Unit-1_Assignment-1(Signals)

1. Write the difference between deterministic and random signal.

2. Write the mathematical representation of the following signals
   i) Step, Ramp, Pulse, Impulse, Signum

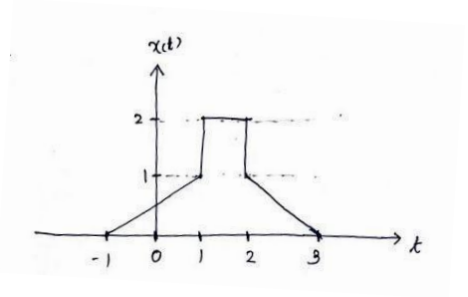
3. Find whether the following signals are periodic or not
   (i)x(n)=cos6πn
   (ii) x(n)=$e^{j8\pi n}$
   (iii) x(n)=sin2πn+ sin6πn
   (iv) x(t)=2u(t)+2sin2t
   (v) x(t)=3 cos(17πt-π/3)+2sin(19πt- π/3)

4. Compute the signal power and signal energy for the discrete time signal
$$x(n) = e^{j10n}u(n)$$

5. Classify the following signals as energy signal or power signal by calculating energy E or power P for the following signals:
   a) $x_1(t) = At^2e^{\frac{-t}{\tau}}u(t)$ b) $x_2(t) = \Pi\left(\frac{t}{\tau}\right) + \Pi\left(\frac{t}{2\tau}\right)$

6. Find even and odd components of the following signals
$$x(t) = sin\, t + 2\sin sin\, t + 2sin^2 t\, cos\, t$$
$$x(n) = \{1,\ 0, -1,\ 2,\ 3\}$$

7. Plot the value of following:
   (a) $2x(t-3)$
   (b) x($\frac{3}{2}t$)
   (c) x($\frac{3}{2}t-2$)
   (d) x(-t+2)
   (e) x(2t+4)
   (f) x(-t-3)



8. Plot the following:
   a) y(n)= 2u(-n+3)
   b) x(t)=r(t). u(2-t)

9. For the two expressions given below,

(a) $y(t)\frac{d^2y}{dt^2} + 3t\frac{dy}{dt} + y(t) = x(t)$

(b) $y(n) = sgn[x(n)]$

Check whether the following systems are
   i static or dynamic
   ii linear or non-linear

iii Causal or non-causal
iv Time invariant or time variant