3 (Sem–6/CBCS) STA HE 1

2025

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 :
   $1 \times 7 = 7$

   (a) A constant is always fixed but a parameter is fixed only for a given time period. *(State True **or** False)*

   (b) Data collected for a variable over a period of time is called

   (i) Cross-sectional data

   (ii) Time series data

   (iii) Pooled data

   (iv) Panel data
   (Choose the correct option)

(c) When a model is extended to include more than one explanatory variable, it is called a _____ regression model.
(Fill in the blank)

(d) Coefficient of determination measures

    (i) The correlation between X and Y

    (ii) The residual sum of squares as a portion of the total sum of squares

    (iii) The explained sum of squares as a portion of the total sum of squares

    (iv) How well the sample regression fits the data
(Choose the correct option)

(e) If the collected data observes two aspects at a time, the data will be called _____.
(Fill in the blank)

(f) In a two variable linear regression model, the slope coefficient measures the change in X which the model predics for a unit change in Y.
(State True or False)

(g) Under the least square procedure, larger the $\hat{u}_i$, the larger the

    (i) Standard error

    (ii) Regression error

(iii) Squared sum of residuals

(iv) Difference between true parameter and estimated parameter
(Choose the correct option)

2. Answer the following questions : 2×4=8

(a) In a two variate regression model write down the least squares estimate of the parameters.

(b) Write *two* limitations of econometrics.

(c) Define cross-section data.

(d) Define econometrics.

3. Answer **any three** from the following questions : 5×3=15

(a) Write a note on the scope of econometrics.

(b) Discuss the assumptions of the linear model.

(c) Write a note on the coefficient of determination r^2.

(d) Show that least squares estimators are unbiased estimators.

(e) Write a note on auto-correlation.

4. Answer **any three** from the following questions : 10×3=30

    (a) (i) Describe the methodology involved in an econometric model. 5

        (ii) Write a note on hypothesis testing. 5

    (b) Show that OLS estimators are best estimators.

    (c) Considering a three variable linear model estimate the parameters by ordinary least square (OLS) method.

    (d) Write short notes on : 5×2=10

        (i) Heteroscedasticity

        (ii) Multicollinearity

    (e) (i) Show that OLS estimators are linear estimators. 5

        (ii) Describe multiple linear regression model. 5

    (f) Define simple linear regression model.

        Find the least squares estimator of σ^2. Write a note on confidence interval of α and β in the linear model

        $Y = \alpha + \beta X + U$. 2+4+4=10