

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2024

SECOND YEAR [BATCH 2022-25]

ECONOMICS [Honours]

Paper : CC 8

Date : 18/05/2024

Time : 11 am – 1 pm

Full Marks : 50

Answer **any five** from the following questions:

[5×10]

1. Consider the following regression, where the errors E_i are independently and identically distributed with mean '0' and variance 1.

$$y_i = \alpha + \beta(x_i - \bar{x}) + E_i, \quad i = 1, 2, \dots, n$$

Let $\hat{\alpha}$ & $\hat{\beta}$ be the ordinary least squares estimators of α & β respectively. Find the correlation coefficient between $\hat{\alpha}$ & $\hat{\beta}$.

10

2. Suppose we run OLS regression: $y_i = \alpha + \beta x_i + \epsilon_i$, where notations have their actual meanings. After this we get an estimate of $\hat{y}_i = \hat{\alpha} + \hat{\beta} x_i$. Now, we regress y_i on \hat{y}_i . Find the estimated slope coefficient of this regression.

10

3. a) Suppose your data produces the regression result $y = 10 + 3x$. Scale y by multiplying observation y by 0.9 and do not scale x . What are the new intercept and slope estimates?
b) Explain adjusted R^2 as a measure of goodness of fit. Illustrate how this measure is superior to standard R^2 .

5

2+3

4. Show that in simple linear regression model, the OLS estimator of the slope parameter is BLUE.

10

5. a) Explain the concept of heteroscedasticity with a suitable example.
b) Describe the way you can identify the presence of heteroscedasticity using graphical visualization technique.
c) State how the BLUE properties of OLS estimates of a standard regression equation get affected by presence of heteroscedasticity.
d) Explain the WLS technique (Weighted Least Square Technique) and describe how it can solve the problems associated with the presence of heteroscedasticity.

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2

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4

6. Show that, in the linear regression model of y on x , the conditional expectation $(E(y/x))$ is the best prediction.

10

7. a) Define the concept of Autocorrelation in the context of classical linear regression analysis.
b) Describe the graphical methods to identify the presence of Autocorrelation.
c) State the consequences of presence of Autocorrelation.
d) Describe the Durbin-Watson technique to identify the presence of Autocorrelation and mention its limitations.

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