JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2024

B.Tech-I Semester (ECE)

COURSE CODE (CREDITS): 18B11EC412 (4) MAX. MARKS: 35

COURSE NAME: Fundamentals of Signals & Systems

COURSE INSTRUCTORS: Dr Rajiv Kumar MAX. TIME: 2 Hours

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	Explain following with respect to a system: a) What do you mean by the system without memory? b) What do you mean by the time-in variance? c) What do you mean by the linearity? d) Explain the inverse system. e) Explain the stable system.	CO-1	**1*5=05**
Q2	a) Find the convolution $y(t) = h(t) * x(t)$, where $h(t) = u(t)$ and $x(t) = e^{-t}u(t)$ b) Let $x(t)$ be a signal with $x(t) = 0$ for $t < 3$. Determine the values of t for which it is guaranteed to be zero: i) $x(3t)$ ii) $x(t/3)$	CO-2	**2+3=05**
Q3	a) Find out the coefficients of Fourier series for the following signal $x(t) = 1 + \sin\omega_o t + 2\cos\omega_o t$ b) What is importance of Fourier series for analyzing a signal?	CO-3	**2+3=05**
Q4	a) What do you mean by the poles a zeros? b) Is it possible get the Laplace transform of every signal? Explain it.	CO-4	**2.5+2.5=5**
Q5	Find the Laplace transform of the following signal:	CO-4	**05**

	$x(t) = 3e^{-t}u(t) - 2e^{-2t}u(t)$ Also, draw the ROC?		
Q6	Explain convolution property, find out $y[n]$ for following LTI system $y[n] = h[n] * x[n]$ using convolution property where; $h[n] = \delta[n-1]$ and $x[n] = \delta[n]$	CO-4	05
Q7	a) What are linearity and time shifting properties of z-transform? b) Find $x(t)$, consider the z-transform: $X(z) = \frac{3 - \frac{5}{6}z^{-1}}{(1 - \frac{1}{4}z^{-1})(1 - \frac{1}{3}z^{-1})}, \quad \lvert z \rvert > \frac{1}{3}$	CO-4	2+3=05