



Regulation R18

Subject code: 2P4DE

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, February 2024

PROBABILITY THEORY AND STOCHASTIC PROCESS

(ECE)

Maximum Marks: 70

Date: 26.02.2024 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.
 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)

Q.NO	QUESTIONS	Marks	CO	Blooms Tx
1	Define probability of the event with an example.	2	CO1	L1
2	State Bayes' theorem.	2	CO1	L1
3	State the central limit theorem.	2	CO2	L1
4	Explain skew and coefficient of skewness	2	CO2	L2
5	Define the joint moments about the origin.	2	CO3	L1
6	Distinguish between joint distribution and marginal distribution.	2	CO3	L2
7	Explain about second order stationary process.	2	CO4	L2
8	Write short notes on Gaussian random process.	2	CO4	L1
9	Write the expression for power spectral density.	2	CO5	L1
10	Find auto correlation function for $S_{xx}(\omega) = \frac{8}{(9 + \omega^2)^2}$	2	CO5	L2

Part-B

Answer All the following questions.

(10M X 5=50Marks)

11.	State and Prove the Total Probability.	10	CO1	L1&L3
	OR			
12.	A binary communication channel carries data as one of two types of signals denoted by 0 and 1. Owing to noise, a transmitted 0 is sometimes received as 1 and a transmitted 1 is sometimes received as 0. For a given channel, assume a probability of 0.94 that a transmitted 0 is correctly received as 0 and a probability of 0.91 that a transmitted 1 is received as a 1. Further assume a probability of 0.45 of transmitting a 0, if a signal is sent. Determine i)Probability that a 1 is received ii)Probability that a 0 was received	10	CO1	L3

	iii)Probability that a 1 was transmitted, given that a 1 was received iv)Probability that a 0 was transmitted, given that a 0 was received v)Probability of error			
13.	Explain Probability Distribution Function and mention its properties.	10	CO2	L2
	OR			
14.a	Explain Moments about the Origin and Moments about the Mean.	5	CO2	L2
b	For the uniformly distributed Random Variable X, Determine i) Moment generating function ii) Mean and Variance	5	CO2	L3
15.a	Define and explain joint density function of two random variables X and Y	5	CO3	L2
b	State properties of joint probability distribution function	5	CO3	L2
	OR			
16.	The joint pdf of (x, y) is given as $f(x, y) = \begin{cases} Ke^{-(ax+by)} & \text{for } x>0, Y>0 \\ 0 & \text{elsewhere} \end{cases}$ Show that X and Y are independent.	10	CO3	L3
17.	Explain the concept of time average and ergodicity. Write the conditions for a random process to be ergodic in mean and autocorrelation.	10	CO4	L2
	OR			
18.	Define cross correlation function of a random process. Write its properties and prove any four of them.	10	CO4	L4
19	Derive the relationship between cross-power spectrum and cross correlation function.	10	CO5	L3
	OR			
20	Explain about cross power spectrum density and its properties with proofs	10	CO5	L2