R22 Regulation *Subject code: 4B3AD*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B. Tech III Semester Supplementary Examinations, June 2026

PROBABILITY AND STATISTICS

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

Maximum Marks: 60 Date:09.06.2026 *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.

Statistical tables are allowed

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	BTL
1.a)	Define the term mathematical expectation of a probability distribution function	1M	1	L1
b)	Find the value of k if the function $f(x) = kx$ in $0 < x < 1$ is a valid probability density function.	1M	1	L2
c)	Determine the binomial distribution for which the mean is 4 and variance 3.	1M	2	L3
d)	Define normal distribution.	1M	2	L1
e)	Define correlation coefficient.	1M	3	L1
f)	Define the principle of least squares.	1M	3	L2
g)	What is the value of correction factor if $n = 5$ *and* $N = 200$.	1M	4	L2
h)	Explain the terms Null hypothesis and Alternative hypothesis.	1M	4	L1
i)	If $\bar{x} = 40$, $\mu = 25$, $S = 8.4$, $n = 24$ then find t.	1M	5	L2
j)	Find the F value if the variance of the first sample will be at least four times as that second sample.	1M	5	L2

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
2	Let X denote the minimum of the two numbers that appear when a pair of fair dice is thrown once. Determine the (i) Discrete probability distribution (ii) Expectation (iii) Variance	10M	1	L3
	OR			
3	If $f(x) = ke^{-x}$ is probability density function of a random variable in $0 < x \leq \infty$, find: (i) k (ii) mean (iii) variance.	10M	1	L3
4	Given that P(X=2) = 9 P(X=4) + 90P(X=6) for a Poisson variate X. Find: (i) P(X<2) (ii) P(X>4) (iii) P(X≥1)	10M	2	L5

	OR			
5	The mean weight of 500 male students at a certain college is 75 kg and the standard deviation is 7 kg. Assuming that the weights are normally distributed find how many students weight (i) Between 60 and 78 kg (ii) more than 92kg.	10M	2	L5
6	Calculate the Karl Pearson's coefficient of correlation from the following data. Wages: 100, 101, 102, 102, 100, 99, 97, 98, 96, 95 Cost of living: 98, 99, 99, 97, 95, 92, 95, 94, 90, 91	10M	3	L3
	OR			
7	Fit the curve $y = ae^{bx}$ for the following data by using least square method. x: 1, 2, 3, 4 y: 21, 35, 59, 92	10M	3	L5
8	A population consists of 5,10,14,18,13,24. Consider all possible samples of size two which can be drawn without replacement from this population. Find (a) The mean of the population (b) The standard deviation of the population (c) The mean of the sampling distribution of means (d) The standard deviation of sampling distribution of means	10M	4	L3
	OR			
9	A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there 150 students having mean IQ of 75 with a S.D. of 15 in the second group there are 250 students having mean IQ of 70 with S.D. of 20. Is there a significant difference between the means of two groups?	10M	4	L2
10	Two independent samples of 8 and 7 items respectively had the following values. Sample-I: 11, 11, 13, 11, 15, 9, 12, 14 Sample-II: 9, 11, 10, 13, 9, 8, 10, - Is the difference between the means of sample significant?	10M	5	L3
	OR			
11	The measurements of the output of two units have given the following results. Assuming that both samples have been obtained from the normal populations at 10% significant level, test whether the two populations have the same variance. UNIT-A: 14.1, 10.1, 14.7, 13.7, 14.0 UNIT-B: 14.0, 14.5, 13.7, 12.7, 14.1	10M	5	L3