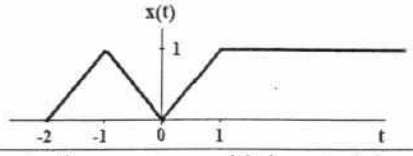
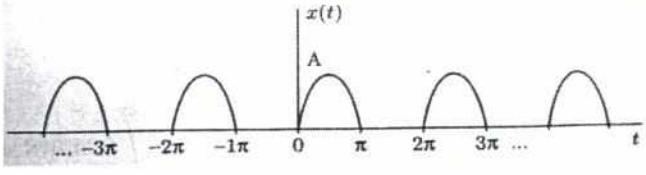
Roll Number:_____ 0/C

Thapar University, Patiala

Department of Electronics and Communication Engineering

B. E. (Second Year): Semester-III (ECE and ENC)	**Course Code: UEC404**
	Course Name: Signals and Systems
September 20, 2016 (MST)	**Tuesday, 10.30 – 12.30 Hrs**
Time: 2 Hours, M. Marks: 24	**Name of Instructor(s): Dr. R. Pandey, Dr. U. Singh, Dr. R. Upadhyay, Ms. M. Kushwaha**

Note: Attempt all questions.
Assume missing data, if any, suitably.

Q.1	Find out whether the following signals are energy signal or power signal: (a)) $x(t) = e^{-2\|t\|}$ (b) $x[n] = 8e^{j4\pi n}\, u[n]$	(03)
Q.2 (a) (b)	Find the even and odd components of the following signals: x[n]={1, 2, 3, 0, 0, 0, 0, 0, 0, 1} ↑ 	(03)
Q.3 (a) (b)	Consider a discrete-time system with input x[n] and output y[n] related by $y[n] = \sum_{k=n-n_0}^{n+n_0} x[k]$; where n_0 is a finite positive integer. Determine whether the system is linear or not. Determine whether the system is time-invariant or not.	(03)
Q.4(a) (b)	Test the causality and stability of the following system: $y(t) = t^2 x(t-1)$ Test the linearity for the system given below: $\frac{d^2y(t)}{dt^2} + \frac{dy(t)}{dt} = x(t).\frac{d^2x(t)}{dt^2}$	(03)
Q.5	The impulse response of an LTI system h(t) is given by $\mathbf{e^{-2(t+1)}\, u(t+1)}$. Find the output y(t) if the input $\mathbf{x(t)=e^{-|t|}}$.	(03)
Q.6	Determine the output of the system at times **n=-5, n=5,** and **n=10,** when the input is **x[n] =u[n]** and impulse response is $\mathbf{h[n] = (3/4)^n u[n]}$.	(03)
Q.7	Find the exponential Fourier series for the half wave rectified sine wave shown in Figure. 	(03)
Q.8	For the continuous time periodic signal $x(t) = 2+\cos(2\pi/3)t + 4\sin(5\pi/3)t$, determine the fundamental frequency ω_0 and the Fourier series coefficient a_k.	(03)