2020

STATISTICS — GENERAL

Paper : DSE-A-1

(Econometrics)

Full Marks : 50

The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.

Day 3

1. Answer *any ten* from the following :

- (a) In a multiple regression model, the value of R^2 is found to be 0.73. How is it interpreted?
- (b) What is a residual?
- (c) Is multicollinearity a data problem or a model problem?
- (d) Mention any one reason for the occurrence of serial correlation.
- (e) Mention a method of overcoming multicollinearity.
- (f) Is there any test to detect the presence of errors in variables?
- (g) What is meant by an instrumental variable?
- (h) What are the consequences of auto-correlation on the ordinary least squares (OLS) estimators of parameters?
- (i) What is meant by dummy variable?
- (j) Mention the primary sources of multicollinearity.
- (k) Justify or correct the statement : 'An example of a perfect collinear relationship is a quadratic or cubic function'.
- (l) Write 'True' of 'False' : 'Heteroscedasticity is more likely a problem of cross-section data'.
- (m) What is heteroscedasticity?
- (n) How can we take care of measurement errors in the dependent variable?
- (o) Write down a plausible approach of dealing with residual auto-correlation.
- 2. Answer *any four* from the following :
 - (a) Explain briefly the reason for insertion of random disturbance term in an econometric model.
 - (b) What do you mean by econometrics? How econometrics can be used as a tool for forecasting and prediction?

Please Turn Over

1×10

5×4

T(5th Sm.)-Statistics-G/DSE-A-1/CBCS/Day-3 (Econ.)(2)

- (c) What is meant by multicollinearity? Indicate its consequences.
- (d) What is meant by errors in variables? What problems do errors in variables create?
- (e) Define auto-correlation. What assumptions of the classical linear regression model will not hold if there is a problem of auto-correlation?
- (f) What are the possible reasons for the emergence of heteroscedasticity? Why is heteroscedasticity a problem?
- 3. Answer any two from the following :
 - (a) Explain the method of generalized least squares to obtain the estimators of a linear model in the presence of heteroscedasticity. 10
 - (b) Consider a simple linear regression model

 $y_t = \beta_1 + \beta_2 x_t + u_t$, t = 1, 2, ..., n.

Assume that $u_t = \rho \ u_{t-1} + \epsilon_t$, $|\rho| < 1$, t = 1, 2, ..., n.

Find the generalized least squares estimates of β_1 and β_2 when ρ is known. 10

(c) Explain the effects of heteroscedasticity on the estimates of the parameters and their variances in a linear model. Briefly discuss a test for detecting the problem of heteroscedasticity. 5+5