Q.P. Code: 16EC404 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B. Tech II Year I Semester Supplementary Examinations August-2022

RANDOM SIGNAL & STOCHASTIC PROCESSES

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	**a**	Explain about Baye's theorem.	**L1**	**6M**
	b	In a bolt factory, machines A, B, C manufacture 30%, 30%, 40% of the total output respectively. From their outputs 4, 5, 3 percents are defective bolt. A bolts is drawn at random and found to be defective. What are the probabilities that it was manufacturing by machines A, B and C?	**L4**	**6M**

OR

2	**a**	Explain about binomial distribution function? Plot the distribution and density function.	**L1**	**6M**
	b	Explain about Poisson distribution function? Plot the distribution and density function.	**L1**	**6M**

UNIT-II

3	**a**	State and prove central limit theorem.	**L1**	**6M**
	b	Find the distribution function FX,Y(x,y) and the marginal distribution functions.	**L4**	**6M**

(X,Y)	(0,0)	(1,2)	(2,3)	(3,2)
P(x,y)	0.2	0.3	0.4	0.1

OR

4	**a**	given the function $f_{X,Y}(x,y) = \begin{cases} b(x+y)^2 & -2 \le x \le 2, -3 \le y \le 3 \\ 0 & \text{elsewhere} \end{cases}$ i) Find the a and b values? ii) Determine the marginal density functions?	**L4**	**6M**
	b	Explain about Jointly Gaussian Function for Two random variables. And its properties.	**L1**	**6M**

UNIT-III

5	**a**	State the conditions for wide sense stationary random process.	**L1**	**6M**
	b	Write short notes on ergodic random processes.	**L2**	**6M**

OR

6	**a**	Explain the significance of auto correlation.	**L1**	**6M**
	b	Find auto correlation function of a random process whose power spectral density is given by $4/(1+(\omega^2/4))$.	**L4**	**6M**

UNIT-IV

7	**a**	Discuss the properties of cross power density spectrum.	**L2**	**6M**
	b	Discuss the relation between cross power spectrum and cross correlation function.	**L2**	**6M**

OR

8	**a**	Discuss the properties of CPSD.	**L2**	**6M**
	b	The auto correlation of a WSS random process X(t) is given by $R_{xx}(\tau) = A\cos(w_0 \tau)$ where A and W_0 are constants. Find psd.	**L4**	**6M**

UNIT-V

9	**a**	Derive the relation between PSDs of input and output random process of an LTI system.	**L3**	**6M**
	b	Discuss about cross correlation between the input X (t) and output Y (t).	**L2**	**6M**

OR

10	**a**	How mean of the system response Y (t) is calculated?	**L1**	**6M**
	b	Write different types of band pass processes with band limited processes.	**L1**	**6M**

*** END ***