

DOON UNIVERSITY, DEHRADUN
Final Semester Examination, 2017
Department of Economics
M.Sc. Seventh Semester
SSEI-512: Econometric Theory

Time Allowed: 3 hrs.

Max. Marks: 50

Note: Attempt All Questions from Sections A,B,C.

SECTION : A

All questions are compulsory and carry equal marks.

(Marks: 5x2=10)

1. Which of the following assumptions are required to show the consistency, unbiasedness and efficiency of the OLS estimates?
 I. $E(v_t) = 0$ II. $\text{Var}(v_t) = \sigma^2$ III. $\text{cov}(v_t, v_{t-j}) = 0$ for all values of $j \neq 0$ IV. $v_t \sim N(0, \sigma^2)$
 (A) II and IV only. (B) I and III only. (C) I, II and III only. (D) All the above four
2. The technique used to estimate the over-identified system of simultaneous equations is (A) ordinary least squares (B) maximum likelihood (C) limited information maximum likelihood (D) two stage least squares
3. The estimated regression equation of a firm producing scooter tyres is:

$$\ln y = -3.56 + 0.31 \ln X_1 - 0.05 \ln X_2 + 0.53 \ln X_3 + 0.37 \ln X_4$$
 The Adjusted $R^2 = 0.89$ ($Y =$ output and X_1 to X_4 are factor inputs). Assuming that all the estimated parameters are statistically significant from zero, the firm has (A) constant returns to scale (B) decreasing returns to scale (C) increasing returns to scale (D) Diminishing marginal returns
4. The sources of auto-correlation among the following are: I. Omitted explanatory variables II. Interpolation in the statistical observation III. Misspecification of the true random term 'v' IV. Economic variables to move together over time
 (A) I and II only (B) I, II and III only (C) I, III and IV only (D) All of the above
5. In the presence of heteroscedasticity, the BLUE (Best Linear Unbiased Estimators) are provided by the method of (A) Ordinary Least Squares (B) Indirect Least Squares (C) Weighted Least Squares (D) Instrumental Variables

SECTION : B**Answer any FOUR.****(Marks: 4x5=20)**

1. Define the following with examples:
 - a) Continuous variables
 - b) Categorical variables
 - c) Endogenous variables
 - d) Exogenous variables
 - e) Predetermined variables
2. Differentiate between a distributed lag model and an auto-regressive model using suitable equations. Explain Koyck's Geometric Lag Scheme and obtain Koyck's transformation.
3. Name the regression models for a binary response variable. Explain any two models.
4. Name the time series models for economic forecasting. Explain any two.
5. Differentiate between random walk with drift and random walk without drift. Use appropriate equations to explain.

SECTION : C**Answer any TWO.****(Marks: 2x10=20)**

1. Study the following table

Salary per year (in thousand rupees)	Qualification	Rank
30.0	Academic	Assistant
65.1	Academic	Assistant
78.6	Professional	Associate
79.1	Professional	Associate
79.2	Academic	Associate
79.6	Academic	Associate
47.2	Professional	Instructor
105.1	Academic	Professor
90.1	Professional	Professor
115.7	Academic	Professor
105.9	Professional	Professor
175.0	Professional	Associate
185.0	Academic	Associate
22.6	Academic	Instructor
30.0	Professional	Instructor
33.8	Professional	Instructor

- a) Define dummy variables and construct a table for the dummy variables created in the above example.
- b) Construct a model to regress salary on qualification and interpret the parameters used.

- c) What is the predicted salary for an academic and the predicted salary for a professional?
 d) Construct a model to regress salary on Rank and find the expected salary for each rank. **2+2+2+4**

2. How is a structural equation different from a reduced form equation? Why is it necessary to obtain a reduced form of a structural equation? Write down the structural form of a recursive model and explain why recursive models are called triangular models.

Obtain the reduced form equations and the reduced form parameters for the following model

$$C_t = a + bY_t + u_t$$

$$Y_t = C_t + I_t$$

2+2+2+4

3. Given the following model

$$D = a_0 + a_1P_1 + a_2P_2 + a_3Y + a_4t + u$$

$$S = b_0 + b_1P_1 + b_2P_2 + b_3C + b_4t + w$$

$$D = S$$

Where D =quantity demanded, S =quantity supplied, P_1 =price of given commodity, P_2 =prices of other commodities, Y =income, C =costs, t =time trend

- a) Is the above model mathematically complete? Give reason.
 b) What is the identification problem? What are the conditions for identification?
 c) Using the conditions for identification, test if the simultaneous equation is identified. **2+2+6**