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3 (Sem-6/CBCS) STA HE 1

2023

STATISTICS

(Honours Elective)

Paper : STA-HE-6016

(Econometrics)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions as directed :

1×7=7

(a) The regression model is linear in the parameters. (Write True **or** False)

(b) If $E(U_i U_j) = 0$ for $i \neq j \quad \forall i, j$ in the linear model $Y_i = \alpha + \beta X_i + U_i$, then the disturbance values are known as _____ . (Fill in the blank)

Contd.

- (c) What do you understand by BLUE?
- (d) Homoscedasticity refers to the error terms having
- zero mean
 - positive variance
 - constant variance
 - positive mean
- (Choose the correct option)
- (e) Data collected at a point in time is called _____. (Fill in the blank)
- (f) In $Y_i = \hat{\beta}_1 + \hat{\beta}_2 X_i + \hat{U}_i$, \hat{U}_i gives the differences between
- the actual and estimated Y values
 - the actual and estimated X values
 - the actual and estimated beta values
 - the actual and estimated U values
- (Choose the correct option)
- (g) For coefficient of determination r^2 for a regression model $0 \leq r^2 \leq 1$.
(Write True or False)

2. Answer the following questions : $2 \times 4 = 8$

- What do you understand by 'econometrics'?
- Define time series data.
- Write the objectives of econometrics.
- What is the significance of b_{yx} the regression coefficient of Y on X?

3. Answer **any three** from the following questions : $5 \times 3 = 15$

- Write a note on coefficient of determination r^2 .
- Write the assumptions in the three variable regression model
 $Y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + U_i$.
- Write a note on the scope of econometrics.
- Discuss the linear model used in econometrics.
- Write a note on autocorrelation.

4. (a) Estimate the parameters of the linear model $Y = \alpha + \beta X + U$. Show that $E(\hat{\alpha}) = \alpha$, $E(\hat{\beta}) = \beta$ where $\hat{\alpha}$ and $\hat{\beta}$ are least square estimators for α and β . Also find standard errors of $\hat{\alpha}$ and $\hat{\beta}$.
3+3+4=10

Or

- (b) State and prove Gauss-Markov theorem. 10

5. (a) Discuss the properties of least square estimators. 10

Or

- (b) Discuss the limitations of econometrics. Also describe the methodology involved in an econometric model. 5+5=10

6. (a) Write short notes on : 5×2=10
(i) Multicollinearity
(ii) Heteroscedasticity

Or

- (b) Write a note on hypothesis testing. Explain how you would construct 95% confidence intervals for the parameters α and β in the simple linear model $Y = \alpha + \beta X + U$. 4+3+3=10