



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 2025

PROBABILITY THEORY AND STOCHASTIC PROCESS (ECE)

Maximum Marks: 70

Date: 29.12.2025

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.
 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)		Marks	CO	BTL
1	Define probability of the event with an example.	2M	1	L1
2	Define Probability density function.	2M	1	L1
3	State the central limit theorem	2M	2	L1
4	How interval conditioning is different from point conditioning?	2M	2	L1
5	Define cross-covariance function.	2M	3	L1
6	Prove that $\mu_2 = m_2 - m_1^2$?	2M	3	L1
7	Explain about stationary process.	2M	4	L1
8	Give an example of a deterministic random process.	2M	4	L1
9	Write the expression for power spectral density.	2M	5	L1
10	State wiener-Khinchin relation.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	State and prove Bayes' theorem.	10M	1	L2
OR				
12	State Random Variable and Types of Random Variables with suitable example.	10M	1	L2
13	A random variable X uniformly distributed in the interval $(0, \pi/2)$. Consider the transformation $Y = \sin x$, obtain the pdf of Y.	10M	2	L2
OR				
14	Prove that the variance of weighted sum of N random variables equals the weighted sum of all their covariances.	10M	2	L2
15	Two statistically independent random variables X and Y have mean values $E[X] = 2$ and $E[Y] = 4$. They have second moments $E[X^2] = 8$ and $E[Y^2] = 25$. Find Variance of $W = 3X - Y$.	10M	3	L2
OR				
16	Define conditional distribution and density function of two Random variables X and Y.	10M	3	L2

17	Define the terms: (i) Random process. (ii) Stationary random process. (iii) Wide sense stationary random process. (iv) Ergodic random process.	10M	4	L2
	OR			
18	What is the probability distribution function of the sum of two random variables?	10M	4	L2
19	Derive the relationship between cross-power spectrum and cross correlation function.	10M	5	L2
	OR			
20	Explain about cross power spectrum density and its properties with proofs.	10M	5	L2