LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**M.Sc.** DEGREE EXAMINATION - **STATISTICS**

FIRST SEMESTER – NOVEMBER 2010

# ST 1816 - APPLIED REGRESSION ANALYSIS

Date : 03-11-10 Dept. No. Max. : 100 Marks

Time : 1:00 - 4:00

**SECTION - A**

**Answer all the questions. 10 x 2 = 20 marks**

1. Write any two properties of least squares estimators of multiple linear regression model.

2. Distinguish between R2 and adjusted R2 statistics.

3. Provide any two examples for linearizing non-linear models.

4. Give an example for a quantitative regressor expressed in terms of indicator variables.

5. Define Mallows’s CP statistic.

6. Define ridge estimator.

7. When do we use piecewise polynomial fitting?

8. Write a note on kernel regression.

9. Define logistic response function.

10. Write a note on Poisson regression.

**SECTION-B**

**Answer any five questions 5 x 8 = 40 marks**

11. Show that the maximum likelihood estimator for the model parameters in multiple linear

regression when the model errors are normally and independently distributed are also least

square estimators.

12. Explain the two popular scaling techniques in computing standardized regression

coefficients.

13. Explain the fitting of regression model with two indicator variables.

14. Write about four primary sources of multicollinearity among regressors.

15. Write the procedure of principal components for obtaining biased estimators of regression

coefficients.

16. How will you predict the response over the range of the data using locally weighted

regression approach ?

17. How will you estimate parameters in a non-linear system?

18. Briefly explain models with a binary response variable.

-2-

**Section -C**

**Answer any two questions 2 x 20 = 40 Marks.**

19. (a) Derive the least squares estimators of model parameters for multiple linear regression

model.

(b) Carryout the test for significance of regression for a multiple linear regression model.

(10 + 10 Marks)

20. (a) Present a formal statistical test for the lack of fit of a regression model.

(b) Explain some variance stabilizing transformations. (15 + 5 Marks)

21. (a) Explain piecewise polynomial fitting (splines).

(b) Elaborately write the use of orthogonal polynomials in fitting regression models.

(10+10) marks

22. (a) Explain the fitting of polynomial models in two or more variables.

(b) Write about Link functions, linear predictor and canonical link for the generalized linear

model. (10 + 10 Marks)

\*\*\*\*\*\*\*\*