

1. Define Signal.
2. Define system.
3. What are the major classifications of the signal?
4. Define discrete time signals and classify them.
5. Define continuous time signals and classify them.
6. Define discrete time unit step & unit impulse.
7. Define continuous time unit step and unit impulse.
8. Define unit ramp signal.
9. Define periodic signal and non-periodic signal.
10. Define even and odd signal ?
11. Define Energy and power signal.
12. Define unit pulse function.
13. Define continuous time complex exponential signal.
14. What is continuous time real exponential signal.
15. What is continuous time growing exponential signal?
16. State the BIBO criterion for stability.
17. Find whether the signal given by $x(n) = 5\cos(6n)$ is periodic
18. Write down the exponential form of the Fourier series representation of a Periodic signal?
19. Write down the trigonometric form of the fourier series representation of a periodic signal?
20. Write short notes on dirichlets conditions for fourier series.
21. State Time Shifting property in relation to fourier series.
22. State parseval's theorem for continuous time periodic signals.

UNIT I

1. Determine whether the following systems are linear, time invariant, causal, stable.

$$(1) \quad y(n) = \log[x(n)]$$

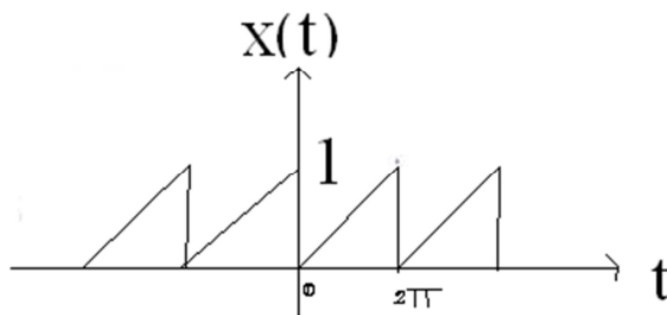
$$(2) \quad y(n) = \sum_{n=0}^{\infty} x(n)$$

2. Determine whether the following systems are linear or not
 $dy(t)/dt + 3ty(t) = t^2x(t)$ & $y(n) = 2x(n) + 1/x(n-1)$
3. Explain the classification of signals with examples
4. Determine whether the following systems are Time-Invariant or not
 $Y(t) = t x(t)$ & $y(n) = x(2n)$
5. (a) Find whether the signal $x(t) = 2 \cos(10t+1) - \sin(4t-1)$ is periodic or not.
 (b) Evaluate $\sum_{n=-\infty}^{\infty} e^{2n} \delta(n-2)$
 (c) Find the fundamental period of the Continuous time signal

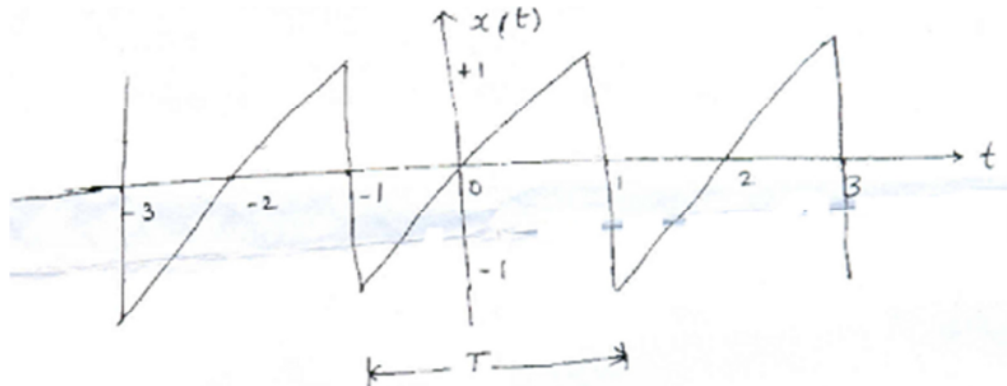
$$x(t) = 20 \cos\left(10\pi t + \frac{\pi}{6}\right).$$

UNIT II

1. Find the inverse laplace transform of $X(S) = S / S^2 + 5S + 6$
2. Find the fourier transform of a rectangular pulse of duration T and amplitude A
3. Obtain the cosine fourier series representation of x(t)



- Find the trigonometric fourier series of the figure shown below



- Find the laplace transform of the signal $x(t) = e^{at} u(t) + e^{bt} u(t)$

UNIT III

- Find the convolution of the two signals $x(t) = e^{-2t} u(t)$ $h(t) = u(t+2)$
- State and prove the convolution property of Z-Transform
- Determine the Z=Transform of $x_1(n) = a^n$ and $x_2(n) = nu(n)$
- Find the convolution of $x(t) = u(t+1)$ and $h(t) = u(t-2)$
- Find the Fourier transform of $x(t) = t \cos \omega t$

UNIT IV

- Find the Unilateral Z-transform and R.O.C of $x(n) = \sin \omega_0 n u(n)$
- Discuss the block diagram representation of an LTI-DT system
- Consider a causal LTI system as in the fig

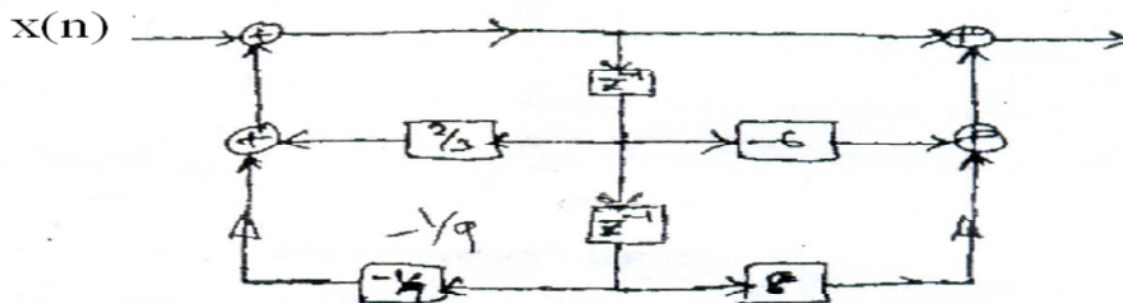


Figure 14 (b)(ii)

Determine the differential equation relating $x(n)$ and $y(n)$.

- State and prove the Parseval's relation.
- Explain any 4 properties of DTFT.

UNIT V

- Develop the Direct form I & II realization of the differential equation

$$dy(t) / dt + 5 x(t) = 3 x(t)$$

2. Prove any 2 properties of Z-transform
3. Obtain the cascade form realization of the system described by the differential Equation

$$y(n) - \frac{1}{4} y(n-1) - \frac{1}{8} y(n-2) = x(n) + 3 x(n-1) + 2 x(n-2)$$

4. Find the state variable matrices A,B,C,D for the equation

$$y(n) - 3y(n-1) - 2y(n-2) = x(n) + 5 x(n-1) + 6 x(n-2)$$
5. Discuss the block diagram representation of an LTI-DT system