D5BEM2302 **Reg. No..............................**

Name: ....

FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2025
(Regular/Improvement/Supplementary)
ECONOMICS & MATHEMATICS (DOUBLE MAIN)
GDEC5B07T: ECONOMETRICS I

Time: 2 ½ Hours **Maximum Marks: 80**

SECTION A: Answer the following questions. Each carries *two* marks.
(Ceiling 25 marks)

1. What is adjusted R^2, and why is it important?
2. Define dummy variables and their role in regression analysis.
3. What is the effect of autocorrelation on the efficiency of OLS estimates?
4. Define omitted variable bias.
5. Define the Sample Regression Function (SRF).
6. What is the purpose of a t-test in regression analysis?
7. When would you use a log-lin regression model?
8. What is an error of measurement?
9. What distinguishes econometrics from pure economics and statistics?
10. State the goals of econometrics.
11. What does a high Variance Inflation Factor (VIF) indicate?
12. What do you mean by heteroscedasticity in a regression model?
13. The estimated saving function of 100 sample households are:

    $$\hat{Y} = -30 + .54\,X$$

    Interpret the slope and intercept.
14. Comment on the relevance of p-value.
15. What do you mean by degrees of freedom?

SECTION B: Answer the following questions. Each carries *five* marks.

(Ceiling 35 marks)

16. Explain the Ramsey RESET test and how it is used to detect specification errors.
17. Discuss the concept of restricted least squares and provide an example of where it might be used.
18. Discuss the methodology of econometrics.

19. Describe the process and purpose of Maximum Likelihood Estimation (MLE) in econometrics.
20. Discuss the importance of the normality assumption and its role in hypothesis testing within regression analysis.
21. Explain the matrix approach to estimation in regression analysis and its advantages.
22. Discuss various methods to address heteroscedasticity in a regression model.
23. Based on a sample size of 500, the following simple regression was estimated by regressing annual income (Y) on years of education (X):

    $\hat{Y} = 20000 - 2500\,X$

    a. What is the predicted annual income when X = 0?
    b. What about X=16?
    c. Comment on the difference between the predicted incomes for X=0 and X=16.

SECTION C: Answer any *two* questions. Each carries *ten* marks.

24. Explain multi collinearity, its causes, detection, and remedial measures.
25. Given the data set relating to output per hectare and labour employed for a particular crop. Estimate the yield as a function of labour and compute the marginal productivity of labour.

Yield	112	115	121	123	142	154	162	154	155	162
Labour in hours of work	360	450	250	360	254	450	310	345	425	496

26. Consider the model;

    $$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + u_i$$

    a. Explain the interpretation of the coefficients $\beta_0, \beta_1, and\ \beta_2$.
    b. Describe the Ordinary Least Squares (OLS) method for estimating the coefficients $\beta_0, \beta_1, and\ \beta_2$.
27. Evaluate the impact of model specification errors and measurement errors on the validity of regression analysis results. Discuss methods for detecting and correcting these errors.

(2 × 10 = 20 Marks)