LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **STATISTICS**

FIFTH SEMESTER – **NOVEMBER 2022**

UST 5503 – REGRESSION ANALYSIS

Date: 28-11-2022   Dept. No.   Max. : 100 Marks
Time: 09:00 AM - 12:00 NOON

PART - A

Answer ALL the questions.   **10 × 2 = 20**

1) Interpret the simple linear regression model Y = -0.2 + 0.7X.

2) List the assumptions made on error term in regression model.

3) Differentiate Mean Absolute Error and Mean Absolute Percentage error.

4) What does a high Anderson-Darling value mean in normality test?

5) What is the relationship between R^2 and F in MLRM?

6) When do we test on partial regression coefficient?

7) When dummy variables are used?

8) What is outlier?

9) What is meant by multicollinearity?

10) What is the need for homoscedasticity in regression model?

PART – B

Answer Any FIVE questions.   **5 × 8 = 40**

11) Carryout the test procedure to test the hypothesis H_0: $\beta_1 = 0$ against H_1: $\beta_1 \neq 0$ and obtain 95% confidence interval of β_1 in Simple Linear Regression model.

12) Obtain the interval estimation of mean response.

13) Explain QQ-plot and PP-plot.

14) Prove that $\hat{\beta} = (X'X)^{-1} X'Y$ in Multiple Linear Regression model.

15) Obtain $V((\hat{\beta}) = \sigma^2 (X'X)^{-1}$ in Multiple Linear Regression model.

16) Discuss various residual analysis methods to find whether observations are outliers.

17) Discuss model with interaction term involving dummy variables.

18) Write the procedure to detect the multicollinearity using variance inflation factor. How do you interpret VIF results?

PART – C

19) Prove that the least square estimates are Best Linear Unbiased Estimate in simple linear regression model.

20) a) Explain Kolmogrov Smirnov test for residuals. **(10 Marks)**

   b) Explain multiple linear regression model. Give its data matrix. **(10 Marks)**

21) a) Carryout the test procedure to test the overall significance of the model using ANOVA approach in MLRM. **(10 Marks)**

   b) Explain the test procedure to test the individual regression coefficient in MLRM. **(10 Marks)**

22) a) Explain the graphical procedure to test the normality assumption of error term used in regression analysis. **(10 Marks)**

   b) Discuss residual plot technique to test the constant variance assumption. **(10 Marks)**

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