ST.JOSEPH'S UNIVERSITY, BENGALURU -27
M. Sc. STATISTICS – II SEMESTER
SEMESTER EXAMINATION: APRIL 2023
(Examination conducted in May 2023)
ST8421: Linear Models and Regression Analysis
(For current batch students only)

Time: 2 Hours   **Max Marks: 50**

This paper contains ONE printed page and ONE part

I   Answer any FIVE of the following   10 X 5 = 50

1. a) Write a model for less than full rank with assumptions.   (3)

    b) State and prove a necessary and sufficient condition for a linear parametric
       function to be estimable in a linear model.   (4)

    c) Show that regression sum of squares and error sum of squares are
       independent in a full rank model.   (3)

2. a) Define multiple linear regression models. Discuss estimation of parameters in
       multiple linear regression models.   (5)

    b) Describe the role of residual analysis in measuring the model adequacy.
       Explain any two methods of residual scaling.   (5)

3. a) Explain Poisson regression model.   (4)

    b) Describe Box-Cox transformation.   (3)

    c) Explain generalized least square method of estimation.   (3)

4. a) What are the sources of multicollinearity? What are the effects of multicollinearity
       on the properties of OLS estimators?   (3)

    b) Describe two diagnostic methods for multicollinearity.   (4)

    c) How to detect influential and leverage observations.   (3)

5. a) What is ridge regression? Explain advantages of ridge estimator.   (4)

    b) Describe how to detect the presence of autocorrelation in the data and its
       consequences in regression analysis. Also describe a test procedure for

autocorrelation. (6)

6. a) Explain heteroscedasticity. (3)

b) Describe variance stabilizing transformation for constant variance. (4)

c) Explain lack of fit test. (3)

7. a) Explain any two methods of subset selection of regressors. (6)

b) Discuss about validation study in regression model. (4)

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