

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, July 2024

Probability & Statistics

(Common to CE, CSE & IT)

Maximum Marks: 70

Date: 18.07.2024 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 which carries 10M.
 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)

		CO	Blo Tx
1	If $f(x) = \begin{cases} \frac{1}{2}(x+1) & -1 < x < 1 \\ 0 & \text{elsewhere} \end{cases}$ Find E(x)	1	L1
2	Define Poisson distribution	1	L1
3	Define Estimator and estimate?	2	L1
4	If we can assert with 95% that maximum error is 0.05 and $p=0.2$. Find the size of the sample.	2	L1
5	Write about (i) Null Hypothesis (ii) Alternative Hypothesis	3	L1
6	Write the test statistic for difference of two proportions in large samples.	3	L1
7	If $\bar{x} = 47.5, \mu = 42.1, S = 8.4$ and $n=25$ then find the value of test statistic t.	4	L1
8	Write the uses of Chi - square test	4	L1
9	Test whether the equations $2x + 3y = 4$, and $x-y=5$ represent valued regression lines	5	L1
10	Write the uses of regressions	5	L1

Part-B

Answer All the following questions.

(5X10M=50Marks)

11	A random variable 'x' has the following probability function <table border="1" style="margin-left: 20px;"> <tr> <td>x</td> <td>0</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>P(x)</td> <td>0</td> <td>k</td> <td>2k</td> <td>2k</td> <td>3k</td> <td>k^2</td> <td>$2k^2$</td> <td>$7k^2+k$</td> </tr> </table> i) Find the value of 'k' ii) Mean (5+5)M OR	x	0	1	2	3	4	5	6	7	P(x)	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$	1	L2
x	0	1	2	3	4	5	6	7													
P(x)	0	k	2k	2k	3k	k^2	$2k^2$	$7k^2+k$													
2	Show that for a Normal distribution mean=median. [10] OR	1	L2																		
3	A population consists of five numbers 5,2,6,12,and 11.Consider all possible samples of size two 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. [10] OR	2	L2																		

14	Show that $s^2 = \frac{1}{n} \sum_{i=1}^n (x_i - \bar{x})^2$ is not unbiased estimator of the parameter σ^2 , but $S^2 = \frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2$ is unbiased estimator of the parameter σ^2 . [10]	2	L2																						
15	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. [10]	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. [10]	3	L2																						
17	Scores obtained in a shooting competitions by 10 soldiers before and after intensive training are given below. Test whether the intensive training is usefull at 0.05 level of significance.[10]	4	L2																						
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Before</td> <td>67</td> <td>24</td> <td>57</td> <td>55</td> <td>63</td> <td>54</td> <td>56</td> <td>68</td> <td>33</td> <td>43</td> </tr> <tr> <td>After</td> <td>70</td> <td>38</td> <td>58</td> <td>58</td> <td>56</td> <td>67</td> <td>68</td> <td>75</td> <td>42</td> <td>38</td> </tr> </table>	Before	67	24	57	55	63	54	56	68	33	43	After	70	38	58	58	56	67	68	75	42	38		
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After	70	38	58	58	56	67	68	75	42	38															
OR																									
18	From the following data, find whether there is any significant liking in the habit of taking soft drinks among the categories of employees. [10]	4	L2																						
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td></td> <td>clerk</td> <td>Teachers</td> <td>Officer s</td> </tr> <tr> <td>Pepsi</td> <td>10</td> <td>25</td> <td>65</td> </tr> <tr> <td>Thumsup</td> <td>15</td> <td>30</td> <td>65</td> </tr> <tr> <td>Fanta</td> <td>50</td> <td>60</td> <td>30</td> </tr> </table>		clerk	Teachers	Officer s	Pepsi	10	25	65	Thumsup	15	30	65	Fanta	50	60	30								
	clerk	Teachers	Officer s																						
Pepsi	10	25	65																						
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19	From the following data calculate the rank correlation coefficient after making adjustment for tied ranks. [10]	5	L2																						
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>X</td> <td>48</td> <td>33</td> <td>40</td> <td>9</td> <td>16</td> <td>16</td> <td>65</td> <td>24</td> <td>16</td> <td>57</td> </tr> <tr> <td>y</td> <td>13</td> <td>13</td> <td>24</td> <td>6</td> <td>15</td> <td>64</td> <td>20</td> <td>9</td> <td>16</td> <td>19</td> </tr> </table>	X	48	33	40	9	16	16	65	24	16	57	y	13	13	24	6	15	64	20	9	16	19		
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y	13	13	24	6	15	64	20	9	16	19															
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20	Fit a straight line to the following data [10] $y = a + bx$	5	L2																						
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