LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **NOVEMBER 2016**

ST 5509 – REGRESSION ANALYSIS

Date: 03-11-2016   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

PART - A

Answer **ALL** questions. $(2 \, X \, 10 = 20 \, marks)$

1. Write the Simple linear regression model and explain the terms in the model.

2. Write down the test statistic for testing slope = 0 in simple linear regression model.

3. Define MAPE.

4. What is the use of PP Plots?

5. Write the expression of R^2 in MLRM.

6. Why adjusted R^2 is a better measure to evaluate model fit than R^2?

7. Define multicollinearity.

8. What are outliers?

9. Write down the linear form of $Y = \beta_0 \, e^{\beta_1 X}$.

10. Discuss the purpose of dummy variable in regression model

PART - B

Answer any **FIVE** questions. $(5 \, X \, 8 = 40 \, marks)$

11. List the various assumptions of linear regression model.

12. Explain QQ plots.

13. Describe the test procedure for testing a subset of regression coefficients equal to zero.

14. Explain the different types of transformations used in modelling.

15. Discuss the procedure to find an outlier and how to delete from the data.

16. Explain how the dummy variables can be used as intercept shifter and slope shifter.

17. An incomplete ANOVA table for the regression model $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$ with $n = 20$ is

    given:

Source	Sum of Squares	DF	Mean sum of Squares	F ratio
Regression	-	-	-	34.519
Residual	105.667	-	-	
Total				

   a. Complete the table.   b. Find adjusted R^2

18. The following data relates to length of service calls (in minutes) and number of units repaired:

Length of service calls (in Minutes)	23	49	74	96	109	149	154
No. of united repaired	1	3	4	6	7	9	10

Fit the regression model $Y = \beta_0 + \beta_1 X$.

PART - C

Answer any **TWO** questions. $(2\ X\ 20 = 40\ marks)$

19.   a.   Explain the test procedure for testing equality of regression coefficients.

      b.   Discuss in detail about testing the normality of error terms.

20.   a.   Describe the Multiple linear regression data model.

      b.   Explain the various methods of detecting multicollinearity.

21.   a.   Explain residual plots in detail.

      b.   Draw a QQ plot for the following data:

          67   66   67.3   67.5   67.9   68.2   68.8   69.6   69.7   80

22. Fit the regression model $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$ for the data given below and complete the

    ANOVA table. Also comment on your findings.

Score in the final(Y)	First Preliminary (X_1)	Second Preliminary (X_2)
68	78	73
85	82	79
90	90	92
55	68	67
65	70	66
75	79	75
81	89	84
79	81	82

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