QP CODE: D2BST2402	(Pages: 3)	Reg. No : .....
		Name : .....

SECOND SEMESTER FYUGP EXAMINATION, APRIL 2025

MINOR COURSE

STA2MN103 : Regression and Probability Theory

(Credits: 4)

Time: 2 Hours **Maximum Marks: 70**

Section A

Answer the following questions. Each carries 3 marks (Ceiling: 24 marks)

1.	Define coefficient of variation and state its use.	BL1	CO1
2.	Define range. Discuss its merits and demerits.	BL1	CO1
3.	What is meant by correlation between two variables?	BL1	CO2
4.	What are the important properties of regression coefficients ?	BL1	CO2
5.	From the scatter diagram how do you intepret the nature of relationship between the variables?	BL2	CO2
6.	What is random experiment? Give examples.	BL1	CO3
7.	Define statistical definition of probability.	BL1	CO3
8.	Suppose an unbiased coin is tossed three times. Find the probability of: (i) At least one head (ii) At most one head (iii) Exactly one head (iv) At least two head.	BL2	CO4
9.	State multiplication theorem of probability	BL1	CO3
10.	If A and B are two events such that P(A) = 1/3 , P(B) = 1/4 and $P(A \cap B) = 1/8$. Find P(A|B) and P(A|B^C).	BL2	CO5

(PTO)

Section B

Answer the following questions. Each carries 6 marks (Ceiling: 36 Marks)

11.	Calculate Quartile deviation and its coefficient to the following data: Variable: 10, 20, 28, 34, 40, 50 Frequency: 15, 18, 10, 13, 12, 8	BL2	CO1
12.	Explain the main difference between regression and correlation.	BL1	CO2
13.	Explain why there are two regression equations. Under what conditions can there be one regression equation?	BL2	CO2
14.	Compute the correlation coefficient for the following data: X : 68 63 48 78 58 43 Y : 17 21 26 45 34 65	BL2	CO2
15.	If P(A) = 0.39, P(B) = 0.21 and P(A or B) = 0.47. Find the probability that (a) Neither A nor B will occur. (b) Both A and B will occur. (c) $P(A^c)$ and $P(B^c)$	BL2	CO3
16.	A Company has 35 female employees and 65 male employees. If two employees are selected at random, what is the probability that : (i) Both will be males. (ii) Both will be females. (iii) There will be one of each sex.	BL2	CO3
17.	Let S = { a , b , c , d } be an equi probable space and consider the events, A = {a , b } , B = { b , d } , C = { a , d }. Show that A, B , C are pair wise independent but they are not total independent.	BL1	CO5
18.	(a) Define independent events. (b) The probability that Mr. A will solve a problem in statistics is 2/5 and the probability that Mr. B will solve that problem is 3/8. If they try independently, then what is the probability that (i) Both will solve the problem. (ii) At least one will solve the problem. (iii) None will solve the problem.	BL2	CO5

Section C

Answer any one question. Each carries 10 marks (1 x 10 = 10 Marks)

19.	Calculate standard deviation from the following data.	BL2	CO1

Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30
Frequency	12	16	20	30	24	18

20.	Assume that a factory has two machines. Past records show that machine I produces 30% of the items of output and machine II 70% of the items of output. Further, 5% of the items produced by machine I were defective and only 1% produced by machine II were defective. If a defective item is drawn at random, what is the probability that the defective item was produced by machine I?	BL3	CO5

CO : Course Outcome

BL : Bloom's Taxonomy Levels (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)