D2AST2002 **(2 Pages)** **Name.....**

Reg.No.....

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2021

STATISTICS

FMST2C07: REGRESSION ANALYSIS

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

Part A: *All* questions can be answered. Each carries *two* weightage (Ceiling 6 weightage).

1. What is a simple linear regression model? What are the assumptions for this model?
2. Define coefficient of determination. How do you calculate it from the sum of squares? What are its implications on the model?
3. What is the role of residual analysis in model checking?
4. Explain any three transformations for linearizing the model.
5. What do you mean by polynomial regression? How do you select the order of the model?
6. What do you mean by a Generalized linear model (GLM)? What are the assumptions in this model? Explain the limitations of GLM.
7. Explain logistic regression model.

Part B: *All* questions can be answered. Each carries *four* weightage (Ceiling 12 weightage).

8. Obtain the 95% confidence interval for the regression coefficients in simple linear regression model.
9. Explain hypothesis testing for the slope and intercept of the simple linear regression model.
10. Given that Y_1, Y_2, Y_3 are random variables with means $\mu_1 + \mu_2$, $\mu_1 + \mu_3$ and $\mu_3 + \mu_2$ respectively and a common variance σ^2. Then show that $l_1\mu_1 + l_2\mu_2 + l_3\mu_3$ is estimable if and only if $l_1 = l_2 + l_3$.
11. Describe the method of locally weighted regression.
12. What are indicator variables? Explain in detail its use in multiple regression model.
13. Describe Poisson regression model and its estimation.
14. Explain link functions and linear predictors with respect to GLM.

(PTO)

Part C: *All* questions can be answered. Each carries *six* weightage (Ceiling 12 weightage).

15. Let $Y_i = \beta_0 + \beta_1 x_i + \in_i$ for i=1,2,...,n where $E(\in) = 0$ and $var(\in) = \sigma^2 I_n$. Find the least square estimators of β_0 and β_1. Also find covariance between the estimators.
16. State and prove Gauss Markov theorem for a simple linear regression.
17. Describe the method of fitting orthogonal polynomials.
18. Explain Forward selection, Backward elimination and Stepwise regression methods.