



End Term (Even) Semester Examination June 2025

Roll no.

Name of the Course and semester: B.TECH CSE (AI/ML SPECIALIZATION) IV

Name of the Paper: Statistical Data Analysis with R

Paper Code: TCS471

Time: 3 hour

Maximum Marks: 100

Note:

- (i) All the questions are compulsory.
- (ii) Answer any two sub questions from a, b and c in each main question.
- (iii) Total marks for each question is 20 (twenty).
- (iv) Each sub-question carries 10 marks.

Q1.	(2X10=20 Marks)	
a.	What is statistical inference ? Explain with an example how it's used in data analysis. Additionally, calculate the mean, median, and mode for: 28, 30, 32, 28, 35, 30, 28, 40	CO1
b.	Explain the difference between population and sample . Why is sampling used in statistics? Also, calculate the standard deviation when the marks obtained by 6 students are: 45, 55, 50, 60, 40, 65	
c.	Define prediction error in statistics. Find the mean using direct method for the data: Class Intervals: 10–20, 20–30, 30–40, 40–50 Frequencies: 5 10 6 4	
Q2.	(2X10=20 Marks)	
a.	i. Explain Bernoulli and Binomial distributions with examples. ii. A card is drawn from a well-shuffled pack. Find the probability that it is: (i) not a face card (ii) a red card (iii) a king	CO2
b.	i. A fair coin is tossed 5 times. Find the probability of getting: (i) at least 1 head (ii) exactly 3 heads ii. Define outliers . Why is it important to detect them during data analysis?	
c.	i. What is meant by correlation and covariance ? Explain the difference with examples. ii. Calculate the covariance if: $r = 0.8$, $\sigma_x = 4$, $\sigma_y = 5$	
Q3.	(2X10=20 Marks)	
a.	Explain the basic components of R programming . Write steps to install R and load a package with example code.	CO3
b.	How can you import a CSV file into R ? Show the function and explain the parameters.	
c.	Describe the use of data exploration in R with examples like <code>summary()</code> , <code>str()</code> and <code>head()</code> .	
Q4.	(2X10=20 Marks)	
a.	Explain different data structures in R . Illustrate with examples: vector, list, matrix, dataframe.	CO4&5
b.	Write an R program to merge and reshape two data frames .	
c.	How does a control structure (if-else / for loop) work in R? Give a real-world	



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	example.	
Q5.	(2X10=20 Marks)	
a.	Write an R function that takes a list of numbers and returns the mean and median .	CO5&6
b.	Create a boxplot and a bar chart for student marks using R	
c.	Explain t-test and chi-square test with R functions and simple examples.	