POST-GRADUATE COURSE
Term End Examination — June, 2023/December, 2023
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) What do you mean by a linear regression model ?

    b) What is the role of the stochastic error term u_i in regression analysis ? What is the difference between the stochastic error term and the residual $\hat{u}_i$?

    c) What do you mean by heteroscedasticity ?

    d) State Durbin-Watson test for detecting autocorrelation problem.

    e) What are the major consequences of multicollinearity in a linear regression model ?

    f) What is Econometrics ?

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

    a) Briefly discuss the major goals of econometrics.

    b) Prove that the regression coefficient ($\hat{\beta}$) is a linear function of the dependent variable.

    c) State the assumptions of classical linear regression model.

    d) Briefly discuss the Goldfeld-Quandt test for detecting the problem of Heteroscedasticity.

[Turn over

e) How can autocorrelation problem be detected ?

f) Distinguish between the concepts of point estimation and interval estimation.

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

a) Discuss the BLUE properties of ($\hat{B}$) in a two-variable CLRM.

b) From a sample of 209 firms, Robin obtained the following regression results :

$$\log(\widehat{\text{salary}}) = 4 \cdot 32 + 0 \cdot 28 \log(\text{sales}) + 0 \cdot 017 R_{oe}$$

$$SE = (0 \cdot 32) \quad (0 \cdot 035) \quad (0 \cdot 004) \quad R^2 = 0 \cdot 283$$

Where Salary = Salary of CEO

Sales = annual firm sales

R_{oe} = Return on equity in per cent

and figures in the parentheses are the standard error (SE).

i) Which of the coefficients are individually statistically significant at 5% level ?

ii) What is the overall significance of the regression ?

iii) Interpret the results.

iv) Can you interpret the coefficient of R_{oe} as elasticity ? Why or why not ?

c) i) From a survey, we obtained the following regressions :

$$\hat{y} = 14 \cdot 4773 + 0 \cdot 0022x$$

$$se(\hat{\beta}_1) = 6 \cdot 1523$$

$$se(\hat{\beta}_2) = 0 \cdot 00032 \qquad y = \text{Number of cell phone subscribers}$$

$$r^2 = 0 \cdot 6023 \qquad x = \text{per capita income}$$

Interpret the above results. Comment on the value of r^2.

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ii) From a sample of 10 observations, the following results were obtained :

$$\sum Y_i = 1110, \; \sum X_i = 1700, \; \sum X_i, Y_i = 205500,$$

$$\sum X^2 = 322000, \; \sum Y^2 = 132100.$$

Correlation coefficient $r = 0 \cdot 9758$.

But on rechecking these calculations it was found that two pairs of observations were recorded as :

Y	X		Y	X
90	120	instead of	80	110
140	220		150	210

What will be the effect of this error on r ? Obtain the correct r.

d) Discuss different ways to solve the problem of multicollinearity.

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