LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **NOVEMBER 2019**

16/17UST5MC02 / ST 5509 – REGRESSION ANALYSIS

Date: 31-10-2019 Dept. No. Max. : 100 Marks

Time: 09:00-12:00

SECTION- A

Answer ALL questions **10X2=20**

1. Explain simple linear regression model.
2. Explain QQ plots.
3. Distinguish between R^2 and adjusted R^2.
4. Explain MAPE.
5. Explain multiple linear regression.
6. What are the conditions satisfied by the residuals in a multiple linear regression model?
7. What are outliers?
8. What are dummy variables? State their uses.
9. What is multicollinearity?
10. State any two assumptions on the error terms in a linear regression model.

SECTION- B

Answer any FIVE questions **5X8=40**

11. Explain test procedure for testing the significance of the slope parameter in a simple linear regression model.
12. Write a note on Anderson Darling test.
13. Show that least square estimators of the intercept and slope parameters of a simple linear regression model are unbiased.
14. Discuss the role of dummy variable trap in the study of interaction effects.
15. Explain the transformation of nonlinear models to achieve linearity.
16. Explain Kolmogrov Smirnov test.
17. Build a simple linear regression model using the following data:

Heart rate at rest (Y)	62	45	40	55	64	53
Body Weight (X)	90	86	67	89	81	75

18. Write a note on detection and removal of outliers.

SECTION- C

Answer any TWO questions **2X20=40**

19. (i). Derive the least square estimators of simple linear regression model. **(10)**

    (ii). Explain residual plots in detail**.** **(10)**

20. Build a Multiple linear regression model for the following data: **(20)**

Sales in thousands(Y)	10	6	5	12	10	15	5	12	17	20
Price per Gallon (X_1)	1.3	2	1.7	1.5	1.6	1.2	1.6	1.4	1	1.1
Advertising (hundreds of dollars)	9	7	5	14	15	12	6	10	15	21

21. (a) Describe the test procedure for testing the overall significance of a multiple regression model. **(10)**

    (b) What are the sources of multicollinearity? Explain variance inflation factor method of diagnosing multicollinearity. **(10)**

22. Find MAE and MAPE for the following**:** **(20)**

Time Period	1	2	3	4	5	6	7	8	9	10
Observed y	58	54	60	55	62	62	65	63	70	68
Forecast y	60	67	56	65	63	63	64	60	72	70

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