

**RESEARCH DEGREE PROGRAMME IN
ECONOMICS**

Term-End Examination

June, 2016

REC-003 : ECONOMETRIC METHODS

Time : 3 hours

Maximum Marks : 100

Note : *Answer questions from each section as directed.*

SECTION - A

Answer any two questions from this section. 20x2=40

1. Consider the following regression model.

$$Y_i = \alpha + \beta X_i + u_i$$

Specify the likelihood function, obtain maximum likelihood estimator for error variance σ^2 .

2. Consider the following simultaneous equation model.

$$Y_1 = \alpha_{13} Y_3 + \beta_{12} X_2 + u_1$$

$$Y_2 = \alpha_{21} Y_1 + \alpha_{23} Y_3 + \beta_{21} X_1 + \beta_{22} X_2 + u_2$$

$$Y_3 = \alpha_{32} Y_2 + \beta_{33} X_3 + u_3$$

Check the identification status of each of the equations in the model on the basis of order and rank condition.

- Describe the augmented Dickey-Fuller test procedure for testing for the presence of a unit root in the scalar time series process y_t .
- What is meant by a dynamic model? Explain how the following model can be estimated.

$$y_t = \alpha + \beta x_t + \gamma y_{t-1} + u_t$$

where $|\gamma| < 1$ and $u_t = \rho u_{t-1} + \eta_t$

In the above model η_t is said to be *iid* with mean 0 and variance σ^2 and $|\rho| < 1$.

SECTION - B

Answer any five questions from this section. 12x5=60

- What are the uses of dummy variables? Explain how a regression model with intercept and slope dummies can be formulated.
- Explain the concept of multicollinearity. What are its consequences on estimates? What remedial measures would you suggest for the multicollinearity problem?
- Explain the underlying ideas in the probit model. Explain how it is formulated and estimated.
- Consider the following equation system.

$$Y_1 = \alpha_{12} Y_2 + \beta_{11} X_1 + \beta_{12} X_2 + u_1$$

$$Y_2 = \alpha_{21} Y_1 + \beta_{21} Y_1 + \beta_{23} X_3 + \beta_{24} X_4 + u_2$$
 Check the identification status of both the equations. Explain one of the procedures to estimate the first equation in the above model.

9. While estimating a regression model you found that the dependent variable is measured with certain error. Specify the model. What are its consequences on estimators ?
 10. What is meant by autocorrelation ? Explain one of the estimation methods in the presence of autocorrelation.
 11. Formulate a panel data model with :
 - (a) fixed effect
 - (b) random effect
 12. Write short notes on the following :
 - (a) Concept of cointegration
 - (b) Error correction model
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