CSE-320

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Sec: 08

Assignment: 2

Q1 Ans: We know,

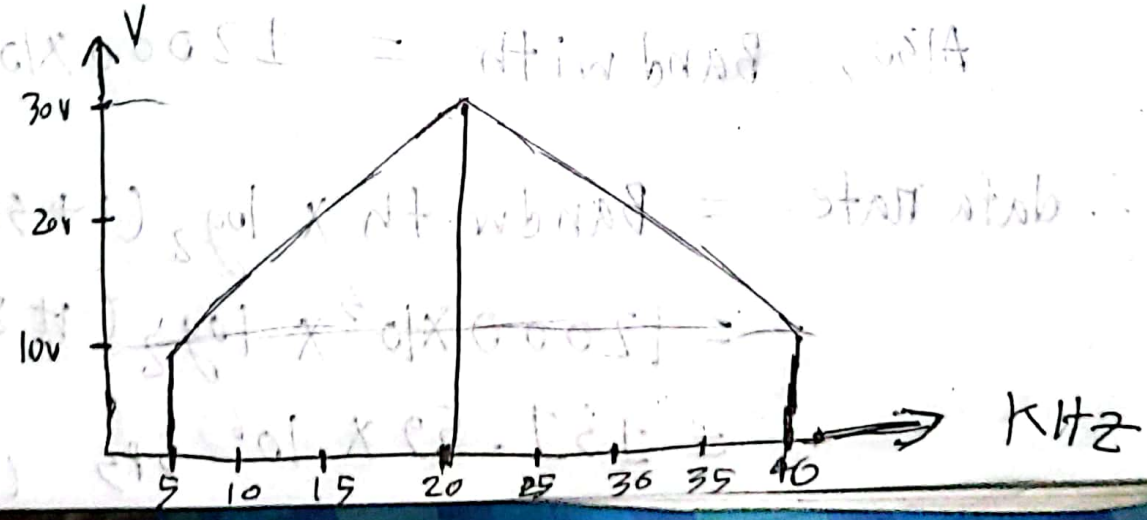
Bandwidth = $f_{nt} - f_L$

$= 40 - 5$

$\doteq 35$ KHz

Given amplitude for 20khz is 30 V

and it is peak amplitude.



Q2] Ans: Given,

$P_1 = 100\ W$

$P_2 = 80\ W$

∴ The attenuation in decibels

$= 10 \log_{10}\left(\frac{P_2}{P_1}\right)$

$= 10 \log_{10}\left(\frac{80}{100}\right)$

$= -0.969\ dB$ (Ans)

Q3] Ans: SNR = 2000

Also, Bandwith = 12000×10^3 Hz

∴ data rate = Bandwith $\times \log_2(1+SNR)$

$= 12000 \times 10^3 \times \log_2(1+2000)$

$= 131.59 \times 10^6$ bps (Ans)

Q4] Ans: Given frame size = 6000000

band width = 10×10^6

Transmission = $\frac{\text{frame size}}{\text{band width}}$

$= \frac{6 \times 10^6}{10 \times 10^6}$

$= 0.6$ sec

Given, distance = 3000×10^3

speed = 2×10^8

propagation time = $\frac{\text{distance}}{\text{speed}}$

$= \frac{3000 \times 10^3}{2 \times 10^8}$

$= 0.015$ sec

~~No 0~~ Number of routers = 5

∴ Queuing time = (Num of routers) x (Queuing time per router)

$= 5 \times 5 \times 10^{-6}$

$= 2.5 \times 10^{-5}$ sec

∴ Processing time = (Num of routers x per router processing time)

$= 5 \times 2 \times 10^{-6}$

$= 1 \times 10^{-5}$ sec

Here, transmission time is the dominant component. Moreover,

both processing time and Queuing time are negligible as they are too small to measure.

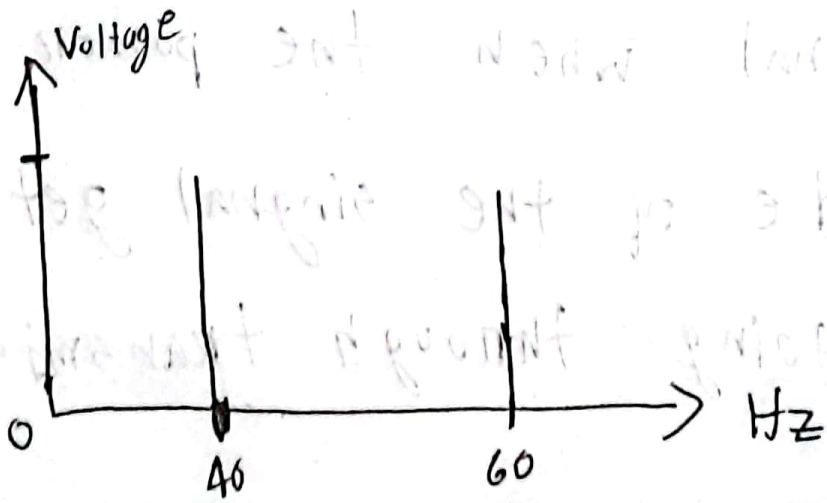
Q5] Ans: We know,

$$\text{Bandwidth} = f_h - f_L$$

$$\Rightarrow 20 = 60 - f_L$$

$$\therefore f_L = 40 \text{ Hz} \leftarrow \text{Lowest frequency}$$

∴ Spectrum



Q6] Ans: Data rate Limit: It describes how fast we can send data in bits per second, over a channel. Data rate depends on three factors.

i] The bandwidth available

ii] The level of signals we use.

iii] The quality of the channel.

Q7] Ans: Attenuation: This is the state of signal when the power or amplitude of the signal get reduced while going through transmission channel

Distortion: This is the state when the singnal get deformed while transmitting through medium. For this reason input and output singnal does not match.

Here, Attenuation makes the singnal weak while in distortion the singnals wave form get deformed:

Q8] Ans: $SNR = \frac{10 \times 200.1 \times 10^{-3}}{2 \times 10^{-6}}$

$= 1 \times 10^{6}$

$\therefore SNR_{dB} = 10 \log_{10}(SNR)$

$$= 10 \log_{10}(1 \times 10^6)$$

$$= 60 \text{ dB}$$

Q9] Ans: A high SNR means the signal is less corrupted by noise, ~~a low~~ in low SNR the signal is ~~more~~ very much corrupted by noise. This is why high SNR is more desirable than low SNR.

Q 10] Ans:

Given,

(i) 67 Levels → $\log_2(67) = 6.066$

≈ 7

(Ans 1)

(ii) 128 Levels → $\log_2(128) = 7$

(Ans 2)

(iii) 198 Levels → $\log_2(198) = 7.629$

≈ 8

(Ans 3)