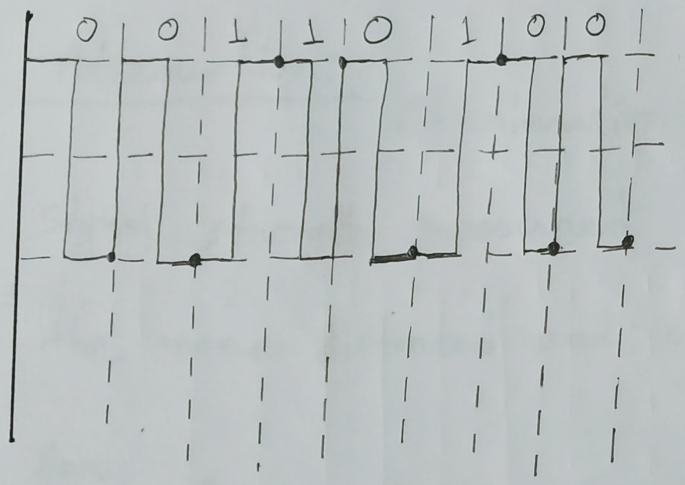
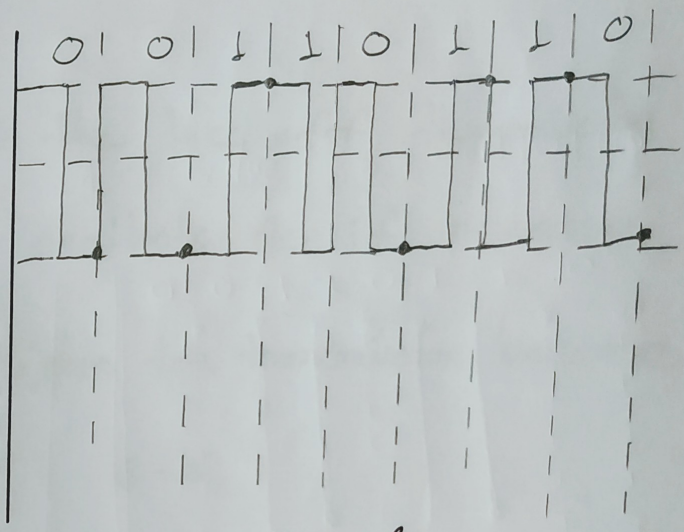
Diff-Manchaster

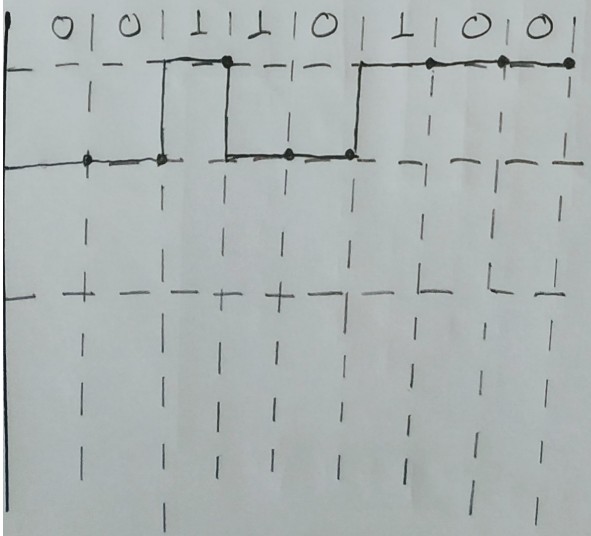


For: 4

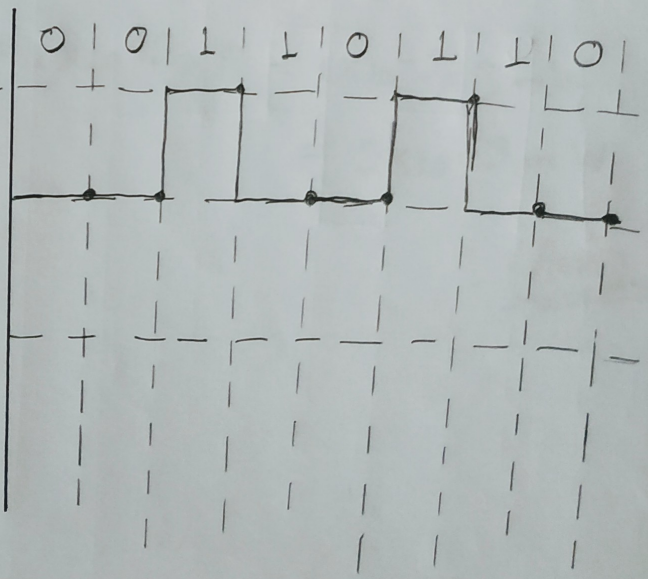


For: 6

MLT-3



For: 4



For: 6

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Ans. to the ques. no - 1(b)

Attenuation: Attenuation is the loss off transmission signal strength measured is decibels. As if increases, the more distorted and unitigble the transmission becomes.

