R22 Regulation *Subject code: 4B3AD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Regular/Supplementary Examinations, December 2024

PROBABILITY AND STATISTICS

(Common to CE,CSE,IT,CSE(AI&ML) & CSE(DS))

Maximum Marks: 60 Date:02.12.2024 Duration: 3 hours

Note: 1.This question paper contains two parts A and B.
2. Part A is compulsory which carries 10 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.

Allow the statistical tables.

	Part-A	CO	Bloom Tx
All the following questions carry equal marks	(10X1M=10 Marks)		
1.a)	Define Discrete and Continuous Random variable.	1	L1
b)	Define probability distribution function.	1	L1
c)	Write the mean and standard deviation of Binomial distribution.	2	L2
d)	Define Normal distribution.	2	L1
e)	Write the regression equation of Y on X.	3	L2
f)	Write the normal equations of a straight line	3	L2
g)	Define Null and Alternative Hypothesis.	4	L1
h)	Define Type-I and Type-II errors.	4	L1
i)	Write about Student's 't'-test .	5	L2
j)	What is the main purpose of ANOVA?	5	L1

	Part-B	CO	Bloom Tx
Answer All the following questions.	(5X10M=50Marks)		
2	Apply the concept of random variable to find (I) K (II) Find $P(X<4)$, $P(X\geq 5)$, $P(3<X\leq 6)$ (III) What will be the minimum value of K so that $P(X\leq 2)>0.3$? (IV) Mean (V) Variance. From the following probability density function.	1	L3

X	0	1	2	3	4	5	6
P(X)	K	3K	5K	7K	9K	11K	13K

[10M]

	OR		
3	If the probability density of a random variable is given by $f(x) = k(1-x^2)$ for $0<x<1$ and $f(x) = 0$ otherwise compute the value of k and the probabilities that a random variable having this probability density will take on a value (i) between 0.1 and 0.2 (ii) greater than 0.5. [10M]	1	L3
4	a) Apply the concept of the Binomial distribution to find its mean. [5M]	2	L3
	b) Determine the probability of getting the sum 6 exactly 3 times in 7 throws with a pair of fair dice. [5M]	2	L3

	OR		
5	a) Apply the concept of Poisson distribution to find its mean. [5M]	2	L3
	b) If the probability that an individual suffers a bad reaction from a certain injection is 0.001, using Poisson distribution compute the probability that out of 2000 individuals more than 2 individuals suffer a bad reaction. [5M]	2	L3
6	Fit and analyze a second-degree polynomial to the following data by the method of least square. [10M] X: 2, 4, 6, 8, 10 Y: 3.07, 12.85, 31.47, 57.38, 91.29	3	L4
	OR		
7	Correlate the grades of Mathematics and English for the following data: Mathematics grade: 70, 92, 80, 74, 65, 83. English grade: 74, 84, 63, 87, 78, 90. [10M]	3	L4
8	a) A coin was tossed 400 times and returned heads 216 times. Test the hypothesis that the coin is unbiased. Use a 0.05 Level of significance. [5M]	4	L4
	b) The means of two large samples of sizes1000 and 2000 members are 67.5 inches and 68.0 inches respectively. Can we conclude from drawn from the same population of S.D 2.5 inches. [5M]	4	L4
	OR		
9	a) 20 people were attacked by a disease and only 18 survived. By testing the hypothesis will you reject the hypothesis that the survival rate attacked by this disease is 85% in favour of the hypothesis that is more at 5% level. [5M]	4	L4
	b) In a sample of 600 students of a certain college 400 are found to use ball pens. In another college from a sample of 900 students 450 were found to use ball pens. Test whether 2 colleges are significantly different with respect to the habit of using ball pens. [5M]	4	L4
10	The nicotine contents in milligrams in two samples of tobacco were found to be as follows: Sample A: 24, 27, 26, 21, 25, - Sample B: 27, 30, 28, 31, 22, 36 Examine the samples to say that the two samples have come from the same normal population? [10M]	5	L3
	OR		
11	Apply the concept of Chi-square test to give the conclusion for the given data: The number of automobile accidents per week in a certain community are as follows: 12,8,20,2,14,10,15,6,9,4. Are these frequencies in agreement with the belief that accident conditions were the same during this 10-week period. [10M]	5	L3