25U292 (Pages: 2) Name : .....

Reg. No : .....

SECOND SEMESTER UG DEGREE EXAMINATION, APRIL 2026

(FYUGP)

(Regular/Supplementary/Improvement)

CC24USTA2MN105 - INTRODUCTION TO PROBABILITY

(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. Differentiate between positive and negative correlation with suitable examples. [Level:2] [CO1]
2. Discuss the merits of scatter diagram. [Level:2] [CO1]
3. Explain the two regression equations and their coefficients. [Level:2] [CO2]
4. Explain how to identify the two regression equations. [Level:2] [CO2]
5. What are mutually exhaustive events? Provide an example. [Level:1] [CO3]
6. Define Statistical Probability. [Level:1] [CO3]
7. In a class of 30 students, 18 like Mathematics, 15 like Science, and 10 like both subjects. What is the probability that a randomly selected student likes Mathematics or Science? [Level:3] [CO3]
8. Let A and B are two events with $P(A) = 0.6$, $P(B) = 0.7$ and $P(A \cap B) = 0.3$. Compute $P(A|B)$ and $P(B|A)$. [Level:3] [CO3]
9. What is the definition of a random variable? [Level:2] [CO4]
10. What are the properties of probability density function? [Level:2] [CO4]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

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

11. Calculate coefficient of correlation for the following data. [Level:3] [CO1]

X	2	3	4	5	6	7	8
Y	4	5	6	12	9	5	4

12. Explain the coefficient of determination. What would be your interpretation if the correlation coefficient 'r' equals 1 and 0.8, using the coefficient of determination. [Level:3] [CO1]

13. Two regression lines are given by $x + 2y - 5 = 0$ $2x + 3y - 8 = 0$ Calculate which is the regression line of x on y. Hence obtain the means of x and y. Also find the coefficient of correlation between x and y. [Level:3] [CO2]

14. You are given the following data: [Level:3] [CO2]

	X	Y
Arithmetic Mean	36	85
Standard Deviation	11	8

Correlation coefficient between x and y = 0.66. Calculate the two regression equations and estimate the value of x when y=75.

15. State and prove *multiplication law of probability.* [Level:3] [CO3]

16. A box contains 8 red, 3 white and 9 blue balls. If 3 balls are drawn at random, compute the probability that (1) All three are blue. (2) Two are red and one is white. (3) Atleat one is white. (4) One of each colour is drawn. [Level:3] [CO3]

17. Define probability mass function. A box contains 3 white, 4 red and 5 blue balls. 2 balls are taken at random. Compute the probability mass function of the number of blue balls. [Level:3] [CO4]

18. Define distribution function.For a discrete random variable X, if the PMF is given by $P(X = x) = \frac{1}{6}$ for $x = 1, 2, 3, 4, 5, 6$ what is the CDF $F(x)$? [Level:3] [CO4]

(Ceiling: 36 Marks)

Part C (Essay questions)

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

19. Judge X and Judge Y given the marks of 10 candidates in beauty contest.Compute the rank correlation coefficient. [Level:3] [CO1]

Judge X	50	60	70	65	80	85	90	92	40	96
Judge Y	60	70	75	60	80	82	86	90	50	95

20. From the data given below: [Level:3] [CO2]

Marks in Economics	25	28	35	32	31	36	29	38	38	32	30
Marks in Statistics	43	46	49	41	36	32	31	30	33	39	30

Calculate the two regression equations.

(1 × 10 = 10 Marks)

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