Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year II Semester Supplementary Examinations July-2022

PROBABILITY THEORY AND STOCHASTIC PROCESSES

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	**a**	State Baye's Theorem.	**L1**	**2M**
	b	State Central Limit Theorem.	**L4**	**2M**
	c	What is a stationary process?	**L1**	**2M**
	d	Write some properties of auto Power density Spectrum.	**L2**	**2M**
	e	Explain mean value of output response.	**L1**	**2M**

PART-B

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

UNIT-I

2		Define the following with examples. i. Sample space ii. Event iii. Mutually exclusive events. iv. Independent events.	**L1**	**10M**

OR

3	**a**	Discuss Joint and conditional probability.	**L1**	**5M**
	b	When are two events said to be mutually exclusive? Explain with an example.	**L1**	**5M**

UNIT-II

4	**a**	Discuss the properties of conditional distribution function.	**L4**	**5M**
	b	If the joint PDF of two-dimensional random variable (x, y) is given by:	**L6**	**5M**

$$f_{X,Y}(x,y) = 2 \quad ; \quad \text{for } 0 \leq X \leq 1,\ 0 \leq Y \leq x$$
$$= 0 \quad ; \quad \text{otherwise}$$

OR

5		The joint pdf is given as $f_{X,Y}(x,y) = e^{-(2x+y)}$ for $x \geq 0$ and $y \geq 0$. Find (i) the value of A (ii) the marginal density functions.	**L6**	**10M**

UNIT-III

6		What is ACF? State and explain any four properties of ACF.	**L1**	**10M**

OR

7	**a**	State the conditions for wide sense stationary random process.	**L2**	**6M**
	b	Write short notes on ergodic random processes.	**L1**	**4M**

UNIT-IV

8	**a**	Discuss the properties of cross power density spectrum.	**L4**	**5M**
	b	Discuss the relation between cross power spectrum and cross correlation function.	**L4**	**5M**

OR

9	The power spectral density of a stationary random process is given by $S_{xx}(\omega) = A \quad -K \le \omega \le K$ $0 \quad$ otherwise Find the autocorrelation function.		L6	10M

UNIT-V

10	**a**	Explain about LTI system.	**L1**	**5M**
	b	Find the power density spectrum of response of a linear system.	**L4**	**5M**

OR

11	Write notes on: (i) Band Pass random process. (ii) Band limited random process (iii) Narrow band random process.		**L1**	**10M**

END