

Reg. No.:



Y8742

Name:

University of Kerala

Second Semester FYUGP Degree Examination, June 2026

Discipline Specific Core Course

STATISTICS**UK2DSCSTA109 - STANDARD DISTRIBUTIONS, CORRELATION AND REGRESSION**

Academic Level: 100-199

2024 Admission onwards

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	Give the formula for Pearson coefficient of correlation.	RE	1
2	Write the expression for finding the characteristic function of a discrete random variable.	RE	3
3	State whether the statement “ Spearman rank correlation coefficient is the correlation between ranks of two variables” is True or False.	UN	1
4	A discrete uniform distribution is defined over k values. What is the sum of all probabilities? Options : A)k B)1/k C)1 D)2k	UN	4
5	X and Y are two random variables and $E(XY) = E(X) E(Y)$. Comment whether this relation is true for all random variables X and Y?	UN	2
6	If X and Y are two variates, there can be atmost Options : A)one regression line B) two regression lines C)three regression lines D)an infinite number of regression lines	UN	1

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	Given the marginal probability density functions of two independent random variables $f(y) = \frac{1}{y}$ and $f(x) = \frac{1}{1-x}$. Find their joint probability density function.	UN	2
8	A discrete uniform random variable X takes values from 2, 3, ..., 10. Write its pdf and find its mean?	UN	4
9	If $f(x, y) = 1$, when $0 < x < 1, 0 < y < 1$ is a joint probability density function. Calculate $P(X > 0.3, Y > 0.4)$.	AP	2
10	Draw scatter diagram for the following data $x : 3, 5, 7, 20$ $y : 4, 5, 10, 15$	AP	1

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) A random variable follows a discrete uniform distribution over $\{1, 2, 3, 4, 5\}$. Derive its mean, variance and moment generating function. OR B) Apply your understanding of regression analysis to determine the following: Given the	AP	4, 1

Qn No.	Question	CL	CO
	regression equations: $2y - 1.2x - 3.5 = 0$ and $2x - 0.8y - 4.2 = 0$, (i) correlation coefficient and regression coefficients. (ii) the means of the variables.		
12	A) Evaluate $E(X^2Y)$ and $P\left(X + Y \leq \frac{1}{2}\right)$ for $f(x, y) = x + y, 0 < x < 1, 0 < y < 1$. OR B) The chance of a student passing an exam is 0.6. 25 students write the exam in one year. If X is the number of students who pass the exam, suggest the distribution of X. Write down the probability density function of X. and find the probability that exactly 4 students pass the exam.	AN	2, 4
13	A) The initial summary statistics from 25 pairs of observations on (X, Y) are: $\sum x = 125, \sum y = 100, \sum x^2 = 650, \sum y^2 = 460, \sum xy = 508$. Upon verification, it was discovered that the pairs (6,14) and (8,6) were incorrectly recorded instead of the correct pairs (8,12) and (6,8) respectively. Evaluate the data given and construct the two corrected regression equations. Also find the corrected correlation coefficient ? OR B) A Binomial distribution has $n=6$ and $p=1/2$. Provide a real-life example to represent this distribution.	EV	1, 4
14	A) The rth raw moment of a particular distribution is $\mu_r' = r!$. Deduct the expression for the moment generating function and characteristic function using this information. OR B) The mean and variance of a discrete random variable taking values $X= 0, 1, 2, \dots$ is 5. Identify the distribution. Create a real life example following this distribution.	CR	3, 4