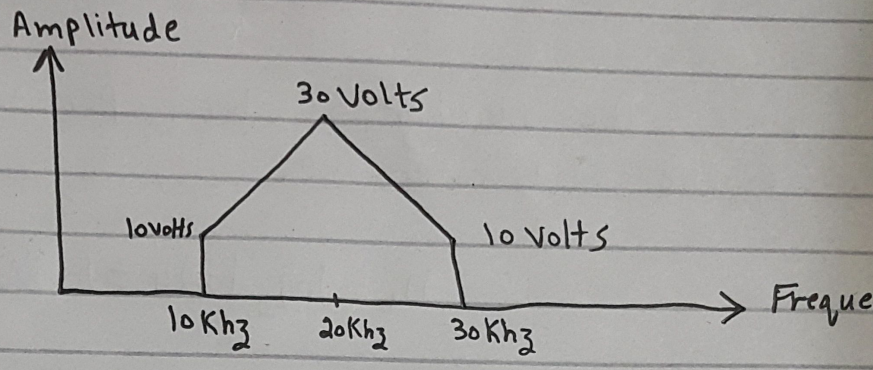
NAME:ZAIN SAEED

ROLL:15569 Pg# 1

Q. 1.(a)

Solution:-



Q.2. (a).

Solution:-

Using the First harmonic, data rate;

$2 \times 6\ Mhz = 12\ Mhz$

Using three harmonics, data rate;

$(2 \times 6\ Mhz) / 3 = 4\ Mbps$

Using Five harmonics data rate;

$(2 \times 6\ Mhz) / 5 = 2.4\ Mbps$

Q.3. (a).

Solution:- (a) In a lowpass signal, the minimum frequency is 0.

$\therefore \quad f_{max} = 0 + 200 = 200\ Khz$.

P.T.O->

$\Rightarrow \quad f_s = 2 \times 20{,}000 = 40{,}000$ samples/sec

The number of bits per sample & the bit rate are;

$$n_b = \log_2 1024 = 10 \text{ bits/sample}$$

$$N = 400 \text{ khz} \times 10 = 4 \text{ Mbps}$$

(b) The value of $n_b = 10$, we can easily calculate the value of SNR_{dB}

$$SNR_{dB} = 6.02 \times n_b + 1.76$$

$$= 6.02 * 10 + 1.76$$

$$SNR_{dB} = 61.96$$

(c) The value of $n_b = 10$. The minimum Bandwidth can be calculated as;

$$B_{PCM} = n_b \times B_{analog} = 10 \times 20 \text{ khz} = 2 \text{ Mhz}$$

).4. (a)

Solution:- (a) In a low-pass signal the minimum frequency is 0.

P.T.O->.

Therefore;

$$f_{max} = 0 + 200 \text{ khz} = 200 \text{ khz}$$

$$\Rightarrow f_s = 2 \times 200{,}000 = 400{,}000 \text{ Sampl}$$

(b) In a band-pass signal, the maximum frequency is equal to the minimum frequency, plus the bandwidth.

Therefore we have;

$$f_{max} = 100 + 200 = 300 \text{ khz}.$$

$$\Rightarrow f_s = 2 \times 300{,}000 = 600{,}000 \text{ samples/s}$$