Bachelor of Arts Examination, 2025

2nd Year, 2ndSemester

ECONOMICS

Subject Code: ARTS/ECON/UG/MAJOR/TH/22/204

INTRODUCTORY ECONOMETRICS

Time : 2 Hours **Full Marks - 30**

Answer one question from each CO

CO 1 : Analyze 2 variable and K variable regression model

1. (a) Define the concept of an unbiased estimator.

   (b) A sample of 10 observations corresponding to non-auto correlated regression model

   $$Y = \alpha + \beta X + u,$$

   Where u follows normal distribution with zero mean and unknown variance σ^2 and X is non stochastic, given the following information:

   $\Sigma X = 80$, $\Sigma Y = 96$, $\Sigma XY = 789$, $\Sigma X^2 = 668$, $\Sigma Y^2 = 952$.

   (i) Find out OLS estimates of β.

   (ii) Test the claim that X and Y are related at 5 percent level of significance, given that the tabulated value of $t_{8,0.25} = 2.306$.

   (iii) Find out goodness of fit for such model and give interpretation of the obtained result.

   [2.5+1+2+2=7.5]

2. (a) In case of multivariate classical linear regression model

   $$Y = X\beta + u,\ Y : n\times l,\ X : n\times k,\ \beta : k\times l,\ u = n\times l$$

   Define variance covariance matrix of the least square estimator of β. How do you estimate such variance covariance matrix?

   (b) Consider the following regression result with 20 observations.

   $$Y_t = 0.171 + 0.727X_{1t} + 0.547X_{2t}$$

   $t$values= (2.726) (1.8295) (9.062)

   $p$value= (0.0144) (0.0849) (0.000)

   $R^2 = 0.9961$

   Give interpretations of the results. [3+4.5=7.5]

CO 2 : Examine consequences of hetroscedasticity, autocorrelation and Multicolinearity

3. Explain the problem of multi collinearity and its consequences. [7.5]

4. Explain the problem of heteroscedasticity and autocorrelation. What will be the effects of these problem on the ordinary least square estimators of a regression model? [4+3.5=7.5]

CO 3 : Interpret Seemingly Unrelated Regression Equation (SURE) Model

5. Construct a Seemingly Unrelated Regression Equation (SURE) model of your own highlighting the basic assumptions and give interpretation of each equation of the model.

[7.5]

6. Can we apply OLS method to estimate the parameters of a SURE model? Justify. Explain a suitable method of estimation for SURE model. [2.5+5=7.5]

CO 4 : Explain regression with Dummy variable

7. Explain a dummy variable. Explain the concept of dummy variable trap. [3+4.5=7.5]

8. Construct an econometric model of your own to explain the uses of dummy variable, highlighting the basic assumptions. [7.5]

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