$B = P_1$

Here, $A = 1$, $B = 7$, $C = 3$

for 1 km = -1 dB, 7 km = -7 dB, The loss in the cable in decibels is $3 \times (-1)$

$= -3$ dB

~~for, 1 km = 1 dB dB =~~

~~1 km = 1 dB~~ $\therefore dB = 10 \log_{10} (P_2/P_1) = -3$

$\Rightarrow (P_2/P_1) = 10^{-3} = 1 \times 10^{-3}$

$\therefore P_2 = 1 \times 10^{-3} \times P_1 = 1 \times 10^{-3} \times 3$ mW

$= 3 \times 10^{-3}$ m W

(Ans.)

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Ans to the ques. no- 1(c)

B = 7
D = 4

Example of unwanted signals:

1. Atmospheric noise
2. Extra terrestial noise
3. Industrial noise.

SNR = signal to noise ratio

signal power = B = 7 milliwatts.

noise = D = 4 microwatts × 7
= 0.028 milliwatts

$$SNR = \frac{7}{0.028} = 250 \text{ dB}$$

$$SNR_{dB} = 10 \log_{10} (250)$$

$$= 23.98 \text{ dB}$$

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Ans. to the ques. no - 1 (d)

Bandwidth = E = 4 MHz = 4×10^6

SNR = 250 (from 1(c))

$C = \text{Bandwidth} \log_2(1 + SNR)$

$= 4 \times 10^6 \times \log_2(1 + 250)$

$= 9.59 \times 10^6$

Data rate depends in 3 factors —

① Bandwidth available.

② Number of levels in digital signal.

③ The quality of the channel level of noise.

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Ans. to the ques. no - 1 ~~(d)~~ (e)

Latency is the delay between a user's action and a web application response to that action, often referred to in networks forms as the total round trip time it takes for a data to travel.

Here,
$F = 6, \quad G = 5, \quad H = 2$

$BW = E = 4\ MHz$

queuing time = $G = 5\ \mu s$. Length = 2000 km

processing time = $H = 2\ \mu s$ Speed = $2 \times 10^8\ m/s$

$$\text{propagation time} = \frac{2000 \times 10^3}{2 \times 10^8} = 0.01 \text{ sec}$$

$$\text{transmission time} = \frac{\text{Frame size}}{\text{Bandwidth}} = \frac{6 \times 10^6}{4 \times 10^6} = 1.5 \text{ sec.}$$

$\therefore$ total latency = $0.01 + 1.5 + 5 \times 10^{-6} + 2 \times 10^{-6}$

$= 1.51$ sec.

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Ans. to the ques. no 1(f)

Here, B = 7, E = 4, F = 6, Peak amplitude 5v, Mid amplitude = 10v.

