

Integral University, Lucknow
 II Mid Semester Examination 2012-2013
 SIGNALS & SYSTEMS (EC-402)

Year : Second Year ECE, EIE, EEE & EE

Maximum Marks: 30

Time : 90 Minutes

Note: Attempt any three questions. Make figures, data sheets & graphs where it needed.

1. (I). Determine the complex exponential Fourier series representation for each of the following signals.

(a). $x(t) = \cos 6t + \sin 8t$

(b). $x(n) = \cos^2(0.125\pi n)$

- (II). Find the Fourier transform of the following signals.

(a) $X(t) = 1$

(b) $x(n) = \begin{cases} 1 & |n| \leq 1 \\ 0 & \text{Otherwise} \end{cases}$

2. Consider a continuous time LTI systems describe by $\frac{dy(t)}{dx} + 3y(t) = 2x(t)$, using Fourier transform ; find the output $y(t)$ for the input signal $x(t) = e^{-t} u(t)$.

3. A causal discrete time LTI system is describe by

$$y[n] - 0.75y[n - 1] + 0.125y[n - 2] = x[n]$$

- (I). Determine the frequency response, magnitude response & phase response of system.

- (II). Find the output response $y[n]$ for $x[n] = \delta[n]$.

4. A casual linear shift invariant system is given by the following difference equation

$$y[n] = y[n - 1] + y[n - 2] + y[n - 3] + x[n - 1]$$

- (I). Find the system function $H(z)$ for the system.

- (II). Find the unit sample response $h[n]$ of the system.

- (III). Find the output response $y[n]$ for $x[n] = (0.5)^n U(n)$

5. Determine the complex exponential Fourier series, magnitude and phase spectrum of the signal $x(t)$ as shown in the figure.

