KAKATIYA INSTITUTE OF TECHNOLOGY AND SCIENCE: WARANGAL-15

Assignment – II

Class	:	II / IV B.Tech II-Semester
Subject	:	EC 225 - Signals & Systems (Common for ECE, EIE and EEE)
Assignment to be submitted on : 09.12.13		

Problem 1

Determine if the following systems are time-invariant, linear, causal, and / or memory less?

S.No.	*Problem*	*Answer*
1.	$dy/dt + 6y(t)=4x(t)$	Linear, time invariant ,causal, memory
2.	$dy/dt +4ty(t)=2x(t)$	Linear, time variant ,causal, memory
3.	$dy/dt + y^2(t)=x(t)$	Non Linear, time invariant ,causal, memory
4.	$y(t) = dx/dt + x(t)$	Linear, time invariant ,causal, memory
5.	$d^2y/dt^2+10\ dy/dt + 4\ y(t)=dx/dt+ 4\ x(t)$	Linear, time invariant ,causal, memory
6.	$dy/dt +\sin(t)y(t)=4x(t)$	Linear, time variant ,causal, memory

Problem 2

The response of an LTI system to a step input, x (t) = u (t) is y (t) = $(1-e^{-2t})$ u (t). What is the response to an input of x(t) = 4u(t)-4u(t-1)?

Problem 3

Consider the continuous time signal x (t) = 3-t $0 \leq t \leq 3$
0 otherwise sketch and label carefully x(3-2t)

Problem 4

A continuous-time signal $x(t)$ is shown in Fig. 1-17. Sketch and label each of the following signals.

(*a*) $x(t-2)$; (*b*) $x(2t)$; (*c*) $x(t/2)$; (*d*) $x(-t)$

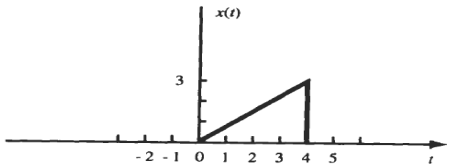

Fig. 1-17

Problem 5

A continuous-time signal $x(t)$ is shown in Fig. 1-27. Sketch and label each of the following signals.

(*a*) $x(t)u(1-t)$; (*b*) $x(t)[u(t)-u(t-1)]$; (*c*) $x(t)\delta(t-\frac{3}{2})$

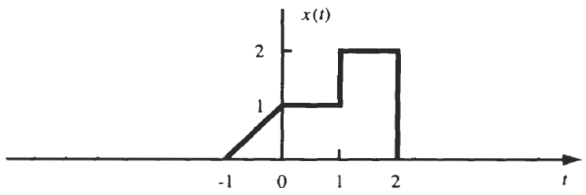

Fig. 1-27

Problem 6

Evaluate the following integrals:

(*a*) $\int_{-1}^{1}(3t^2+1)\delta(t)\,dt$

(*b*) $\int_{1}^{2}(3t^2+1)\delta(t)\,dt$

(*c*) $\int_{-\infty}^{\infty}(t^2+\cos\pi t)\,\delta(t-1)\,dt$

(*d*) $\int_{-\infty}^{\infty}e^{-t}\delta(2t-2)\,dt$

Problem 7

Evaluate $y(t)=x(t)*h(t)$, where $x(t)$ and $h(t)$ are shown in Fig. 2-6, (*a*) by an analytical technique, and (*b*) by a graphical method.

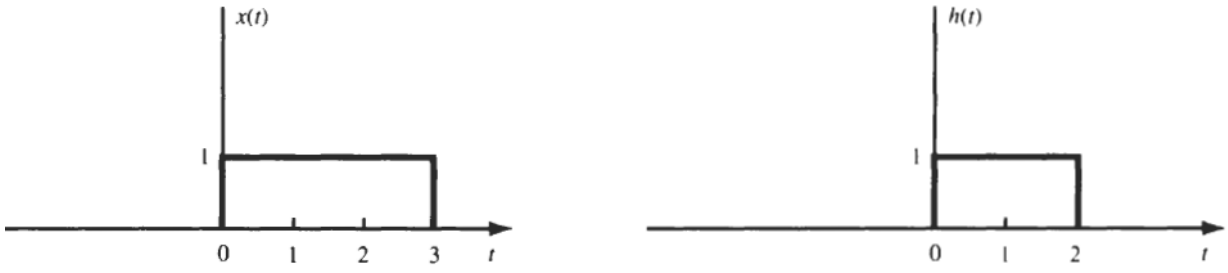

Fig. 2-6