

**Master of Arts Examination: 2017**  
**(2<sup>nd</sup> Year 4<sup>th</sup> Semester)**  
**Economics**  
**Comprehensive-II**

Time:

Full Marks:50

(Use separate answer-script for each group)

**Group: A ( 25 Marks)**

Answer any two from the following

1. Using an economic explain the meaning of Hamiltonian and equation of motion of Costate variable. 12.5
2. Define Current Value Hamiltonian and associated first order condition and Equations of Motion of state and costate variables. 6.5+6=12.5
3. *Min T*  
 Subject to  $\frac{dy}{dt} = y + u$ ,  $y(0) = 5$ ,  $y(T) = 11$ ,  $T$  free,  $u(t) \in [-1,1]$ . ( 12.5)
4. Clearly explain the Transversality Conditions for a vertical terminal line problem and a horizontal terminal line problem. (6 ¼ + 6 ¼)

**Group: B (25 Marks)**  
 (Answer any one)

- 5.(a) what do you mean by a consistent estimator? Will the application of OLS to the Simultaneous equation system lead to consistent estimator? Justify.
- (b) What do you mean by Identification problem? Explain it by using a simple demand supply model.
- (c) Let  $y$  and  $x$  be random scalars such that

$$E(y|x) = \delta_0 + \delta_1(x - \mu) + \delta_2(x - \mu)^2,$$

where  $\mu = E(x)$ . Suppose  $x$  has a symmetric distribution, so that  $E[(x - \mu)^3] = 0$ . Show that  $L(y|1, x) = \alpha_0 + \delta_1 x$  for some  $\alpha_0$ , where  $L(\cdot|\cdot)$  stands for linear projection.

[ Turn over

6. (a) Explain the concept of stationarity.  
 (b) Distinguish between trend stationary process (TSP) and difference stationary process (DSP).  
 (c) How do you test for the existence of TSP or DSP?

- (d) A researcher has data on average annual rate of growth of employment,  $e$ , and the average annual rate of growth of GDP,  $x$ , both measured as percentages for a sample of 27 developing countries and 23 developed countries for the period 1985 to 1995. She defines a dummy variable  $D$  that is equal to 1 for developing countries and 0 for the developed countries. Hypothesizing that the impact of GDP growth on employment growth is lower in the developed countries than in the developing countries she defines an interaction dummy variable  $xD$  as the product of  $x$  and  $D$  and fits the following regression (standard errors in parentheses):

$$\text{whole sample } \hat{e} = -1.45 + 0.19x + 0.78xD, \quad RSS = 50.23 \quad (1)$$

(0.36)            (0.10)            (0.10)

He also runs simple regressions of  $e$  on  $x$  for the developed countries only and the developing countries only, with the following results:

$$\text{developed countries } \hat{e} = -2.74 + 0.50x, \quad RSS = 18.63; \quad (2)$$

(0.58)            (0.15)

$$\text{developing countries } \hat{e} = -0.85 + 0.78x, \quad RSS = 25.23. \quad (3)$$

(0.42)            (0.15)

Suppose the researcher had included  $D$  as well as  $xD$  as an explanatory variable in regression (1).

(a) What would the coefficients of the regression have been?

(b) Is inclusion of  $D$  as another regressor statistically justified? ( $F_{1,46}^{crit,5\%} = 4.06$ )