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3 (Sem-6/CBCS) STA HE 1

2024

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) Population census data is an example of cross-sectional data.

(State True or False)

(b) Studying the dependence of a variable on only a single explanatory variable is known as

(i) One-variable regression analysis

(ii) Two-variable regression analysis

Contd.



(iii) Three-variable regression analysis

(iv) Multiple regression analysis

(Choose the correct option)

(c) The number of degrees of freedom for a simple bivariate linear regression with 100 observations is _____.

(Fill in the blank)

(d) In classical linear regression model, X_i and U_i are positively correlated.

(State True or False)

(e) Heteroscedasticity means that

(i) All X variables cannot be assumed to be homogeneous

(ii) The variance of the error term is not constant

(iii) The observed units have no relation

(iv) X and Y are not correlated

(Choose the correct option)

(f) The fitted regression equation is given by :

$$\hat{Y}_i = -12 + 0.5X$$

What is the value of the residual at the point $X = 50$, $Y = 70$?

(g) Multiple linear regression models are linear in parameters and linear in variables.

(State True or False)

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

(a) Define econometrics.

(b) Define simple linear regression model.

(c) Write *any two* consequences of multicollinearity.

(d) Suppose β_2 is the slope coefficient of a regression model. What does it indicate ?

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

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

(b) Define time series data and cross-section data.

(c) Write a note on multicollinearity.

(d) Write an explanatory note on coefficient of determination.

(e) Describe multiple linear regression model.

4. Answer the following questions : $10 \times 3 = 30$

(a) What are the statistical assumptions in linear model? Describe the least square estimation method. $5 + 5 = 10$



Or

State and prove Gauss-Markov theorem.

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

Or

What do you mean by hypothesis testing? How will you test the significance of regression coefficient in the linear model $Y = \alpha + \beta X + U$?

Also construct 95% confidence interval for α and β . 3+4+3=10

- (c) Discuss about the scope of econometrics. Also describe the methodology of an economic model.

5+5=10

Or

Write short notes on : 5×2=10

(i) Autocorrelation

(ii) Heteroscedasticity

