

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 1 EXAMINATIONS-2022

B.Tech - III Semester (ECE)

COURSE CODE (CREDITS): 18B11EC412 (4)

MAX. MARKS: 15

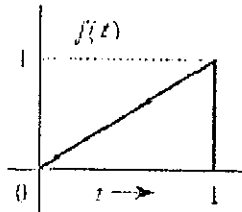
COURSE NAME: Fundamentals of Signals & Systems

COURSE INSTRUCTORS: Dr. Vikas Baghel

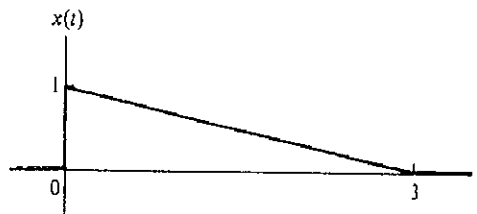
MAX. TIME: 1 Hour

*Note: All questions are compulsory. Marks are indicated against each question in square brackets.*

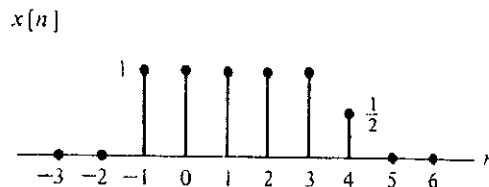
- Q1. a) Determine the power of  $x[n] = \left(\frac{1}{2}\right)^n u[n]$ . [2] [CO1]  
b) Find the energy of the signal sketched below: [1]



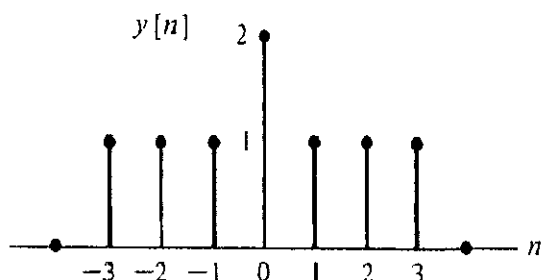
- c) For  $x(t)$  indicated in figure, sketch and carefully label  $x(1 - 3t)$ . [1]



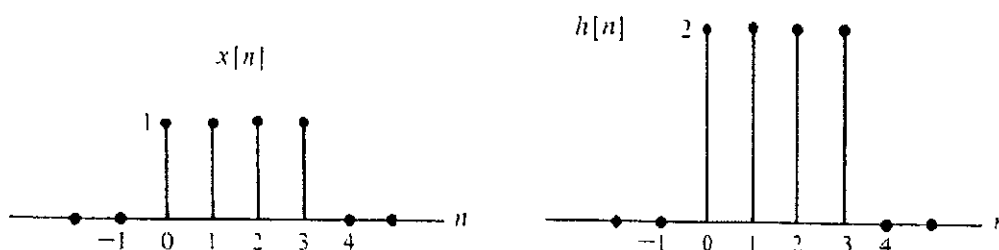
- d) A discrete-time signal  $x[n]$  is shown in figure. Sketch and carefully label  $x[2n]$ . [1]



- Q2. a) Find Consider the signal  $y[n]$  in figure. Find the signal  $x[n]$  such that [2] [CO1]  
 $Even\{x[n]\} = y[n]$  for  $n \geq 0$  and  $Odd\{x[n]\} = y[n]$  for  $n < 0$ .



- b) Consider the signals  $x(t) = \cos\left(\frac{2\pi t}{3}\right)$  and  $y(t) = 2 \sin\left(\frac{16\pi t}{3}\right)$ . Show that [1]  
 $z(t) = x(t) + y(t)$  is periodic and find its fundamental period.
- Q3. a) Determine the discrete-time convolution of  $x[n]$  and  $h[n]$  for the following [2] [CO2]  
case:



- b) Table contains the input-output relations for several continuous-time and [5]  
discrete-time systems, where  $x(t)$  or  $x[n]$  is the input. With proper  
explanation, indicate whether the property along the top row applies to  
each system by answering yes or no in the appropriate boxes.

$y(t)/y[n]$	Memoryless	Linear	Time-invariant	Causal	Invertible	Stable
$y(t) = (2 + \sin(t))x(t)$						
$y[n] = \sum_{k=-\infty}^n x[k]$						