## mortus barros art 93 (Sem-6/CBCS) STA HE 1

## 2024

### STATISTICS

(Honours Elective)

Paper: STA-HE-601

(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

- (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)

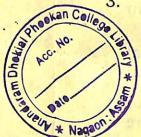
- (e) Heteroscedasticity means that
  - (i) All X variables cannot be assumed to be homogeneous
  - (ii) The variance of the error term is not constant
  - (iii) The observed units have no relation
  - (iv) X and Y are not correlated (Choose the correct option)
- (f) The fitted regression equation is 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: 2×4=8
  - (a) Define econometrics.
  - (b) Define simple linear regression model.
  - (c) Write any two consequences of multicollinearity.
  - (d) Suppose  $\beta_2$  is the slope coefficient of a regression model. What does it indicate?



Answer any three from the following questions: 5×3=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: 10×3=30
  - (a) What are the statistical assumptions in linear model? Describe the least square estimation method. 5+5=10

State and prove Gauss-Markov (b) Deline simple tinear re-maroant model

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

## regression 70 del What does it

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  $\alpha$  and  $\beta$ . 3+4+3=10

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

5+5=10

Write short notes on: 5×2=10

(i) Autocorrelation

