JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech-IV Semester (ECE)

COURSE CODE (CREDITS): 25B11EC414 / ~~25B11EC311~~ MAX. MARKS: 15

COURSE NAME: SIGNALS AND SYSTEMS

COURSE INSTRUCTOR: Dr Rajiv Kumar MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of non-programmable calculators is allowed

Q.No	Question	CO	Marks
Q1	Define following systems with help of giving one example of each: i) Memory system ii) Invertible system iii) Causal system	CO-1	3
Q2	What do you mean by *even symmetry* and *odd symmetry* of a signal? Show that the even part and the odd part of a generalized signal $x(t)$ can be derived as: Even part: $x_e(t) = \frac{x(t) + x(-t)}{2}$ Odd part: $x_o(t) = \frac{x(t) - x(-t)}{2}$	CO-1	1+2=3
Q3	What do you mean by the principle of homogeneity and principle of superposition? Check whether the following systems are linear or nonlinear: i. $y(t) = 10x(t) + 5$ ii. $y(t) = e^{x(t)}$ iii. $y(t) = 4\frac{d^2x(t)}{dt^2} + 5\frac{dx(t)}{dt} + x(t)$	CO-1	2+3=5
Q4	Explain the concept of convolution for discrete time and continuous time systems. Find the output y(t) of the system using the convolution operation $y(t) = x(t) * h(t)$. If the input to the system is $x(t) = e^{-at}u(t), \quad a > 0$ and impulse response of the system is $h(t) = u(t)$	CO-2	1+3=4

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