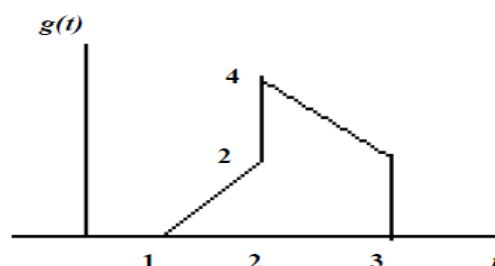
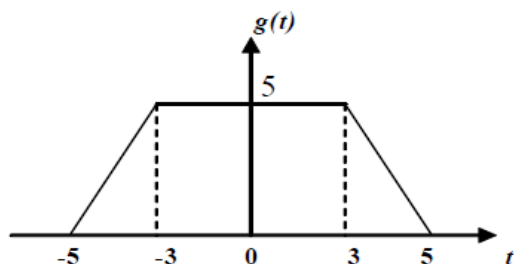




Problem Set 4

*Classwork :-*

1. Evaluate the FT of the shown waveforms using the linearity property:



2. Find the spectrum of each of the following signals and sketch its magnitude and phase:

a)  $g(t) = \frac{1}{1+t^2}$ , then find  $\int_{-\infty}^{\infty} g(t) dt$

b)  $g(t) = [u(t) - u(t - 5)]. \cos(10.t)$

c)  $g(t) = |t|$ , then find FT of  $\ll -j2\pi t. g(t) \gg$

d)  $g(t) = t. e^{-t/\tau}. u(t)$

e)  $g(t) = A. \text{tri}\left(\frac{t+\tau}{2.\tau}\right). u(t + \tau)$

3. Sketch the magnitude and phase of the following Fourier transforms and Evaluate the IFT of each spectrum:

a)  $G(f) = 9. \text{sinc}^2[4.(f - 5)] + 9. \text{sinc}^2[4.(f + 5)]$

b)  $G(f) = e^{-2f}. u(f + 2)$

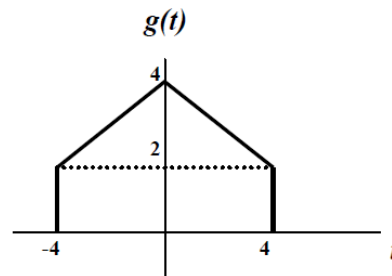
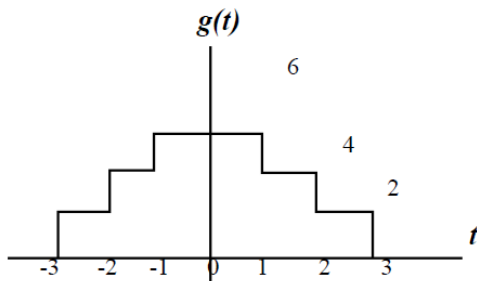
c)  $G(f) = 2. \text{rect}\left(\frac{f-4}{2}\right). e^{10\pi f j}$

d)  $G(f) = (f - 3). [u(f - 1) - u(f - 3)]$

4. Evaluate the FT of the waveforms shown in problem (1) using the differentiation property.

*Homework Assignment:-*

1. Evaluate the FT of the shown waveforms using the linearity property:



2. Find the spectrum of each of the following signals and sketch its magnitude and phase:

a)  $g(t) = \text{rect}(t) \cdot \text{tri}\left(\frac{t}{2}\right)$

b)  $g(t) = e^{5t} \cdot \sin(2 \cdot \pi \cdot t) \cdot u(-t)$

c)  $g(t) = \frac{1-jt}{1+jt}$

d)  $g(t) = 6 \cdot \text{rect}\left(\frac{t}{20}\right) \cdot \text{sgn}(t)$

e)  $g(t) = \frac{1}{t^2+2 \cdot t+1}$

3. Sketch the magnitude and phase of the following Fourier transforms and Evaluate the IFT of each spectrum:

a)  $G(f) = \frac{1}{1+\omega^2}$

b)  $G(f) = \frac{4}{j \cdot (2+\pi f)}$

c)  $G(f) = \frac{d}{df} \cdot e^{-2|f|}$

d)  $G(f) = \frac{1+jf}{1+\omega^2}$

4. Evaluate the FT of the waveforms shown in problem (1) using the differentiation property.