D2AST2202 **(2 Pages)** **Name:…….**
Reg. No……..……

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2023
(Regular/Improvement/Supplementary)

STATISTICS
FMST2C07: REGRESSION ANALYSIS

Time: 3 Hours **Maximum Weightage: 30**

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

1. Write the linear model for simple linear regression. Find its Least square estimator of parameters.
2. What is the coefficient of determination? Provide the formula for calculating it in the context of simple linear regression.
3. What is the Gauss-Markov linear model? What assumptions are required for this model to hold?
4. What are some common methods for checking the adequacy of a linear regression model?
5. What is polynomial regression modeling and how does it differ from linear regression modeling?
6. What is kernel regression and how does it work?
7. What is non-linear regression and how does it differ from linear regression modeling?

(4 × 2 = 8 weightage)

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

8. What is a generalized linear model and how does it relate to the logistic and Poisson regression models?
9. Explain the use of confidence intervals of parameters of simple linear regression. Find confidence intervals for slope and intercept.
10. State and prove Gauss-Markov theorem.
11. How is the variance of the error term estimated in a linear regression model?
12. Explain the simple linear regression model. Derive the Estimator by maximum likelihood.
13. How are polynomial models in one variable constructed? What are some common applications of these models?
14. What are orthogonal polynomials? How are they used in polynomial regression modeling?

(4 × 3 = 12 weightage)

(P.T.O.)

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

15. What is residual analysis and what steps can be taken to address any issues identified during this analysis? Provide a brief explanation.

16. What are some limitations of the Gauss-Markov linear model and what alternatives are available for modeling data that does not meet its assumptions?

17. a) What is variable selection in regression modeling and why is it important?

    b) What are indicator variables and how can they be used to model categorical data?

18. a) What is the logistic regression model and how is it used in binary classification problems?

    b) What is the Poisson regression model and how is it used in count data analysis?

(2 × 5 = 10 weightage)