R20 Regulation *Subject code: 3B4AA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, December 2025

PROBABILITY & STATISTICS

(Common to CE, CSE & IT)

Maximum Marks: 70 Date: 16.12.2025 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 mass function.	2M	1	L1
2	Define normal distribution.	2M	1	L1
3	Define Estimator and estimate.	2M	2	L1
4	A random sample of size 100 has a standard deviation of 5. What can say about the maximum error with 95% confidence .	2M	2	L1
5	Write the working rule for the significance between two means for large samples.	2M	3	L1
6	Write the test statistic for difference of two means in large samples.	2M	3	L1
7	Write the uses of chi – square test.	2M	4	L1
8	If $n_1 = n_2 = 5$, $\bar{x} = 13.4$, $\bar{y} = 12.9$. The sum of squares of deviation from mean are 0.82 and 0.66 respectively. Then test where population variances are equal or not.	2M	4	L1
9	If θ is the angle between two regression lines and standard deviation of y is twice the standard deviation of x and r = 0.25 then find Tan θ.	2M	5	L1
10	Write the normal equations for parabola.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	The cumulative distribution function for a continuous random variable 'x' is $F(x) = \begin{cases} 1 - e^{-2x} & , x \geq 0 \\ 0 & , x < 0 \end{cases}$ Evaluate (i) density function (ii) Mean (iii) Variance	10M	1	L2
	OR			
12	Out of 800 families with 5 children each how many would you expect to have (i) 3 boys (ii) 5 girls (iii) either 2 or 3 boys (iv) at least one boy? Assume equal probabilities for boys and girls.	10M	1	L2
13	A population consists of five numbers 3,6,9,15and 27. Consider all possible samples of size three Which can be drawn with out replacement from this population. Find i) The population mean. ii) The standard deviation of the population.iii) The mean of the sampling distribution of means. iv) standard deviation of the sampling distribution of means.	10M	2	L2

	OR			
14	a) A sample of size 100 was taken whose variance is 16 and mean 4. Construct 99% confidence interval for the mean. And also find maximum error of mean at 95% confidence? b) Find 95% confidence limits for the mean of a population from which the following sample was taken 15,17,10,18,16,9,7,11,13,14.	5M 5M	2	L2
15	A die wars thrown 9000 times and of these 3220 yielded a 3 & 4 , Is this consistent with the hypothesis that the die was unbiased?	10M	3	L2
	OR			
16	In a city A 20% of a random sample of 900 school boys has certain slight physical defect . In another city B 18.5% of a random sample of 1600 schoolboys has the same defect . Is the difference between the proportion significance at 5% l.o.s.	10M	3	L2
17	Use F- test to the following data to test the significance of variances X: 67, 24, 57, 55, 63, 54, 56, 68, 33, 43 Y: 70, 38, 58, 58, 56, 67, 68, 75, 42, 38	10M	4	L2
	OR			
18	A random sample of 10 boys had the following I.Q's : 70,120,110,101,88,83,95,98,107,100 (a)Do these data support the assumption of a population mean I.Q of 100 (b) Find a reasonable range in which most of the mean I.Q values of samples of 10 boys lie.	10M	4	L2
19	Price indices of cotton and wool are given below for the 12 months of a year. Obtain the equations of lines of regression between indices and wool. cotton(x): 78, 77, 85, 88, 87, 82, 81, 77, 76, 83, 97, 93 wool(y): 84, 82, 82, 85, 89, 90, 88, 92, 83, 89, 98, 99	10M	5	L2
	OR			
20	Fit a following of the curve $y = ae^{bx}$ X: 2, 3, 4, 5, 6 Y: 144, 172.8, 207.4, 248.8, 298.5	10M	5	L2