Question Paper Code: R14A21HS03

R14

ANURAG Engineering College

(An Autonomous Institution)

II B.Tech I Semester Supplementary Examinations, June/July – 2024

PROBABILITY AND STATISTICS

(COMPUTER SCIENCE AND ENGINEERING)

Time: 3 Hours **Max. Marks: 75**

Section – A (Short Answer type questions) (10 Marks)

Answer All Questions

		Course Outcome	B.T Level	Marks
1.	Define i) Equally likely events ii) Mutually exclusive events	CO1	L1	2M
2.	If A & B are any two events and $A \subset B$ *then prove that* $P(A) \leq P(B)$	CO1	L2	3M
3.	The mean and variance of a binomial distribution are 6 & 3 respectively find the mode of the binomial distribution	CO2	L2	2M
4.	If X is a Poisson variate such that p(x=0) = p(x=1) = K. Determine K.	CO2	L1	3M
5.	Find population correction factor if n =5 and N=30	CO3	L1	2M
6.	Define type II error.	CO3	L1	3M
7.	Find $F_{0.01}$ (24,19)	CO4	L2	2M
8.	Define the principles of design of experiments	CO4	L1	3M
9.	Consider the Markov chain with transition Probability matrix $\begin{bmatrix} 0.4 & 0.6 & 0 & 0 \\ 0.3 & 0.7 & 0 & 0 \\ 0.2 & 0.4 & 0.1 & 0.3 \\ 0 & 0 & 0 & 1 \end{bmatrix}$ Is this matrix irreducible?	CO5	L2	2M
10.	Find periodic and aperiodic states in each of the following transition probability matrices. i) $\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ ii) $\begin{bmatrix} \frac{1}{4} & \frac{3}{4} \\ \frac{1}{2} & \frac{1}{2} \end{bmatrix}$	CO5	L2	3M

Section B (Essay Questions)

Answer all questions, each question carries equal marks. **(5 X 10M = 50M)**

11. A)	A, B, C are aiming to shoot a balloon. A will succeed 4 times out of 5 attempts. The chance of B to shoot the balloon is 3 out of 4 and that of C is 2 out of 3. If the three aim the balloon simultaneously then find the probability that at least two of them hit the balloon.	CO1	L3	10M
	OR			
B)	A product is assembled from 3 components X, Y, Z. the probability of these components being defective is 0.01, 0.02, 0.05 respectively. What is the probability that the assembled product will not be defective?	CO1	L3	10M
12. A)	The probability density function of a variable 'x' is	CO2	L3	10M

x	0	1	2	3	4	5	6
P(x)	k	3k	5k	7k	9k	11k	13k

Find (i) 'k' (ii) $p(x < 4)$ (iii) $p(3 < x \leq 6)$ iv) Mean v) Variance.

OR

B)	It has been found that 2% of the tools produced by a certain machine are defective what is the probability that in a shipment of 400 such tools i) 3% or more ii) 2% or less will prove defective	CO2	L3	10M
13. A)	Random samples of 400 men and 600 women were asked whether they would like to have a flyover near the residence, 200 men and 325 women were in favor of the proposal. Test the hypothesis that proportions of men and women in favor of the proposal are same, at 5% level	CO3	L3	10M
	OR			
B)	The means of two large sample of sizes 1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can the samples be regarded as drawn from the same population of S.D 2.5 inches.	CO3	L3	10M
14. A)	Use F test to test the significance difference variances of two diets. At 5% level of significance.	CO4	L3	10M

DietA	25	32	30	34	24	14	32	24	30	31	35	25	-	-	-
DietB	44	34	22	10	47	31	40	30	32	35	18	21	35	29	22

OR

B)	Give the complete statistical analysis of C. R. D.	CO4	L3	10M
15. A)	Suppose that the probability of a dry (state 0) follows a rainy day (state 1) is 1/3, and probability of a rainy day is ½.Then we have a two state markov chain such that $P_{10}=1/3$ are $P_{01}=1/2$ then find the transition probability matrix.	CO5	L3	10M
	OR			
B)	A fair die is tossed repeatedly. If X_n denotes the maximum of the numbers occurring in the first n tosses, find the transition probability matrix P of the Markov chain $\{X_n\}$.Find also P^2 and $P(X_2=6)$.	CO5	L3	10M