

25U287

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Name :

Reg. No :

SECOND SEMESTER UG DEGREE EXAMINATION, APRIL 2026

(FYUGP)

(Regular/Supplementary/Improvement)

CC24USTA2MN101 - PROBABILITY THEORY - I

(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. Explain distribution function and its properties. [Level:2] [CO1]
2. Explain properties of Poisson distribution. [Level:2] [CO1]
3. Explain expectation of a discrete random variable and its properties. [Level:2] [CO1]
4. Describe moment generating function(m.g.f). [Level:2] [CO1]
5. Explain normal distribution with mean, variance and m.g.f. [Level:2] [CO2]
6. Calculate mean of Rectangular distribution. [Level:2] [CO2]
7. Explain different types of regression. [Level:2] [CO3]
8. Explain the properties of 't' distribution. [Level:2] [CO4]
9. Explain properties of chi-square distribution. [Level:2] [CO4]
10. Discuss the difference between Parameter and Statistic. [Level:2] [CO4]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

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

11. Calculate mean, and m.g.f of Poisson distribution. [Level:3] [CO1]
12. If the mean and variance of a Binomial distribution are 4 and 2 respectively. Find the probability of (i) exactly five successes (ii) less than two successes. [Level:3] [CO1]

13. Given a discrete random variable X with probability distribution as.

[Level:3] [CO1]

x	0	1	2	3	4
f(x)	0.2	k	2k	k/2	0.1

- (i) Compute the value of k (ii) $2 P(X < 4)$

14. Describe Exponential distribution also find it's mean and m.g.f.

[Level:3] [CO2]

15. Calculate correlation coefficient from the following data and interpret the result.

[Level:3] [CO3]

Marks in English	30	40	5	20	10	45	22	18
Marks in Hindi	55	75	60	12	11	38	25	15

16. Compute rank correlation for the following data. The marks of 10 students in two subjects A and B are as follows.

[Level:3] [CO3]

A	45	20	48	18	36	41	50	28	32	49
B	42	36	45	26	40	47	51	23	31	44

17. Compute Spearman's rank correlation for the following data. The marks of 10 students in two subjects Economics and Statistics are as follows.

[Level:3] [CO3]

Economics	15	20	28	12	40	60	20	80
Statistics	40	30	50	30	20	10	30	60

18. Describe Chi-square distribution and also derive it's mean and variance.

[Level:3] [CO4]

(Ceiling: 36 Marks)

Part C (Essay questions)

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

19. The height of the school children of one institution is normally distributed with mean of 54 inches and S.D of 12 inches. Calculate in what percentage of students have height (i) between 46 and 56 inches (ii) greater than 50 inches.

[Level:3] [CO2]

20. Determine the two regression lines from the data given below.

[Level:3] [CO3]

X	42	44	58	55	89	98	66
Y	56	49	53	58	65	76	58

Estimate the value of X when Y is expected to be 72 and the value of Y when X is expected to be 85.

(1 × 10 = 10 Marks)
