LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **STATISTICS**

FIRST SEMESTER – APRIL 2010

ST 1816 - APPLIED REGRESSION ANALYSIS

Date & Time: 03/05/2010 / 1:00 - 4:00 Dept. No. Max. : 100 Marks

SECTION – A

Answer All the questions. (10 x 2 = 20 Marks)

01. Define a simple linear regression model.
02. Write the significance of R^2 in regression model.
03. Define variance inflation factor.
04. Write the properties of hat matrix.
05. Define PRESS statistic.
06. What is Box-Cox method?
07. Write any two uses of dummy variables.
08. Provide four primary sources of multicollinearity.
09. Distinguish between least square and ridge regressions.
10. Define link function.

SECTION – B

Answer any Five questions. (5 x 8 = 40 Marks)

11. Derive the least square estimators of parameters of a simple linear regression model.
12. Write the properties of the least squares fit.
13. Explain test procedure for multiple linear regression.
14. Explain any two methods for scaling residuals.
15. Write about variance-stabilizing transformations.
16. What are the important considerations that arise when fitting a polynomial in one variable?
17. Explain the consequences of model misspecification.
18. Explain the effects of multicollinearity.

SECTION – C

Answer any Two questions. (2 x 20 = 40 Marks)

19. The weight and systolic blood pressure of 18 randomly selected males in the age group 25-30 are shown below:

Weight:	165	167	180	155	212	175	190	210	200	149
	158	169	170	172	159	168	174	185		
Systolic BP:	130	133	150	128	151	146	150	140	148	125
	133	135	150	153	128	132	149	158		

i. Fit a simple linear regression model. (8)
ii. Test the hypothesis $H_0 : \beta_1 = 0$ (5)
iii. Calculate R^2 (2)
iv. Find a 95% confidence interval on the slope (5)

20. (a) Derive a formal test for lack of fit of the regression model. (15)
(b) Write a note on generalized and weighted least squares. (5)

21. (a) Explain the use of orthogonal polynomials in fitting a model. (6)
(b) Explain in detail the criteria for evaluating subset regression models. (14)

22. (a) Explain the techniques used in detecting multicollinearity. (14)
(b) Write a note on non linear regression models. (6)

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