Total number of printed pages–7

3 (Sem–6/CBCS) STA HE 1

2026

STATISTICS

(Honours Elective)

Paper : STA–HE–6016

(Econometrics)

Full Marks : 60

Time : Three hours

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

1. Answer ***any seven*** from the following questions : 1×7=7

   (a) What are the properties of least squares estimators ?

   (b) In the regression equation $Y = \alpha + \beta X$, β is called

      (i) slope of X

      (ii) intercept of X

(iii) intensity of X

(iv) coefficient of X

(Choose the correct option)

(c) When two variables are said to be heteroscedastic ?

(d) If $E(U_iU_j)=\sigma_u^2$ for $i=j, \forall i, j$ in the linear model $Y_i=\alpha+\beta X_i+U_i$, then the disturbance terms are known as _____. *(Fill in the blank)*

(e) All OLS estimators are linear estimators. *(Write True **or** False)*

(f) Economic model refers to a set of equations which describes the relationships among the _____ variables. *(Fill in the blank)*

(g) Mathematical Economics + Statistics = _____. *(Fill in the blank)*

(h) The Econometric theory is the quantitative relationship among economic phenomena.

*(Write True **or** False)*

(i) In usual notation, r^2 means _____. *(Fill in the blank)*

(j) Give the full form of BLUE.

2. Answer ***any four*** from the following questions : 2×4=8

(a) Write the null and alternative hypothesis for testing the significance of the regression coefficient of the explanatory variable in the model $Y=\alpha+\beta X+U$.

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

(c) Write a note on economic model.

(d) What is the significance of b_{yx}, the regression coefficient of y on x?

(e) Write *two* limitations of econometrics.

(f) What are the assumptions for a three variable linear regression model?

(g) Write the objectives of econometrics.

(h) What is linear regression model?

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

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

(b) ANOVA in econometrics. Explain.

(c) Write an explanatory note on coefficient of determination in connection to goodness of fit of a linear model.

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

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(e) Write a note on multicollinearity.

(f) Describe the test for testing the significance of the intercept α in the linear model $y = \alpha + \beta x + u$.

(g) Write a note on multiple linear regression model.

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

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

(a) Explain how you would construct 95% confidence intervals for the three unknown parameters α, β and σ_u^2 in the simple linear model. Mention utility of confidence interval in testing of hypothesis. 3+3+3+1=10

(b) Write short notes on : 5×2=10

(i) Heteroscedasticity

(ii) Autocorrelation

(c) State and prove Gauss-Markov theorem.

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

(e) How will you test the significance of regression coefficient in the linear model $Y = \alpha + \beta X + U$?

(f) Estimate the regression parameters by OLS method in a linear regression model.

(g) Prove that ordinary least square estimators are best, linear and unbiased estimators.

(h) (i) Explain what you mean by the term 'econometrics'. 5

(ii) State completely the assumptions of the linear model. 5

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