

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2022
(Regular/Improvement/Supplementary)

STATISTICS
FMST2C07: REGRESSION ANALYSIS

Time: 3 Hours

Maximum Weightage: 30

Part A: Answer any *four* questions. Each carries 2 weightage.

1. In a simple regression model show that the least square estimators of the model parameters are Best Linear Unbiased Estimators (BLUE).
2. Distinguish between R^2 and adjusted R^2 . How they are useful in regression analysis?
3. What are standardized and studentized residuals?
4. In a simple regression model, under usual assumptions, obtain an unbiased estimator of σ^2 .
5. What are indicator variables? Explain its application in regression analysis using an example.
6. Distinguish between leverage point and influential point using examples.
7. Explain link function, linear predictor and canonical link.

(4 × 2 = 8 weightage)

Part B: Answer any *four* questions. Each carries 3 weightage.

8. In a simple regression model $y = \beta_0 + \beta_1 x + \varepsilon$, under usual assumptions to be stated, test the hypothesis $H_0 : \beta_1 = 0$.
9. State Gauss-Markoff theorem. Point out its applications in regression problems.
10. Write explanatory note on Mallows's C_p statistic. Explain its applications.
11. Explain various variance stabilizing transformation techniques using suitable examples.
12. Explain the procedure for fitting polynomial regression models involving two variables.
13. What are orthogonal polynomials? Point out the advantages of using orthogonal polynomials in regression models.
14. Write explanatory notes on Residual analysis and the phenomena of over dispersion in GLM.

(4 × 3 = 12 weightage)

(P.T.O.)

Part C: Answer any *two* questions. Each carries 5 weightage.

15. In a multiple regression model when the model errors are normally and independently distributed, obtain the maximum likelihood estimators of the model parameters. Compare these estimators with least square estimators.
16. Explain the “variable selection problem” in regression analysis. Outline stepwise regression methods for the selection of best subset of possible candidate regressors.
17. Explain Non-parametric regression. Outline Kernel regression and Locally Weighted Regression Methods.
18. Describe Generalized Linear Models. Explain Logistic and Poisson regression models.

(2 × 5 = 10 weightage)