C 2218 (Pages : 3) Name.....

Reg. No.....

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2021

Mathematics

ME 4C 04—MATHEMATICAL ECONOMICS

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *the twelve questions.*
Each question carries 1 *mark.*

1. What are the two types of econometrics ?
2. Give an example of an economic model.
3. What is the conditional expectation function or the population regression function ?
4. State Gauss-Markov Theorem.
5. What is the maximum value of the co-efficient of determination ?
6. Define correlation co-efficient.
7. What are the two branches of classical theory of statistical inference ?
8. What is the mean and variance of a standard normal variable ?
9. Define 'confidence interval'.
10. What is type I error ?
11. Give an example of a regression model that not linear in the variables.
12. What is Logarithmic Reciprocal Model ?

(12 × 1 = 12 marks)

Part B

Answer any **six** *questions in two* **or** *three sentences.*
Each question carries 3 *marks.*

13. Write a short note on Keynesian consumption function.
14. What is the difference between the population and sample regression functions ? Illustrate with an example.

Turn over

15. Given $E(u_i|X_i) = 0$, show that $E(Y_i|X_i) = \beta_2 + \beta_2 X_i$.

16. Show that the mean value of the estimated $Y = \hat{Y}_i$ is equal to the mean value of the actual Y in a sample : $\{(x_i, y_i) : i = 1, 2, ..., n\}$.

17. What are the classical normal linear regression model assumption for μ_i.

18. Under the normality assumption find the 100 $(1 - \alpha)$ % confidence interval for regression co-efficient β_2

19. Write a short note on Testing of hypothesis.

20. What are the three main features of reciprocal models ?

21. Find the elasticity of the log linear regression model ln Y = β_1 + β_2 ln X.

(6 × 3 = 18 marks)

Part C

Answer any **six** *questions from the following.*
Each question carries 5 *marks.*

22. Write any *five* properties of coefficient of correlation.

23. Show that the least-squares estimator $\hat{\beta}_2$ is linear.

24. Show that $\hat{\sigma}^2$ is an unbiased estimator of true σ^2.

25. What are the 5 important properties of OLS Estimators under the Normality Assumption on u_i.

26. Briefly discuss about maximum likelihood estimation of Two variable regression model.

27. Find the Confidence Intervals for Regression Co-efficients β_1.

28. Consider the following regression model : $1 / Y_i = \beta_1 + \beta_2 (1/X_i) + u_i$.

    (a) Is this a linear regression model ? Why ? Why not ?

    (b) How would you estimate this model ?

    (c) What is the behavior of Y as X tends to infinity ?

    (d) Can you give an example where such a model may be appropriate ?

29. How to measure the growth rate using the LogLin model ?

30. What is Log Linear regression model ? How to measure elasticity using this model ?

(6 × 5 = 30 marks)

Part D

Answer any **two** *questions from the following.*

Each question carries 10 *marks.*

31. Discuss various steps involved in the traditional econometric methodology.

32. Write the 10 Assumptions made in the classical linear regression model.

33. In the following table, you are given the ranks of 10 students in midterm and final examinations in mathematics. Compute Spearmans co-efficient of rank correlation and interpret it.

Midterm	:	1	3	7	10	9	5	4	8	2	6
Final	:	3	2	8	7	9	6	5	10	1	4

34. Why do we employ the normality assumption on μ_i.

(2 × 10 = 20 marks)