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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- MAY-2019

B.Tech [CSE/IT], IV Semester

COURSE CODE: 10B11EC301 MAX. MARKS: 35

COURSE NAME: Signals and Systems

COURSE CREDITS: 04 MAX. TIME: 2 Hours

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q.1	A causal LTI system is described by the difference equation $y[n] = y[n-1] + y[n-2] + x[n-1]$. Find the system function $H(z) = Y(z)/X(z)$. Plot the poles and zeros of $H(z)$. Indicate the ROC and find the unit step response of the system. Also find a stable (non-causal) unit impulse response that satisfies the difference equation.	**[06]**	**CO4**
Q.2	Determine the functions of time, $x(t)$, for all the possible associated ROCs for $X(s) = \frac{(s+2)}{s^2+7s+13}$. Specify about the stability and causality of all the time functions.	**[06]**	**CO4**
Q.3	Determine the impulse response of continuous LTI system described by following differential equation: $\frac{d^2}{dt^2}y(t) + 7\frac{d}{dt}y(t) + 12y(t) = \frac{d}{dt}x(t) + 2x(t)$	**[06]**	**CO2**
Q.4	(a) Determine the DTFT of the signal $x[n] = 2^n \sin\left(\frac{\pi}{4}n\right)u[-n]$. (b) Consider a discrete LTI system with impulse response $h[n] = \left(\frac{1}{2}\right)^n u[n]$. Using DTFT, determine the response of the system to the input $x[n] = (-1)^n$.	**[06]**	**CO3**
Q.5	Define the following terms- 1. Sampling theorem 2. Nyquist Criteria 3. Impulse train signal	**[06]**	**CO5**
Q.6	If the impulse response of an LTI system $h[n] = \{3,3,3,3\}$ then find the output of this system for the input $x[n] = \{1,4,5,6\}$.	**[05]**	**CO2**