R18 Regulation *Subject code:2H3AE*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Supplementary Examinations, December 2025

PROBABILITY & STATISTICS

(Common to CE, ME, CSE & IT)

Maximum Marks: 70 Date:15.12.2025 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	Write about Discrete random variables.	2M	1	L1
2	If X_1, X_2 are two random variables and a ,b are constants then $E(aX_1 + bX_2)$?	2M	1	L1
3	The mean and variance of a binomial distribution are 6 & 3 respectively find the mode of the binomial distribution.	2M	2	L1
4	If X =B(n,p) then write the conditions under which X tends to a Poisson distribution.	2M	2	L1
5	Test whether the equations $2x + 3y = 4$, and x-y=5 represent valued regression lines.	2M	3	L1
6	Write the two Regression equations.	2M	3	L1
7	What is mean by level of significance?	2M	4	L1
8	Define Left tailed test.	2M	4	L1
9	Write the one use of t-test.	2M	5	L1
10	Write the formula for chi- square test.	2M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	BTL
11	A continuous random variable has the probability function $f(x) = \begin{cases} K\, x\, e^{-\lambda x} & \text{for } x \geq 0,\ \lambda > 0 \\ 0 & \text{otherwise} \end{cases}$ Determine (i) k (ii) Mean (iii) Variance	10M	1	L2
	OR			
12	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

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<tr><td>13</td><td>If 10% of the rivets produced by a machine are defective, find the probability that out of 5 rivets chosen of random (i)Non will be defective (ii) one will be defective (iii) at most two rivets will be defective</td><td>10M</td><td>2</td><td>L2</td></tr>
<tr><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>14</td><td>Derive variance and mode of the Normal distribution.</td><td>10M</td><td>2</td><td>L2</td></tr>
<tr><td>15</td><td>Fit a second-degree polynomial to the following data $y = a + bx + cx^2$
<table>
<tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>y</td><td>2.3</td><td>5.2</td><td>9.7</td><td>16.5</td><td>29.4</td><td>35.5</td><td>54.4</td></tr>
</table></td><td>10M</td><td>3</td><td>L2</td></tr>
<tr><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>16</td><td>Fit a curve of the form $y = ab^x$ to the following data.
<table>
<tr><td>X</td><td>1</td><td>2</td><td>3</td><td>4</td></tr>
<tr><td>Y</td><td>4</td><td>11</td><td>35</td><td>100</td></tr>
</table></td><td>10M</td><td>3</td><td>L2</td></tr>
<tr><td>17</td><td>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</td><td>10M</td><td>4</td><td>L2</td></tr>
<tr><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>18</td><td>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% level.</td><td>10M</td><td>4</td><td>L2</td></tr>
<tr><td>19</td><td>A random sample of 10 boys had the following I.Q's :
70,120,110,101,88,83,95,98,107,100.
Do these data support the assumption of a population mean I.Q of 100</td><td>10M</td><td>5</td><td>L2</td></tr>
<tr><td></td><td>OR</td><td></td><td></td><td></td></tr>
<tr><td>20</td><td>The means of two random samples of sizes 9 and 7 are 196.42 and 198.82 respectively. The sum of the squares of the deviations from the mean are 26.94 and 18.73 respectively, can the sample be considered to have been from the same normal population.</td><td>10M</td><td>5</td><td>L2</td></tr>
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