lowest frequency = BX10 = 7X10 = 70 KHz = 70000 Hz

highest frequency = EFX10 = 46X10 = 460 KHz = 460000 Hz

Bandwidth = 460000 - 70000 = 390000 Hz

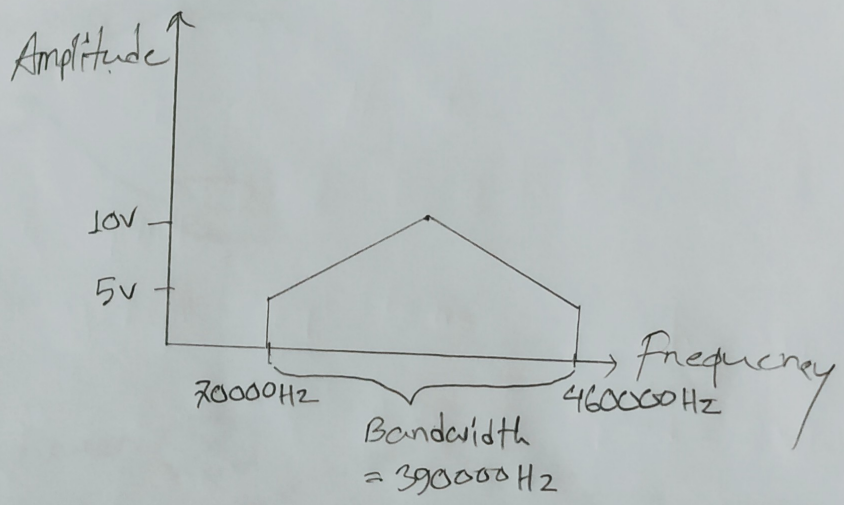

Fig: Frequency spectrum of non-periodic Composite signal

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Ans. to the ques. no-2

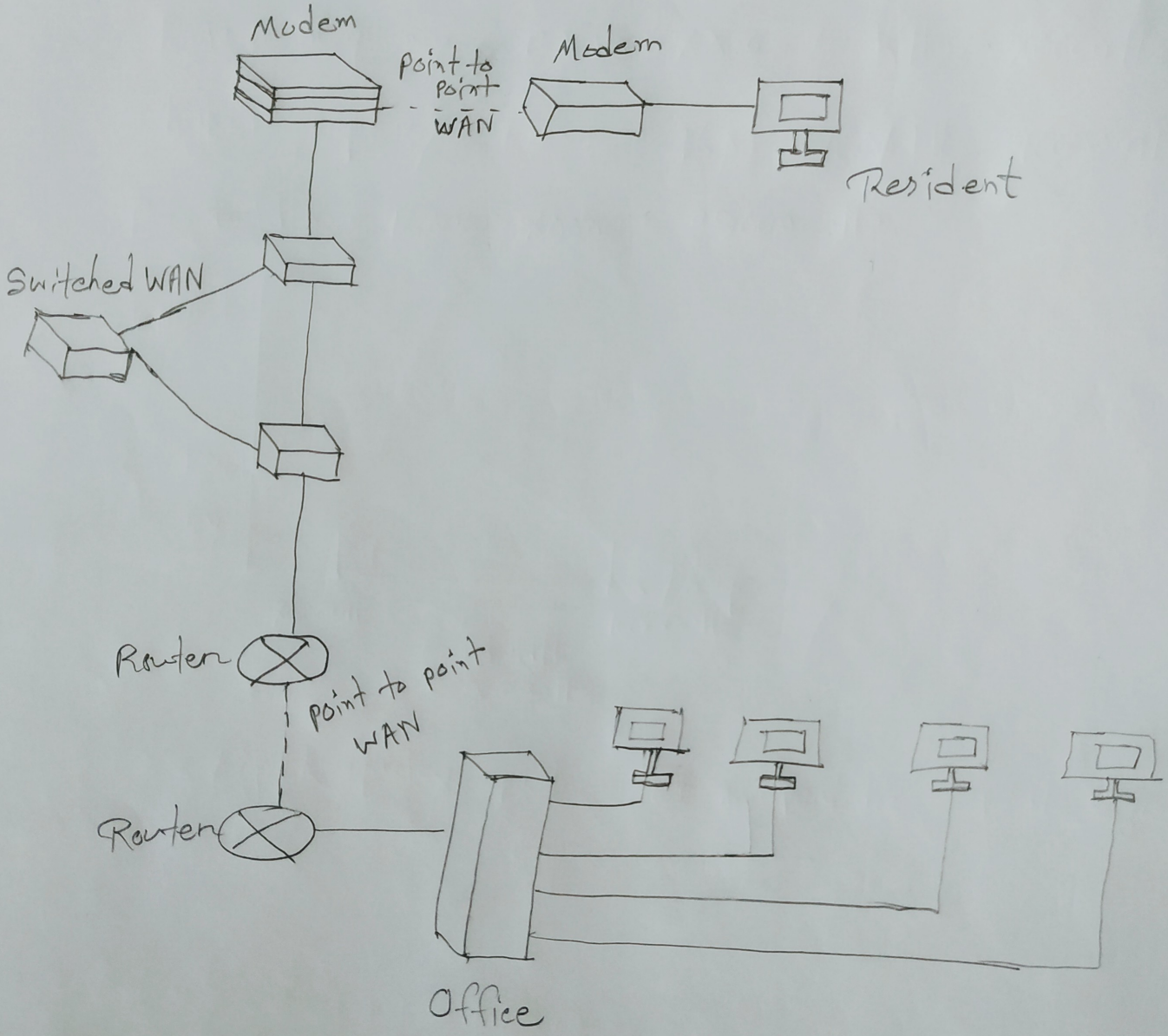

Fig: A heterogeneous network mode of three WANs and TWO LAN's.