LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **APRIL 2024**

UST 5503 – REGRESSION ANALYSIS

Date: 06-04-2024 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 NOON

PART - A

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

1. Explain the terms in Simple linear regression model.
2. Define MAPE.
3. Why is adjusted R^2 a better measure to evaluate model fit than R^2?
4. Write down the linear form of $Y = \beta_0 e^{\beta_1 X}$.
5. Give any two methods of detecting outliers
6. What is homoscedasticity?
7. Define outliers
8. What are the assumptions of linear regression model?
9. State any two methods to detect multicollinearity.
10. Define dummy variables.

PART - B

Answer Any FOUR questions. **4 X 10 = 40**

11. Explain the various assumptions of simple linear regression model.
12. Prove that the least square estimators for simple linear regression are unbiased.
13. Explain the Kolmogorov-Smirnov test for residuals.
14. An incomplete ANOVA table for the regression model of four independent variables with sample size 50 is:

Source	Sum of squares	Degrees of freedom	Mean sum of squares	F Ratio
Regression	-	-	-	46.55
Residual	125.97	-	-	
Total	-	-		

Complete the above table and find the coefficient of determination.

15. Draw a PP-plot for the following data.

X : 82 82 83 84 85 85 86 88 89 89

16. Discuss the residual plots in linear regression model.
17. Explain in detail about dummy variable trap.
18. Discuss the residual plots in linear regression model.

PART - C

Answer Any TWO questions. **2 X 20 = 40**

19. (a) Derive the least squares estimators of Simple Linear regression Model.
    (b) Explain Variance Influence Factor in Regression model.
20. (a) Draw a QQ plot for the following data:
    67.0, 66.0, 67.3, 67.5, 67.9, 68.2, 68.8, 69.6, 69.7, 80.0
    (b) Describe the Multiple linear regression model using matrix approach.
21. (a) Discuss the test for overall significance of a simple linear regression Model.
    (b) Explain the Anderson-Darling test for regression model diagnostics.
22. Fit a Simple Linear Regression model to the data given below & test for its overall significance.

Revenue ($000')	5	10	15	15	20	25	30	30	40	40

Investment in TV Advt. ($000')	1	1.5	2	3	3.5	3.5	4	5	6	9

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