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3 (Sem-6/CBCS) STA HE 1

2022

**STATISTICS**

(Honours Elective)

Paper : STA-HE-6016

(Econometrics)

Full Marks : 60

Time : Three hours

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

1. Answer **any seven** from the following questions :  $1 \times 7 = 7$

(a) Give the full form of BLUE.

(b) In usual notation,  $r^2$  means \_\_\_\_\_ .  
(Fill in the blank)

Contd.

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

(Write True or False)

(d) Mathematical Economics + Statistics = \_\_\_\_\_.

(Fill in the blank)

(e) Economic model refers to a set of equations which describes the relationships among the \_\_\_\_\_ variables.

(Fill in the blank)

(f) All OLS estimators are linear estimators.

(Write True or False)

(g) If  $E(U_i U_j) = \sigma_u^2$  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)

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

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

(a) slope of  $X$

(b) intercept of  $X$

(c) intensity of  $X$

(d) coefficient of  $X$

(Choose the correct option)

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

2. Answer **any four** from the following questions :  $2 \times 4 = 8$

(a) What is linear regression model?

(b) Write the objectives of econometrics.

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

(d) Write two limitations of econometrics.

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

- (f) Write a note on economic model.
- (g) In a two variate regression model write down the least squares estimate of the parameters.
- (h) Write the null and alternative hypothesis for testing the significance of the regression coefficient of the explanatory variable in the model  $Y = \alpha + \beta X + U$ .

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

- (a) Write a note on the scope of econometrics.
- (b) Write a note on multiple linear regression model.
- (c) Describe the test for testing the significance of the intercept  $\alpha$  in the linear model  $y = \alpha + \beta x + u$ .

(d) Write a note on multicollinearity.

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

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

(g) ANOVA in econometrics. Explain.

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

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

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

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

(b) Prove that ordinary least square estimators are best, linear and unbiased estimators. 10

(c) Estimate the regression parameters by OLS method in a linear regression model. 10

(d) How will you test the significance of regression coefficient in the linear model

$$Y = \alpha + \beta X + U ? \quad 10$$

(e) Considering a three variable linear model estimate the parameters by ordinary least square (OLS) method. 10

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

(g) Write short notes on :  $5 \times 2 = 10$

(i) Heteroscedasticity

(ii) Autocorrelation

(h) Explain how you would construct 95% confidence intervals for the three unknown parameters  $\alpha$ ,  $\beta$  and  $\sigma_u^2$  in the simple linear model. Mention utility of confidence interval in testing of hypothesis.  $3+3+3+1=10$