

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- DEC-2018

B.Tech [ECE], III Semester

COURSE CODE: 10B11EC301

MAX. MARKS: 35

COURSE NAME: Signals and Systems

COURSE CREDITS: 04

MAX. TIME: Two Hours

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

Q.1	<p>(a) If Laplace transform of $x(t)$ is $X(s) = (s + 2)/(s^2 + 4s + 5)$ then find the Laplace transform of the following (i) $y(t) = tx(t)$ (ii) $y(t) = e^{-t}x(t)$</p> <p>(b) A system is represented by a differential equation: $\frac{d^2y(t)}{dt^2} - \frac{dy(t)}{dt} - 2y(t) = x(t)$, find the response of this system for input $x(t) = e^{-4t}u(t)$ {Using Laplace transform}</p>	[04]	CO4
Q.2	<p>(a) A discrete LTI system is defined by the following system function $H(z) = \frac{5z^{-1}}{(1 - 2z^{-1})(1 - 3z^{-1})}$ determine $h(n)$ if ROC: (i) $z > 3$ (ii) $2 < z < 3$</p> <p>(b) Find the step response of the following system using z-transform $y[n] - \frac{3}{4}y[n - 1] + \frac{1}{8}y[n - 2] = x[n]$</p>	[04]	CO4
Q.3	State and prove sampling theorem for a band limited signal. Also explain the effect of aliasing in reconstruction of signal.	[04]	CO5
Q.4	<p>(a) If the impulse response of a system is $h[n] = \left(\frac{1}{3}\right)^n u[n]$ then find its response for the input $x[n] = \left(\frac{1}{2}\right)^n u[n]$ using DTFT.</p> <p>(b) Explain the relation between the DTFT and z-transform.</p>	[03]	CO3
Q.5	<p>(a) Explain the properties of Fourier series in brief.</p> <p>(b) Prove the shifting property of Fourier Transform.</p>	[03]	CO3
Q.6	<p>(a) Find the correlation of given sequences $x[n] = \{1, 2, 4, -2\}$ and $y[n] = \{-1, -3, 3\}$</p> <p>(b) What are the operations of signals? Explain the types of operations.</p>	[03]	CO2
		[02]	