ID: 18-39230-3

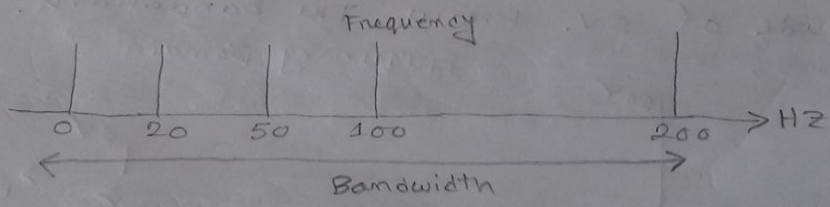
Assignment: 1

Q: 3-5: Distinguish between and broadband transmission.

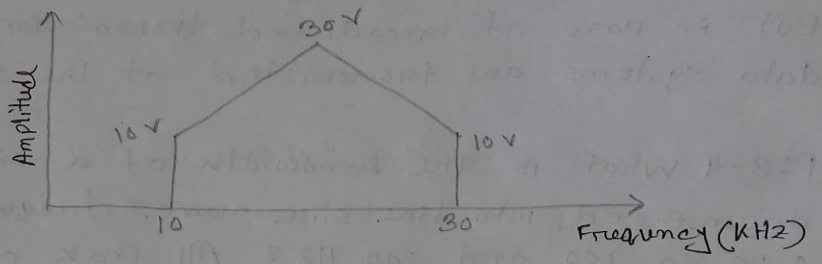
Ans: The main difference between baseband and broadband transmission is in the data transmission System. In case of a signal is transmitted at a time. But in case of broadband transmission System, multiple data systems are transmitted at the same time.

P: 3-4 What is the bandwidth of a signal can be decompased into fine sine waves frequencies at 0, 20, 50, 100 and 200 Hz ? All Peak amplitudes are the same. Draw bandwidth.

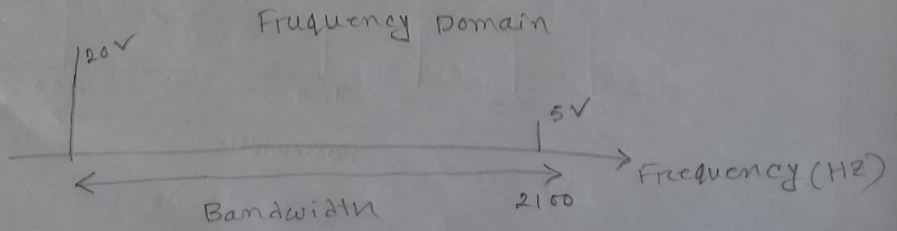
Ans: Bandwidth = 200 - 0 = 200 Hz



P: 3-13: A non-Periodic Composite signal frequencies from 10 to 30 KHz. The Peak amplitude is 10 V for lowest and 30 V for 20 Hz signal. Assuming the amplitude change gradully from minimum to maximum draw the frequency spectrum.



P: 3-5: A Periodic Composite signal with a bandwidth of 2000 Hz is composed of two sine waves. The first one has a frequency of 100 Hz with a max amplitude of 20 V. The second one has a maximum amplitude of 5 V. Draw the bandwidth.



P: 3-14: A TV channel has a bandwidth of 6 MHz. If we send a signal using one channel, what are the data rates of one harmonic, three harmonics and five harmonics?

Ans: using one harmonic, data rate = (2×6) = 12 mbps
using three harmonic, data rate = (2×6)/3 = 4 mbps
using five harmonic, data rate = (2×6)/5 = 2.4 mbps

P: 3-14: A signal travels from point A to B. At point A, the signal power is 10w. At point B, power is 90w. what is the attenuation?

Ans: Attenuation is Decibel = $10 \log_{10} (90/100) = -0.46$ dB

P: 3-16: The attenuation of a signal is -10. dB what is the final signal power if it was originally 5w?

Ans:- Attenuation = $-10 = 10 \log_{10} (P_2/5) = 10^{-1}$, or, $P_2 = 0.5$W

P: 3-17: A signal has passed through three cascaded amplifiers, each with 4 dB gain. What is the total gain? How much is signal amplified?

Ans:- Total gain = 3×4 = 12 dB. signal amplification = $10^{1.2}$
= 15.85

P3-25:- A signal with 200 milliwatts power through 10 devices, each with an average noice of 2 - microwatts, what is SNR? what is SNRdB?

Ans:- SNR = (200 mw) / (10 × 2 × μw) = 10,000

$SNR_{dB} = 10 \log_{10} SNR = 40$

P: 3-26:- If the Peak voltage value of a signal is 20 times the Peak voltage of the noise, what is the SNR? what is SNRdB?

Ans: for voltage, SNR = $(20/1)^2 = 400$

$SNR_{dB} = 10 \log SNR = 26.021$