

**SECOND SEMESTER UG DEGREE EXAMINATION, APRIL 2025**  
**(FYUGP)**  
**CC24USTA2MN103 - REGRESSION AND PROBABILITY THEORY**  
 (Statistics - Minor Course)  
 (2024 Admission - Regular)

Time: 2.0 Hours

Maximum: 70 Marks

Credit: 4

**Part A (Short answer questions)**

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

1. Explain quartile deviation. Write demerits of quartile deviation. [Level:2] [CO1]
2. Calculate range of 100, 200, 50, 20, 300, 250. [Level:3] [CO1]
3. Explain the concept of regression and give an example. [Level:2] [CO2]
4. Explain random experiment. Give two examples. [Level:2] [CO3]
5. Explain classical definition of probability. Compute the probability of getting a head when a coin is tossed. [Level:3] [CO3]
6. Distinguish between axiomatic and classical definition of probability. [Level:3] [CO3]
7. Describe mutually exclusive events. [Level:2] [CO3]
8. Let A, B and C are three events,  $P(A) = 0.17, P(B) = 0.23, P(C) = 0.46, P(A \cap B) = 0.0391, P(A \cap C) = 0.0782, P(B \cap C) = 0.1058$  and  $P(A \cap B \cap C) = 0.035$ . Determine whether A, B and C are mutually independent. [Level:3] [CO4]
9. Explain independence of two events. If  $P(A) = 0.5, P(B) = 0.4$  and  $P(A \cap B) = 0.2$ . Check whether A and B are independent. [Level:2] [CO4]
10. State multiplication law of independent events. Calculate the probability of getting two heads when tossing two fair coins. [Level:3] [CO4]

**(Ceiling: 24 Marks)**

**Part B (Paragraph questions/Problem)**

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

11. Calculate standard deviation of 129, 131, 125, 130, 126, 122. [Level:3] [CO1]
12. Compute quartile deviation and coefficient of quartile deviation for the data 20, 30, 25, 35, 40, 42, 50, 26, 28. [Level:3] [CO1]
13. Draw scatter diagram and comment on correlation. [Level:3] [CO2]

<b>X</b>	1	3	4	6	8	9	11	14
<b>Y</b>	1	2	4	4	5	7	8	9

14. Explain the meaning and significance of the concept of correlation. [Level:2] [CO2]

15. Calculate regression line equation Y on X from the following data [Level:3] [CO2]

<b>X</b>	1	2	3	4	5
<b>Y</b>	25	30	35	40	45

16. Discuss addition theorem for mutually exclusive events and not mutually exclusive events. [Level:3] [CO3]

17. Define conditional probability. If  $P(A) = 1/13$ ,  $P(B) = 1/4$  and  $P(A \cap B) = 1/52$  compute (i)  $P(A/B)$  (ii)  $P(B/A)$ . [Level:3] [CO4]

18. A spam detector categorises emails as spam or not spam. 20% are spam. The spam detector correctly identifies 95% of spam emails and incorrectly classifies 5% of non-spam emails as spam. If an email is classified as spam, what is the probability it is actually spam? [Level:3] [CO4]

(Ceiling: 36 Marks)

**Part C (Essay questions)**

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

19. Prices of a particular commodity in 5 years in 2 cities are given below. Compute CV and find which city is more stable [Level:3] [CO1]

Price in city A	25	24	19	17	19
Price in city B	20	21	23	30	22

20. Compute the Karl Pearson's coefficient of correlation for the following data. [Level:3] [CO2]

<b>X</b>	39	65	62	90	82	75	25	98	36	78
<b>Y</b>	47	53	58	86	62	68	60	91	51	84

(1 × 10 = 10 Marks)

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