

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST - 1 EXAMINATION- FEB-2023

COURSE CODE (CREDITS): 18B1WEC636 (2)

MAX. MARKS: 15

COURSE NAME: Fundamentals of Digital Signal Processing & Applications

COURSE INSTRUCTORS: Dr. Vikas Baghel

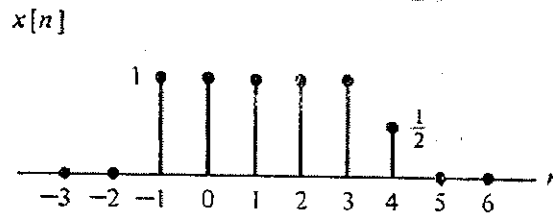
MAX. TIME: 1 Hour

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

Q1. a) What is the difference between Continuous-time signal and Discrete-time signal. Explain with examples. [2] [CO1]

b) Determine the power and energy of $x[n] = \left(\frac{1}{2}\right)^n u[n]$. [3]

Q2. a) A discrete-time signal $x[n]$ is shown in figure. Sketch and carefully label $x[2n]$. [2] [CO1]



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 $z(t) = x(t) + y(t)$ is periodic and find its fundamental period. [3]

Q3. a) What is Unit Step sequence? Write the relationship between Unit Step sequence and Unit Impulse sequence. [2] [CO1]

b) Table contains the input-output relations for several continuous-time and 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. [3]

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