Q.P Code:23EC0401	R23	H.T.No.									

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech. II Year I Semester Regular & Supplementary Examinations November-2025
SIGNALS, SYSTEMS AND STOCHASTIC PROCESSES
(Electronics & Communications Engineering)

Time: 3 Hours **Max. Marks: 70**

PART-A

(Answer all the Questions **10 x 2 = 20** Marks)

1	a	Define signal and system.	CO1	L2	2M
	b	Discuss about causal and non-causal, Time invariant and time variant systems.	CO1	L1	2M
	c	Test whether the signal $y(t) = 3x(t) + 2$ is linear or non linear.	CO2	L1	2M
	d	Find the fourier transform of $e^{-at}u(t)$	CO2	L2	2M
	e	Define sampling theorem.	CO3	L1	2M
	f	What is impulse response.	CO3	L1	2M
	g	Explain about Paley-Wiener criterion.	CO4	L1	2M
	h	Define wide sense stationary random processes.	CO4	L1	2M
	i	Define Power Spectrum Density.	CO5	L1	2M
	j	Explain the statement of Wiener-Khinchin relation.	CO5	L1	2M

PART-B

(Answer all Five Units **5 x 10 = 50** Marks)

UNIT-I

2	a	Define energy and power signals. Find the signal x(t)= e-2t u(t) is a power signal or energy signal.	CO1	L1	5M
	b	Discuss the following. (i) Even and Odd signals (ii) Periodic and Non-Periodic Signals.	CO1	L2	5M

OR

3		Find the linearity, time-invariance, causality, stability and invertibility of the following system. $Y(t)=x(t+1) + x(t-1)$	CO1	L3	10M

UNIT-II

4		Explain modulation property of Fourier transform	CO2	L1	10M

OR

5		State and prove sampling theorem.	CO2	L1	10M

UNIT-III

6	a	Sketch the magnitude and phase response for a distortion less transmission system.	CO3	L3	5M
	b	Define linear time variant system.	CO3	L2	5M

OR

7		Derive the output response of linear time invariant system.	CO3	L1	10M

UNIT-IV

8	a	Define Wide Sense Stationary Process and write it's conditions.	CO4	L1	6M
	b	A random process is given as $X(t) = At$, where A is a uniformly distributed random variable on (0,2). Find whether X(t) is wide sense stationary or not.	CO4	L3	4M

OR

9	a	Define Covariance of the Random processes with any two properties.	CO5	L1	5M
	b	Derive the expression for cross correlation function between the input and output of a LTI system.	CO5	L2	5M

UNIT-V

10	a	Define Power Spectral density with three properties.	CO5	L1	5M
	b	Find the power spectral density for $R_{XX}(\tau)=A^2/2 \sin(\omega_0\tau)$.	CO5	L2	5M

OR

11		Derive the relationship between cross-power spectral density and cross correlation function.	CO5	L1	10M

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