UNIT 5: (PAM,PP,PWM)

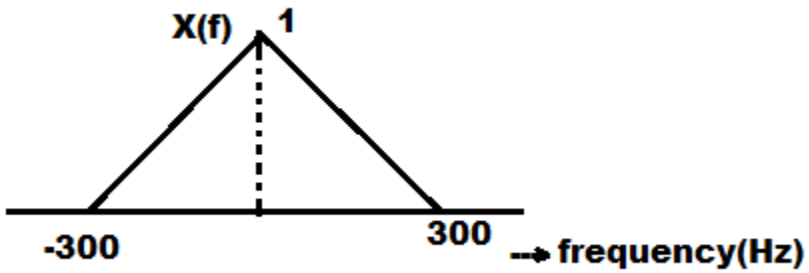
Short answer questions:

1. Compare AM and PAM.
2. State and explain sampling theorem.
3. State sampling theorem for band passes signals.
4. What is aperture effect in sampling process
5. what do you mean by synchronization in PAM systems.
6. What is aliasing effect? How to avoid aliasing in sampling?
7. Define nyquist rate and nyquist interval.
8. Give the definitions of PAM, PWM and PPM.
9. What do you mean by Pulse Time Modulation Techniques?
10. Differentiate Low Pass sampling with Band Pass Sampling.

Long answer questions:

1. With the help of waveforms, explain the generation and demodulation of PPM.
2. Compare PAM, PWM and PPM modulation schemes.
3. State and prove sampling theorem for low pass signals.
4. Draw PAM, PWM and PPM signals for a single tone message signal and explain The generation process.
5. How PPM signals can be demodulated? Give the relevant circuit and explain.
6. Write short note on Aliasing effect and band pass sampling.
7. Compare ideal, Natural and Flat-top sampling techniques.
8. Explain the generation and demodulation of Flat-top PAM in detail.
9. Explain the generation methods of PWM?
10. Explain the demodulation of PWM in detail?
11. Explain the generation methods of PPM?
12. Explain the demodulation of PPM in detail?
13. Explain difference between PPM and PWM.
14. Differentiate the terms Ideal Sampling, Natural Sampling and Flat-top Sampling.
15. Explain the operation of PAM. How do we provide synchronization in PAM .what are the disadvantages of PAM.
16. Figure of merit calculations of PAM,PWM and PPM.
17. Bandwidth of PAM,PWM and PPM .
18. Frequency spectra of PAM,PWM and PPM.
19. Problems on sampling theorem.

20. The frequency spectrum of x(t) is X(f) is given as follows



Draw the frequency spectrum of sampled signal by assuming suitable values for sampling frequency under the following conditions

i. Over sampling ii. Under sampling iii. Perfect sampling.

Unit5-2015-2016
Assignment5 (CO5)

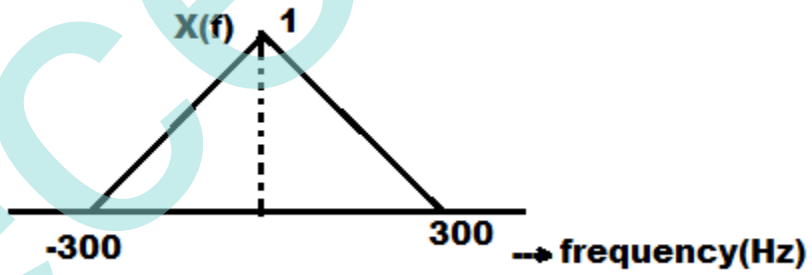
1. a. State and prove sampling theorem for low pass signals. 5M.
   b. Write a short note on sampling of Band pass signals. 5M.

2. With a neat circuit diagram explain the generation and demodulation of PPM signal 10M.

3. Compare and Contrast the following Pulse modulation techniques PAM, PWM and PPM 15M.

TUTORIAL TEST 5 (CO5)

1. Explain the operation of Natural sampling in detail. 10M.
2. Explain the working of PWM modulator and Demodulator in detail. 10M.
3. a. The frequency spectrum of x(t) is X(f) is given as follows 10M.



