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Paper Code : BSCDA-403 Introduction to Regression Analysis

UPID : 004728

Time Allotted : 3 Hours

Full Marks : 70

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following : [1 x 10 = 10]
- (I) How many variables are there in a two way anova?
 - (II) What is the probability of committing a Type I error is called?
 - (III) The ratio of MST and MSE in ANOVA is known as _____ -
 - (IV) What is $\rho(X,Y)$ when X and Y are uncorrelated?
 - (V) If an anova test data has 20 data points then what is the total degrees of freedom?
 - (VI) What is the value range of correlational coefficient?
 - (VII) If no true variance exists between the groups, the ANOVA's F-ratio should be what?
 - (VIII) What is a confidence interval?
 - (IX) What is linear hypothesis?
 - (X) What is the method of maximum likelihood?
 - (XI) Write full form of ANOVA.
 - (XII) Write a use of confidence interval.

Group-B (Short Answer Type Question)

Answer *any three* of the following : [5 x 3 = 15]

2. Write a few lines about statistical significance. [5]
3. Write and explain the constants in the regression lines of Y on X and X on Y. [5]
4. I roll a fair die n times. Let X be the number of 1's that I observe and let Y be the number of 2's that I observe. Find $Cov(X,Y)$ and $\rho(X,Y)$. [5]
5. Write a few lines about Type 1 and Type II errors. [5]
6. Write about the assumptions of ANOVA. [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following : [15 x 3 = 45]

7. (a) What is the joint pdf of two random variables X and Y having the standard bivariate normal distribution with correlation coefficient ρ [3]
- (b) Let X and Y be jointly normal random variables with parameters $\mu_X, \sigma^2_X, \mu_Y, \sigma^2_Y$, and ρ . Find the conditional distribution of Y given $X=x$. [9]
- (c) What are the two questions arise about any hypothesized relationship between two variables? [3]
8. Draw the diagrams representing the following correlations. [15]
 - i. Strong positive
 - ii. Weak positive.
 - iii. No correlation
 - iv. Weak negative
 - v. Strong negative
9. (a) What are two types of tools that are used to address the questions of hypothesized relationship? [2]
- (b) Write a few lines about stating the research hypothesis. [5]
- (c) Write a few lines about stating the null hypothesis. [5]
- (d) Draw a normal with 95% level of significance. [3]
10. (a) Write key ideas of linear regression. [5]
- (b) Write Important Properties of Regression Line. [5]

(c) What are the Assumptions made in Linear Regression? [5]

11. (a) Write and elaborate two common methods of point estimatirs. [10]

(b) Write at least three differences between correlation and regression. [5]

*** END OF PAPER ***