R18 Regulation *Subject code:2P4DE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech IV Semester Supplementary Examinations, December 2024

PROBABILITY THEORY AND STOCHASTIC PROCESS
(ECE)

Maximum Marks: 70 Date:12.12.2024 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X2M=20) Marks)		CO	Bloom Tx
1	Define probability of the event with an example.	1	L1
2	State Bayes' theorem.	1	L1
3	State the central limit theorem	2	L1
4	How interval conditioning is different from point conditioning?	2	L1
5	Define cross-covariance function.	3	L1
6	Prove that $\mu_2 = m_2 - m_1^2$?	3	L1
7	Write about ergodic random processes.	4	L1
8	Where the Poisson random processes are used?	4	L1
9	Show that $Sxx(\omega) = Sxx(-\omega)$.	5	L1
10	Write properties of cross power density spectrum.	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	State and prove total probability' theorem. Coin A has a probability of head =1/4 and coin B is a fair coin. Each coin is flipped four times. If X is the number of heads resulting from coin and Y denotes the same from coin B, what is the probability for X=Y? [10M]	1	L2
	OR		
12	State Random Variable and Types of Random Variables with suitable example. Define the term Independent events. State the conditions for Independence of [10M] i) any two events A and B ii) any three events A,B and C	1	L2
13	Obtain the variance of Raleigh random variable. [10M]	2	L2
	OR		

14	A random variable X uniformly distributed in the interval $(0, \pi/2)$. Consider the transformation Y=sinx, obtain the pdf of Y. [10M]	2	L2
15	A) Define and explain joint distribution function of two random variables X and Y [5M] B) State properties of joint probability density function. [5M]	3	L2
	OR		
16	A) The joint pdf of (x, y) is given as $f(x, y) = \{ Ke^{-(ax+by)}$ for $x>0, Y>0$ 0 elsewhere} Show that X and Y are independent [5M] B) State central limit theorem. [5M]	3	L2
17	Define autocorrelation function of a random process. Write properties of auto correlation function of a WSS process and prove any three of them. [10M]	4	L2
	OR		
18	A) Define cross correlation function of a random process. Write its properties and prove any four of them. [5M] B) Explain in brief the concepts of stationary random processes. [5M]	4	L2
19	Derive the relation between PSDs of input and output random process of an LTI system. [10M]	5	L2
	OR		
20	Explain about cross power spectrum density and its properties with proofs. [10M]	5	L2