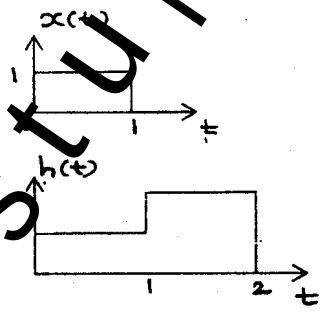
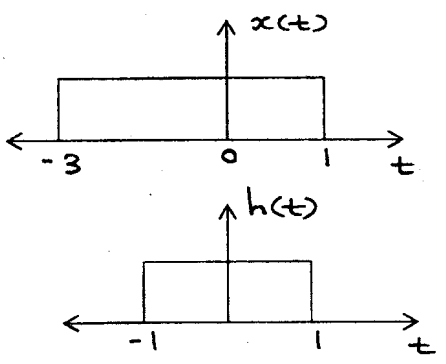
TE/ETRX/Sem V/Rev
Continous Time signals & SYS.

Con. 5814–10. (REVISED COURSE) GT–6690

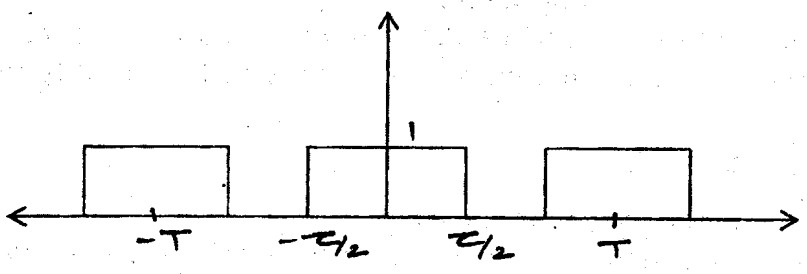
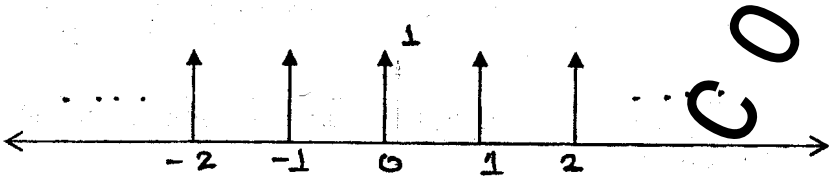
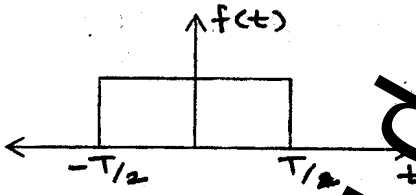
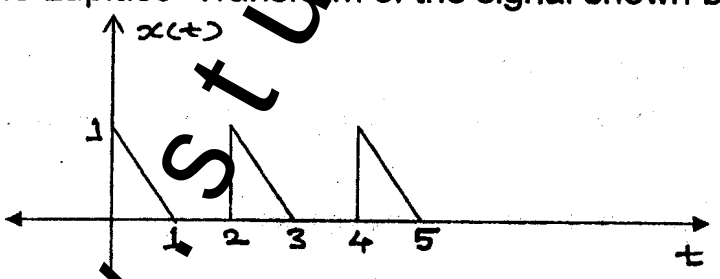
15/12/10

(3 Hours) [Total Marks : 100

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** questions.
(3) Assume any **suitable** data wherever **required** but **justify** the same.

Sr.No.	Questions	Marks
Q.1	Answer any four questions.	
Q.1.a	State and explain the physical significance of scaling property of Fourier Series of C.T. Signal	05
Q.1.b	Determine whether following signal is periodic or non-periodic. $x(t)=2\sin\left(\frac{2}{3}t\right)+4\cos\left(\frac{1}{2}t\right)+4\cos\left(\frac{1}{4}t-\frac{1}{5}\pi\right)$	05
Q.1.c	Classify the following system on the basis of stability and causality. $y''(t)-2ty'(t)=x(t)$	05
Q.1.d	Explain the relationship between Fourier transform and Laplace Transform of a signal	05
Q.1.e	Obtain the cross correlation of $x(t)$ & $h(t)$	05
		
Q.2.a	Sketch $x(t)$ if, $x(t)=r(t+4)-r(t+2)-r(t+2)$. Hence obtain $x(-t+2)$	10
Q.2.b	Convolve the following signals. 	10

Q.3.a	Determine the step response of the system whose impulse response is $h(t) = e^{-t}u(t)$	08
Q.3.b	A system has state equation as $\begin{bmatrix} \dot{x}_1(t) \\ \dot{x}_2(t) \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$, obtain the transfer function.	12

Q.4.a	Find the Fourier series of the following signal.	12
		
Q.4.b	Obtain the Fourier Transform of the signal shown below. 	08
Q5.a	Find the Fourier transform of the gate function and draw the spectrum. 	10
Q5. b	Find the Fourier transform of signum signal.	05
Q.5.c	State and prove convolution property of Fourier Transform in Time domain.	05
Q.6.a	Find the Laplace Transform of the signal shown below. 	08
Q.6.b	Describe the different random processes.	12
Q.7.a	The differential equation of the system is given as $\ddot{y}(t)+3\dot{y}(t)+2y(t)=x(t)$ With $x(t)=4e^{-2t}$ and $\dot{y}(t)=4$ Determine the total response of the system.	10
Q.7.b	Obtain the inverse Laplace Transform of $X(S)=\frac{4}{(S+1)(S+2)^3}$ For all possible region of convergence.	10