M.A. Examination, 2018
Semester-III
Economics
Course – X (Core)
(Quantitative Methods)

(For Back Candidates)

Time: Three Hours **Full Marks: 40**

Questions are of value as indicated in the margin

Answer ***any four*** questions

1. (a) Find the steady-state points and determine their stability properties for the following

   $\dot{y} = 3y^2 - 2y$.

   (b) Quantity demanded in a market is given by $q^d = P^{-2}$ and quantity is supplied is given by $q^s = 8P$

   If price adjusts according to $\dot{P} = \alpha(q^d - q^s)$, where $\alpha > 0$ is a constant, conduct a qualitative analysis of the dynamics of market price. 5+5

2. Consider a version of Solow model with the standard assumptions: Constant population growth rate, $\frac{L(t)}{L(t)} = n > 0$; and the constant saving rate, s(t) = sY(t), s ∈ (0,1). The only difference with the standard Solow model is that the production function, $Y(t) = F(K(t), L(t))$, satisfies the property of diminishing returns to scale.

   (a) Write down the time path of labour, L(t).

   (b) Derive the intensive from of production function, $y(t) = f(k(t))$, where $y(t) = \frac{Y(t)}{L(t)'}$ and $k(t) = \frac{K(t)}{L(t)}$.

   (c) Using the time path of, L(t), and the intensive from production function, $y(t) = f(k(t))$, derive the expression for the capital accumulation, equation, $\frac{k(t)}{k(t)}$.

   (d) Explain the possibility of the existence of a steady-state equilibrium for this formulation of the Solow model. 1+2+3+4

3. Draw the phase diagram and analyse the nature of stability of steady state growth equilibrium in the following two sector dynamic model, given by

   $\dot{k}_1 = 12 - k_1 - k_2$; and

   $\dot{k}_2 = \sqrt{k_1} - k_2$

   Here $\dot{k}_1$ is the capital labour ratio in the ith sector. 10

P.T.O.

4. Write down what will be the consequences of introducing human capital in Solow model. 10

5. State the assumptions of Ramsey-Solow model. How does this model differ from Solow model? Write a short note on "Time minimization problem" of Ramsay Solow model. 3+2+5

6. (a) Solve the following differential equation $(t + 2y)dy + (y + 3t^2)dt = 0$.

   (b) Write a short note on "Bernoulli's Equation". 6+4

7. What is the difference between endogenous growth model and exogenous growth model? Write a short note on Arrow Model (1962). 10

8. Show in the context of Barrow (1990) model that competitive market equilibrium is Pareto inefficient. 10

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