POST-GRADUATE DEGREE PROGRAMME
Term End Examination — December, 2024
ECONOMICS
Paper-IX : BASIC ECONOMETRICS

Time : 2 hours] [Full Marks : 50

Weightage of Marks : 80%

Special credit will be given for precise and correct answer. Marks will be deducted for spelling mistakes, untidiness and illegible handwriting. The figures in the margin indicate full marks.

Use of scientific calculator is strictly prohibited.

1. Answer any *four* of the following questions : $2\frac{1}{2} \times 4 = 10$

   a) Discuss the relation between econometrics and economic theory.

   b) Show that the regression coefficient ($\overset{\wedge}{\beta}$) is linear.

   c) What do you mean by Multiple regression analysis ?

   d) Explain Variance Inflation Factor test.

   e) What do you mean by Heteroscedasticity ?

   f) Describe in brief any one way to solve the problem of Autocorrelation.

2. Answer any *four* of the following questions : $5 \times 4 = 20$

   a) Derive the two normal equations in a two-variable linear regression model.

   b) State the assumptions of the Classical Linear Regression Model.

   c) Differentiate between Point estimation and Interval estimation.

   d) Mention the main sources of Multicollinearity problem.

   e) State the White test for detecting the problem of Heteroscedasticity.

   f) Define Autocorrelation. Describe in brief the structure of Autocorrelation problem.

3. Answer any *two* of the following questions :   10 × 2 = 20

a) Consider a model $Y = X\beta + u$, where the order of Y matrix is $n*1$, order of X is $n*k$, order of b is $k*1$ and order of u is $n*1$. The estimated regression equation is $\hat{Y} = X\hat{\beta}$. Prove that $\hat{\beta}$ is BLUE.

b) The following table shows twelve pairs of observation on X (price) and Y (quantity supplied).

Y	X
69	9
76	12
52	6
56	10
57	9
77	10
58	7
55	8
67	12
53	6
72	11
64	8

Assuming a linear supply function, estimate the supply function.

c) i)   How can the problem of Multicollinearity be detected ?

    ii) Discuss different ways to solve the problem of Multicollinearity.

                                                5 + 5

d) A researcher using time series data for the period 1954-65, estimated the following consumption function : $\hat{C} = 3 + 0 \cdot 9272\ X$. The following table includes the data used and the residual errors.

Year	Consumption (C)	Income (X)	e_i
1954	236	257	0·52
1955	254	275	1·82
1956	267	293	1·87
1957	281	309	2·71
1958	290	319	2·99
1959	311	337	1·30
1960	325	350	3·25
1961	335	364	0·26
1962	355	385	0·78
1963	375	405	2·23
1964	401	437	1·45
1965	431	469	1·14

Test for heteroscedasticity using Spearman's rank correlation coefficient.

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