Draw the frequency spectrum of sampled signal by assuming suitable values for sampling frequency under the following conditions

ii. Over sampling ii. Under sampling iii. Perfect sampling.

a. Explain the concept of under sampling. What are the necessary requirements to be taken care of to avoid aliasing effect?

.....

Prepared by P.Lakshmi Prasanna

Unit5
Assignment5 (CO5)

1. (a). Write in detail about Aliasing effect in Sampling of low pass signals. Suggest one method to avoid aliasing effect. 5M.
   (b). Write a short note on Band Pass Sampling. 5M.

2. Express your views about Flat-top Sampling and discuss Aperture effect in it and propose a method to eliminate aperture effect. 10M.

3. Compare and Contrast the following Pulse modulation techniques PAM, PWM and PPM 10M.

Prepared by **P.Lakshmi Prasanna**

UNIT-5[CO5]
Pulse Modulation Techniques

1. **In Pulse Position Modulation, the drawbacks are ( ) 2M.**

   a) Synchronization is required between transmitter and receiver
   b) Large bandwidth is required as compared to PAM
   c) None of the above
   d) Both a and b.

2. **In PWM signal reception, the Schmitt trigger circuit is used ( ) 2M.**

   a) To remove noise
   b) To produce ramp signal
   c) For synchronization
   d) None of the above.

3. **In pulse width modulation, ( ) 2M.**

   a) Synchronization is not required between transmitter and receiver
   b) Amplitude of the carrier pulse is varied
   c) Instantaneous power at the transmitter is constant
   d) None of the above.

4. **In different types of Pulse Width Modulation, ( ) 2M.**

   a) Leading edge of the pulse is kept constant
   b) Tail edge of the pulse is kept constant
   c) Centre of the pulse is kept constant
   d) All of the above.

5. **In Pulse time modulation (PTM), ( ) 2M.**

a) Amplitude of the carrier is constant
b) Position or width of the carrier varies with modulating signal
c) Pulse width modulation and pulse position modulation are the types of PTM
d) All of the above.

6. **Drawback of using PAM method is ( ) 2M.**

   a) Bandwidth is very large as compared to modulating signal
   b) Varying amplitude of carrier varies the peak power required for transmission
   c) Due to varying amplitude of carrier, it is difficult to remove noise at receiver
   d) All of the above.

7. Pulse time modulation (PTM) includes ( ) 2M

a) Pulse width modulation
b) Pulse position modulation
c) Pulse amplitude modulation
d) Both a and b.

8. Calculate the Nyquist rate for sampling when a continuous time signal is given by
$x(t) = 5 \cos 100\pi t + 10 \cos 200\pi t - 15 \cos 300\pi t$ ( ) 3M.

a) 300Hz
b) 600Hz
c) 150Hz
d) 200Hz.

9. Calculate the minimum sampling rate to avoid aliasing when a continuous time signal is given by $x(t) = 5 \cos 400\pi t$ ( ) 3M.

a) 100 Hz
b) 200 Hz
c) 400 Hz
d) 250 Hz.

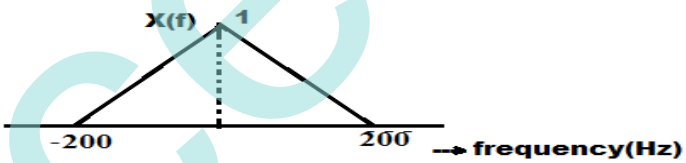
10. A distorted signal of frequency f_m is recovered from a sampled signal if the sampling frequency f_s is ( ) 2M.

a) $f_s > 2f_m$
b) $f_s < 2f_m$
c) $f_s = 2f_m$
d) $f_s \geq 2f_m$.

11. The desired signal of maximum frequency w_m centered at frequency w=0 may be recovered if ( ) 2M.

a) The sampled signal is passed through low pass filter
b) Filter has the cut off frequency wm
c) Both a and b
d) None of the above.

12. The frequency spectrum of x(t) is X(f) is given as follows 6M.



Draw the frequency spectrum of sampled signal by assuming suitable values for sampling frequency under the following conditions
i. Over sampling ii. Under sampling iii. $f_s = 2f_m$.