LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIFTH SEMESTER – **APRIL 2018**

ST 5509– REGRESSION ANALYSIS

Date: 07-05-2018 Dept. No. Max. : 100 Marks

Time: 09:00-12:00

PART A

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

1. What do we mean by linear regression model?
2. Define Mean Absolute Error.
3. Explain the need for QQ plots.
4. What are outliers?
5. Describe multiple linear regression model.
6. Write the expression for adjusted R^2 in multiple linear regression model.
7. Discuss the purpose of dummy variables in linear regression model.
8. Define Hat matrix.
9. Define multicollinearity.
10. Mention the test procedures for studying the normality of error terms.

PART B

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

11. Describe the test procedure for testing slope and intercept of simple linear regression model.
12. Write a note on Anderson Darling test.
13. Discuss the procedure of constructing confidence interval for slope and intercept of simple linear regression model.
14. Explain the test procedure of overall significance of multiple linear regression model.
15. Write a detailed note on residual plots.
16. Explain various types of transformation that can be used for modelling.

17. Fit a regression model $Y = \beta_0 + \beta_1 X$ for the data relating to heart rate at rest (Y) to body weight in kilograms (X)

X	90	86	67	89	81	75
Y	62	45	40	55	64	53

18. Draw QQ plot for the followingdats:

97, 96, 97.4, 97.2, 98.2, 97.8, 99.6, 98.9, 100, 99.7

PART C

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

19. a. Derive the least square estimators of β in simple linear regression model. **(12)**

b. List the assumptions of linear regression model. **(8)**

20. a. Explain different methods of diagnosing the problem of multicollinearity. **(12)**

b. Write a note on Kolmogrov-Smirnov test. **(8)**

21. Discuss in detail about methods of scaling residuals**.** **(20)**

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

Period	2001	2002	2003	2004	2005	2006
Observed(y)	112	132	129	140	145	120
Forecast ($\hat{y}$)	112	120	122	130	130	140
Period	2007	2008	2009	2010	2011	2012
Observed(y)	140	135	140	130	140	144
Forecast ($\hat{y}$)	130	132	135	138	136	136

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