25U293 (Pages: 2) Name : .....

Reg. No : .....

SECOND SEMESTER UG DEGREE EXAMINATION, APRIL 2026

(FYUGP)

(Regular/Supplementary/Improvement)

CC24USTA2MN111 - STATISTICAL MODELING AND SAMPLING TECHNIQUES

(Statistics - Minor Course)

(2024 Admission onwards)

Time: 2.0 Hours Maximum: 70 Marks

Credit: 4

Part A (Short answer questions)

Answer ***all*** questions. Each question carries 3 marks.

1. Define skewness and explain how it affects the shape of a data distribution. [Level:2] [CO1]
2. Explain the visual differences between a mesokurtic, leptokurtic, and platykurtic distribution. [Level:2] [CO1]
3. Define sample size. [Level:2] [CO2]
4. Determine the normal equation to fit a straight line $y=a+bx+cx^2$. [Level:3] [CO3]
5. Classify between perfect positive and perfect negative correlation. [Level:2] [CO3]
6. Explain the relationship between correlation coefficient and regression coefficients. [Level:2] [CO3]
7. Provide the syntax to display numbers from 1 to 5 using a `while` loop in R. [Level:3] [CO4]
8. The following data represents the salaries of employees in a company (in thousands): `40, 45, 50, 55, 60, 65, 70, 75, 80, 85`. Provide an R code for calculating variance and standard deviation. [Level:3] [CO4]
9. Provide an R script to calculate Pearson's correlation between two variables: height (in cm) and weight (in kg). Use the following data: height = 150, 160, 170, 180, 190 and weight = 50, 60, 70, 80, 90. [Level:3] [CO4]
10. Given the data set: `30, 45, 55, 60, 65, 70, 80, 85, 95`, provide an R code for calculating inter quartile range. [Level:3] [CO4]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

Answer ***all*** questions. Each question carries 6 marks.

11. Explain the method of selecting a systematic sample. [Level:2] [CO2]

12. Calculate the percentile coefficient of kurtosis for the following data given below [Level:3] [CO1]

Interval	0-10	10-20	20-30	30-40	40-50
Frequency	20	25	30	10	5

13. Explain the importance of planning in the organization and execution of a large sample survey. [Level:2] [CO2]

14. Explain the main advantages of using sampling over a complete census in data collection. [Level:2] [CO2]

15. Explain what a questionnaire is and outline the steps involved in designing a well-structured questionnaire. [Level:2] [CO2]

16. Define non-sampling errors and explain how they differ from sampling errors. [Level:2] [CO2]

17. Following are the rank obtained by 10 students in two subjects, Statistics and Mathematics. Calculate Spearman's rank correlation coefficient. [Level:3] [CO3]

Statistics	1	2	3	4	5	6	7	8	9	10
Maths	2	4	1	5	3	9	7	10	6	8

18. You are given the following data: [Level:3] [CO3]

	X	Y
Arithmetic Mean	36	85
Standard deviation	11	8

(i) Calculate the two regression equations.

(ii) Estimate the value of X when Y=75.

(Ceiling: 36 Marks)

Part C (Essay questions)

Answer any ***one*** question. The question carries 10 marks.

19. The following represents the distribution of marks (out of 100) of students: [Level:3] [CO1]

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	5	7	15	20	25	10	8

Compute Karl Pearson's measure of skewness.

20. Calculate Karl Pearson's coefficient of correlation between imports and exports. [Level:3] [CO3]

Imports	46	68	72	75	80	70	93	100
Exports	64	50	39	48	52	46	40	30

(1 × 10 = 10 Marks)

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