Total number of printed pages–4

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 : 1×7=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)

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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.

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(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