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Class Notes

If the composite signal is periodic, the decomposition gives a series of signals with discrete frequencies.

If the composite signal is non-periodic, the decomposition gives a combination of sine waves with continious frequencies

Problem

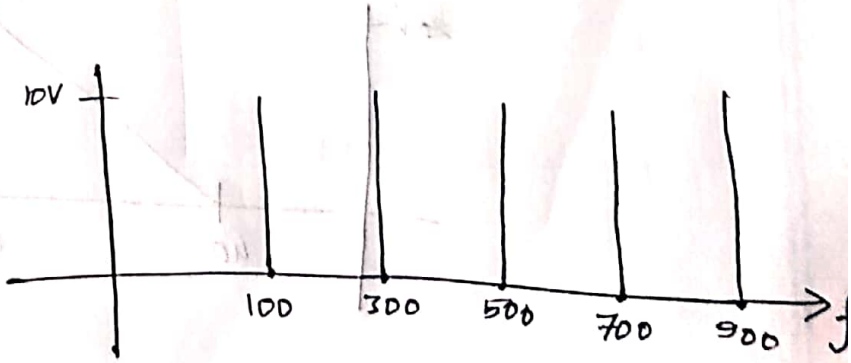
Frequency – 100, 300, 500, 700, 900

Max amplitude – 10V

Bandwidth = $f_H - f_L$

= 900 - 100

= 800



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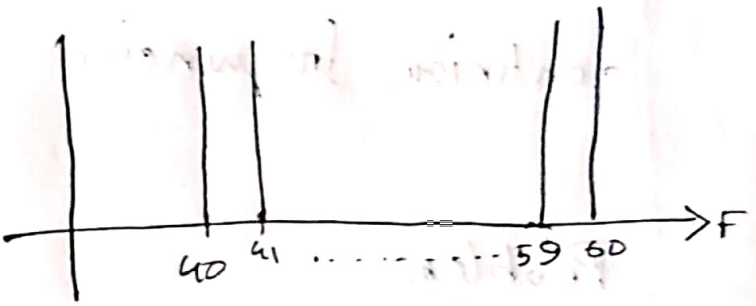
Problem 2

Bandwidth 20Hz

Highest freq 60Hz

∴ Lowest = 60 - 20 Hz

∴ = 40Hz

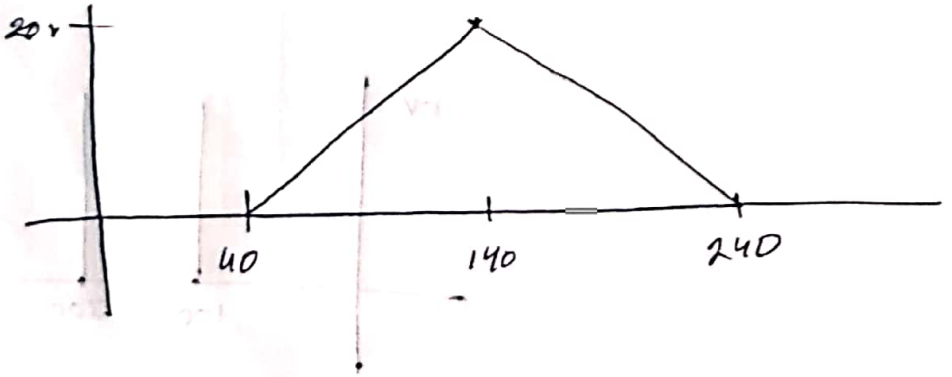


Non-periodic

BW = 200 kHz

Middle freq = 140 kHz

Peak Amp = 20V



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Problem

Signal at the beginning -0.3 dB/km

Power 2mW

Power of the signal at 5km?

$P_1 = 2\,mW$

$P_2 = ?$

$dB = -0.3 \times 5$

$= -1.5$

$$\Rightarrow \frac{P_2}{P_1} = 10^{-0.15} = 0.71$$

$$\Rightarrow P_2 = 0.71\, P_1 = 0.7 \times 2 = 1.4\,mW$$

Problem

Power = 10mW

Powera of noise = $1\mu W$

$SNR = 10000\,\mu W / 1\,\mu W = 10,000$

$SNR_{dB} = 10 \log_{10} 10000 = 10 \log_{10} 10^4 = 40$