CODE No.: 19BT30403 SVEC-19

SREE VIDYANIKETHAN ENGINEERING COLLEGE

(An Autonomous Institution, Affiliated to JNTUA, Ananthapuramu)

II B.Tech I Semester (SVEC-19) Regular Examinations February – 2021

SIGNALS AND SYSTEMS

[Electronics and Communication Engineering]

Time: 3 hours **Max. Marks: 60**

Answer One Question from each Unit
All questions carry equal marks

UNIT-I

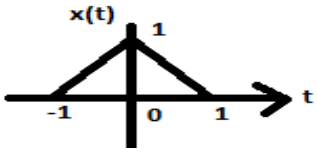
1.	a)	Illustrate the following classifications of continuous time sequences with examples. i) Static and Dynamic systems. ii) Time variant verses and Time in-variant systems.	6 Marks	L1	CO1	PO2
	b)	Given a signal. $x(t) = t+2 \quad -2 < t < 2$ $= 0 \quad$ otherwise. Plot the following signals x(2t), x(-t), x(t/2), 2 x(-2t+3).	6 Marks	L2	CO1	PO2
		(OR)				
2.	a)	Test whether the following signals are periodic signals or aperiodic signals. In case of periodic signals, determine the fundamental frequencies. i) $x(t) = 2\sin(2/3)t + 3\cos(2\pi/5)t$. ii) $x(t) = 4\cos(3\pi t+\pi/2) + 2\sin(8\pi t+\pi/2)$.	6 Marks	L2	CO1	PO2
	b)	Find the energy of a rectangular pulse having unit height and unit width centered at origin. Suppose now this signal is shifted right side (or left side) by 1 unit. Find the new signals energy and power. Is there any change in the value of energy calculated? Give the reasons.	6 Marks	L3	CO1	PO2

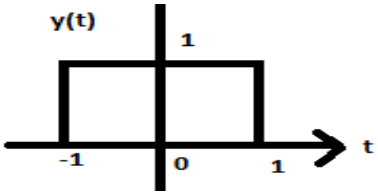
UNIT-II

3.	a)	i) State and prove the Time Reversal property of Fourier Transform ii) Using that property find *x(t) = u(t) + u(-t)*	6 Marks	L1	CO2	PO1
	b)	Find the Fourier Transform of $x(t) = e^{-at}u(t)$.	6 Marks	L2	CO2	PO1
		(OR)				
4.		State and prove convolution property in Fourier Transform.	12 Marks	L2	CO2	PO2

UNIT-III

5.	a)	State and prove Parsevals's theorem. Explain its physical significance.	6 Marks	L1	CO3	PO1
	b)	A filter has an input $x(t) = e^{-2t}u(t)$ and Transfer function $H(w) = \frac{1}{1+jw}$ and find the ESD of the output.	6 Marks	L1	CO3	PO1
		(OR)				
6.	a)	Fine the relation between convolution and correlation with examples.	6 Marks	L1	CO3	PO1
	b)	Fine the cross correlation between unit triangular and unit gate pulse.	6 Marks	L1	CO3	PO5





UNIT-IV

7.	a)	The step response of an LTI system is found to be $2e^{-3t}u(t)$ i) Find the impulse response h(t) of the system. ii) Find the response of the system when the input is $e^{-t}u(t)$.	6 Marks	L3	CO4	PO2
	b)	Find the Laplace Transform of the signal $x(t) = e^{-2t}u(-t) + e^{-3t}u(-t)$ and also find its ROC.	6 Marks	L2	CO4	PO2
		(OR)				
8.	a)	Using properties of Laplace Transform find: i) $x(t) = te^{-t}u(t)$. ii) $x(t) = e^{-2t}\cos(2\pi 100t)u(t)$.	6 Marks	L2	CO4	PO2
	b)	Find the inverse Laplace Transform of the following : $X(S) = \frac{S+1}{(S+1)(S+1)+4}$.	6 Marks	L1	CO4	PO1

UNIT-V

9.	a)	State and prove Sampling theorem.	6 Marks	L1	CO5	PO1
	b)	An amplifier with Gain = 30dB and Bandwidth = 25KHZ is found to have T = 120K. Noise figure = 2. Find output noise.	6 Marks	L3	CO5	PO4
		(OR)				
10.	a)	Explain the reconstruction of a signal from its samples using interpolation technique.	6 Marks	L2	CO5	PO2
	b)	List out different types of Noises.	6 Marks	L3	CO5	PO4