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PG Even Semester (CBCS) Exam., May—2019

ECONOMICS

( 2nd Semester )

Course No. : ECOCC-205

( Basic Econometrics )

*Full Marks : 70**Pass Marks : 28**Time : 3 hours**The figures in the margin indicate full marks  
for the questions*Answer **five** questions, taking **one** from each Unit

## UNIT—I

1. (a) Distinguish between Econometrics and Mathematical Economics.
- (b) Obtain the OLS estimators of a two-variable linear regression model.
- (c) Define standard error of regression.

4+8+2=14

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( Turn Over )

2. (a) Write short notes on any *two* of the following :
  - (i) Nature and scope of Econometrics
  - (ii) Adjusted  $R^2$
  - (iii) Individual statistical significance vs. overall statistical significance
- (b) Derive the mean and variance of the slope coefficient of a two-variable linear regression model. (3+3)+8=14

## UNIT—II

3. (a) Discuss the concepts of total, partial and multiple correlation coefficients.
- (b) Discuss the ANOVA approach for testing the overall significance of a three-variable linear regression model. 6+8=14
4. (a) State the important assumptions underlying a three-variable linear regression model.

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( Continued )

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- (b) A researcher has obtained the following results by regressing earnings ( $E$ ) on years of schooling ( $S$ ) and on the work experience ( $W$ ) for a sample of 10 persons :

$$\hat{E} = 263.64 + 0.0056S - 2.234W$$

$$SE(\hat{\beta}_1) = 11.59 \quad SE(\hat{\beta}_2) = 0.0019$$

$$SE(\hat{\beta}_3) = 0.2099$$

$$R^2 = 0.7077 \quad \bar{R}^2 = 0.6981$$

Based on these information—

- (i) interpret the estimated slope coefficients;
- (ii) test the null hypothesis that  $H_0: \beta_2 = \beta_3 = 0$ ;
- at 5% level of significance.

It is given that  $F_{0.05}(2, 7) = 4.74$ .

$$6 + (4 + 4) = 14$$

UNIT—III

5. (a) Do you agree with the view that perfect multicollinearity is more serious than less-than perfect multicollinearity? Justify your answer with the help of suitable arguments.

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- (b) In case of an estimated three-variable linear regression model, a researcher has calculated the value of  $r_{23}$  as  $r_{23} = 0.64$  (the symbol has its usual meaning). Calculate the values of variance-inflating factor (VIF) and tolerance (TOL) and check the presence of multicollinearity between the variables  $X_2$  and  $X_3$ .

- (c) Discuss any three remedial measures for curbing the problem of multicollinearity. 4+4+6=14

6. (a) What is heteroscedasticity?

- (b) Describe the steps involved in White's test for detecting heteroscedasticity.

- (c) Add a brief note on the remedial measures of heteroscedasticity. 2+6+6=14

UNIT—IV

7. (a) Define the following terms :

- (i) Spurious regression
- (ii) Co-integration
- (iii) Autocorrelation function
- (iv) Stationary time series

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( Continued )

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- (b) Distinguish between random walk model with drift and random walk model without drift.
- (c) Do you agree with the view that the trend in a non-stationary time series is constant? Justify your answer.

$$(2 \times 4) + 4 + 2 = 14$$

8. Write short notes on any *two* of the following :

$$7 \times 2 = 14$$

- (a) Phillips-Perron unit root tests
- (b) Error-correction mechanism
- (c) Correlogram

UNIT—V

9. (a) Define the following terms :
- (i) Endogenous variables
- (ii) Exogenous variables
- (iii) Instrumental variable
- (iv) Simultaneous equation bias
- (b) "Simultaneous equation models and recursive models are similar." Do you agree? Explain in detail.  $(2+2+2+2)+6=14$

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10. (a) Define the following terms :
- (i) Structural coefficients
- (ii) Reduced form coefficients
- (iii) Rank condition of identification
- (iv) Order condition of identification

- (b) Check the rank and order conditions for the following demand-supply equation system :

$$\begin{array}{cccc} q^d & 0 & 1p & u_1 \\ q^s & 0 & 1p & 2w & u_2 \\ q^d & q^s & & & \end{array}$$

where the symbols have their usual meanings.  $(2+2+2+2)+6=14$

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