JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

B.Tech-V Semester (ECE)

COURSE CODE(CREDITS): 18B11EC511 (4) MAX. MARKS: 25

COURSE NAME: PRINCIPLES OF DIGITAL SIGNAL PROCESSING

COURSE INSTRUCTORS:Dr. Nishant Jain MAX. TIME: 1 Hour 30 Minutes

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Note: *(a) All questions are compulsory.*
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	a. For the following system: $y[n] = x[n] + x^2[n-1]$, examine if the system is (i) Causal (ii) Stable (iii) Time Invariant: b. Compute the discrete convolution of the following sequence: $x[n] = \{1,2,-1,1\}$; $h[n] = \{1,0,1,1\}$ ↑	CO1	3+2=5
Q2	c. Evaluate the zero-input response of the system described by the homogeneous second order difference equation: $y[n] - 3y[n-1] - 4y[n-2] = 0$ d. Justify that Discrete time exponential signals whose frequencies are integral multiple of 2π are identical.	CO1 CO4	3+2=5
Q3.	a. If the input discrete time signal is an even function, then justify that the magnitude spectrum of the signal will be an even function and the phase spectrum will be an odd function of frequency. b. Using time shifting property of discrete time Fourier transform, evaluate the Fourier transform of $x[n] = \delta[n+2] - \delta[n-2]$	CO4	2+3=5
Q4	Compute the frequency response of x[n]. Also draw its magnitude and phase response. $x[n] = \begin{cases} 1, for\ n = -2,-1,0,1,2 \\ 0, otherwise \end{cases}$	CO2	5
Q5.	Determine and draw the impulse response of an ideal Low pass filter and determine if it is physically realizable?	CO3 CO5	2+1+2 =5