IC260- Signals and Systems

Tutorial-1

Date : 20/03/2013
Max. marks : 20
Good Luck!!

Q.1 A signal $x(t)$ is shown in Figure1. Sketch and label carefully each of the following signals:

(a) $[x(t) + x(-t)]u(t)$ Marks : 2

(b) $x(4 - t/2)$ Marks : 2

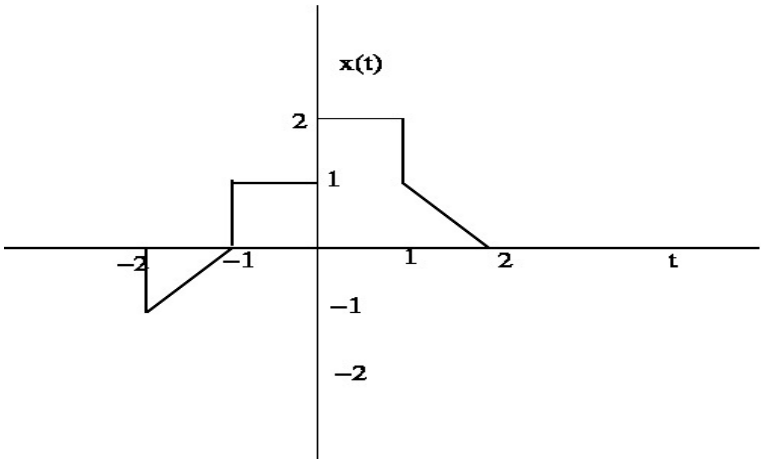

Figure 1:

Q.2 Determine the fundamental period of the discrete-time signal:
$x[n] = e^{j(2\pi/3)n} + e^{j(3\pi/4)n}$ Marks : 3

Q.3 Consider two systems:
1) $y[n] = sin[x[n]]$
2) $y[n] = \sum_{k=n-n_0}^{n+n_0} x[k]$
Discuss about their following properties:
a) Static Vs Dynamic,
b) Linear Vs Non-linear,
c) Time invarient Vs Time varient,
d) Causal Vs Non-causal. Marks : 4

Q.4 Compute energy/power of the signal:
$x(t) = c_1 cos(\omega_1 t + \theta_1) + c_2 cos(\omega_2 t + \theta_2)$ here $\omega_1 \neq \omega_2$ Marks : 4

Q.5 Consider an LTI (Linear time invarient) system whose response to the signal $x_1(t)$ is the signal $y_1(t)$. Determine and sketch carefully the response of the system to the input $x_2(t)$ and $x_3(t)$. $x_1(t)$, $y_1(t)$, $x_2(t)$ and $x_3(t)$ are shown in Figure. 2. Marks : 5

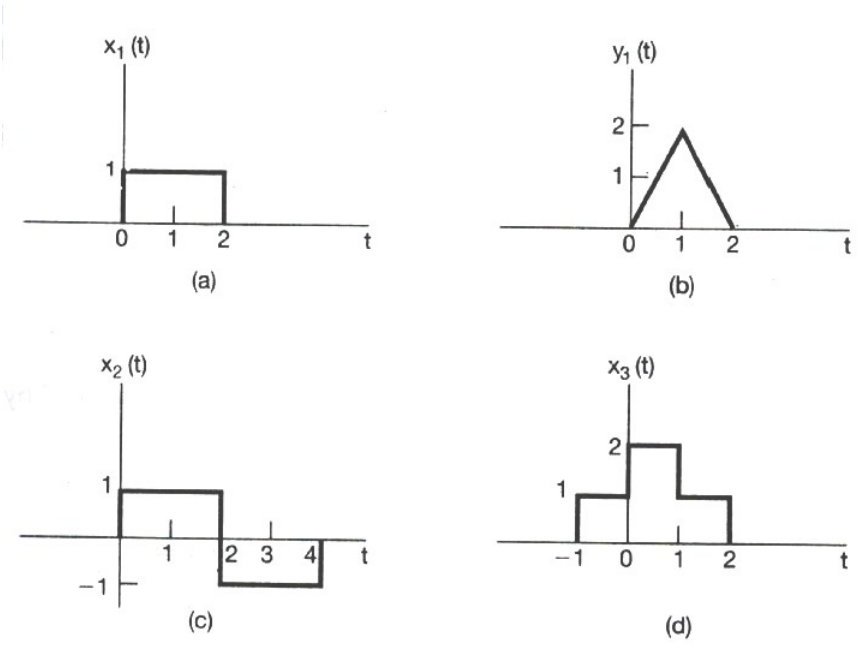

Figure 2: Figure for Q.5