Reg. No.: .....

Name: .....

University of Kerala

U8741

Second Semester FYUGP Degree Examination, April 2025

Discipline Specific Core Course

STATISTICS

UK2DSCSTA110 - STATISTICAL METHODS II

Academic Level: 100-199

Time: 1 Hour 30 Minutes(90 Mins.) **Max. Marks: 42**

Part A. 6 Marks.Time:6 Minutes.(Cognitive Level:Remember(RE)/Understand(UN)) Objective Type. 1 Mark Each.Answer all questions

Qn No.	Question	CL	CO
1	Each outcome of a random experiment is called ____	RE	4
2	State the general equation for a first-degree curve.	RE	3
3	The standard error helps in determining the _____ of the regression coefficients.	UN	3
4	Define zero correlation, positive correlation and negative correlation.	UN	1
5	Probability of the intersection of two mutually exclusive events is always _____.	UN	4
6	The coefficient of determination (R^2) can take negative values. State whether true or false.	UN	3

Part B.8 Marks.Time:24 Minutes.(Cognitive Level:Understand(UN)/Apply(AP))Short Answer. 2 marks each.Answer all questions

Qn No.	Question	CL	CO
7	List out the normal equations in fitting a straight line of the form $y = ax + b$.	UN	3
8	What is a scatter diagram?	UN	1
9	Write down the transformation used to fit a power curve $y = ax^b$.	AP	3
10	A bag contains 5 Red and 4 Black balls. Two balls are drawn at random. What is the probability that both of them are red	AP	4

Part C. 28 Marks.Time:60 Minutes (Cognitive Level:Apply(AP)/Analyse(AN)/Evaluate(EV)/Create(CR)) Long Answer.7 marks each.Answer all 4 Questions choosing among options * within each question

Qn No.	Question	CL	CO
11	A) Two dice are thrown.Let A be the event that the sum of the points on the faces shown is odd and let B be the event that the sum of numbers is 7.Describe i) the complete sample space ii)the events A and B iii)the probability of events A and B iv)the events A' and B' OR B) We have data on the relationship between fertilizer amount (X) and plant yield (Y) X 10 15 20 25 30	AP	4, 3

Qn No.	Question	CL	CO
	Y 25 32 45 50 58, Fit a linear curve $y = ax + b$ using the least squares method.		
12	A) Given X 10 15 20 25 30 35 40 and Y 11 13 16 20 27 34 41. Use the normal equations to determine the coefficients a, b, and c for the quadratic curve $y = ax^2 + bx + c$. Plot the original data points and the fitted curve on the same graph. Analyze the shape of the fitted curve. OR B) Hours Studied (X): 2, 3, 4, 5, 6, 20; Exam Scores (Y): 60, 65, 70, 75, 80, 95. a.) Calculate Pearson's correlation coefficient with and without the outlier (20, 95). Examine how the outlier affects the correlation and why it might be appropriate or inappropriate to remove it. b.) Explain the implications of the change in correlation for the relationship between study hours and exam scores.	AN	3, 1
13	A) Describe the construction and interpretation of a scatter diagram. How does it help in understanding the relationship between two variables? Provide a detailed example. OR B) Justify whether the angle between regression lines is a reliable measure of correlation strength.	EV	1, 3
14	A) Fit a straight line to this data and **design a control rule** that predicts part diameter and find the diameter with level 6: Machine setting(X) : 1 2 3 4 5 Diameter(Y): 10.2 10.5 10.9 11.2 11.5 OR B) You are designing a mystery game in which players must draw colored tokens from a hidden bag to unlock a secret door. The bag contains 12 white, 6 red, and 7 black tokens. To proceed to the next level, a player must draw exactly two white tokens and one black token in a single attempt. Calculate the probability that a player successfully complete the game. If you want to make the challenge easier, how many additional white tokens would you add to increase the probability by at least 10%?	CR	2, 4