

Reg. No.:



Name:

University of Kerala

U9162

Second Semester FYUGP Degree Examination, April 2025

Discipline Specific Core Course

STATISTICS

UK2DSCSTA111 - DATA ANALYSIS USING R- I

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	Give the R function to determine the value of the probability density function of the t distribution.	RE	4
2	If correlation coefficient is zero then	RE	1
3	Write an R command to find the 95th percentile of a normal distribution with a mean of 100 and a standard deviation of 15.	UN	5
4	Correlation coefficient is invariant under changes of	UN	2
5	What do you mean by a statistic?	UN	4
6	The regression equation $y = ab^x$ is converted to a linear equation of the form $Y = A + Bx$, then $B =$	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	Explain how will you compare two regression equations in terms of coefficient of determination.	UN	1
8	Define Binomial Distribution. Provide a situation where Binomial distribution is appropriate	UN	4
9	An average of 2 cars arrive at a gas station every 10 minutes. The number of cars arriving per 10-minute interval follows a Poisson distribution. Write the R program to calculate the probability that 5 cars will arrive at the gas station in a given 10-minute interval.Use the properties of the Poisson distribution and write a program in R to find the expected number of cars arriving at the gas station in a 10-minute interval.	AP	4
10	Discuss the concept of correlation based on diagrammatic representation.	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) Explain the concept of a binomial distribution. How does it differ from other probability distributions? Provide an example of a real-world scenario where a binomial distribution would be applicable. OR B) The relationship between yield of a crop Y and the amount of fertilizer X applied to that crop has been formulated as $Y = ab^x$. Given the following data:	AP	4, 3

Qn No.	Question	CL	CO												
	<table><tr><td>X</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Y</td><td>44.4</td><td>54.6</td><td>63.8</td><td>65.7</td><td>68.9</td></tr></table> Explain how you will use R software to find the values a and b. Write down the R programming for the same.	X	0	1	2	3	4	Y	44.4	54.6	63.8	65.7	68.9		
X	0	1	2	3	4										
Y	44.4	54.6	63.8	65.7	68.9										
12	A) Analyse the differences in usage between <code>dnorm()</code>, <code>pnorm()</code>, and <code>qnorm()</code> in R. Explain their applications with suitable examples. OR B) Consider the ‘cars’ data built in R. There are two variables in the data viz, speed and stopping distance, and these are denoted by ‘speed’ and ‘dist’. Suppose you wish find a regression equation of ‘dist’ as dependent variable and ‘speed’ as independent variable. How will you get a primary information using a plot? What is the R command for getting such a plot? Suppose the plot shows a linear pattern. Then write the R programme to fit the variables with a simple linear regression model. Explain how you will interpret the results if you get the output for the values of the coefficients as follows with an R^2 value equal to 0.65107. coefficients: <table><tr><td>(Intercept)</td><td><u><code>cars\$speed</code></u></td></tr><tr><td>-17.579</td><td>3.932</td></tr></table>	(Intercept)	<u><code>cars\$speed</code></u>	-17.579	3.932	AN	5, 3								
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13	A) Give a brief explanation of advantages and limitations of Spearman’s rank correlation coefficient. OR B) Explain the procedure for fitting the regression equation of the form $y = ab^x$ in R. If the observations on the variables (x, y) are (5,130),(6,54),(7,24),(8,6),(9,3),(10,3), then write the R program to fit the above regression equation. Use some outputs of your imagination for the coefficients and R^2 value, explain how you will interpret the results.	EV	1, 3												
14	A) Create a comprehensive report on the application,importance and properties of normal distribution in Statistics OR B) Write R program to find Karl Pearson correlation coefficient if $n=25$, sum of the variables as 120 and 100, sum of square of the variables as 655 and 450, sum of the product of the variables as 1000.	CR	4, 2												