2009

M.A./M.Sc.

2nd Semester Examination

ECONOMICS

PAPER—VII (EC-1203)

Full Marks : 40

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Answer *all* questions.

1. Answer any *five* questions : 2×5

   (a) What is functional?

   (b) What is the economic interpretation of λ in the Hamiltonian?

   (c) What is decision graph?

   (d) What is dominant strategy?

   (e) What is metric?

(f) Distinguish coarser and finer topologies.

(g) What is normal form representation of a game?

(h) What is test vector?

(i) How does linear programming differ from non-linear programming?

(j) Explain the concepts of local and global optimum in non-linear programming?

2. Answer any *two* questions : 5×2

(a) Draw the phase diagram for the following differential equation system and check whether the node is stable or unstable.

$$\dot{y}_1 = 2y_1 - 2$$

$$\dot{y}_2 = 3y_2 - 6$$

(b) Prove that Stackleberg equilibrium is a subgame perfect equilibrium with the help of a suitable example.

(c) Define topological spaces with suitable examples. Distinguish between discrete and indiscrete topological spaces.

(d) Max $\pi = x_1$

s.t. $x_2 - (1 - x_1)^3 \leq 0$

$2x_1 + x_2 \leq 2$

$x_1, x_2 \geq 0$

Find optimal solution of this problem and check out the validity of the Kuhn-Tucker condition.

3. Answer any *two* questions : 10×2

(a) Solve the following optimisation problem to find the optimal control path.

$$\max \int_0^T \left(K - aK^2 - I^2\right) dt$$

subject to

$$\dot{K} = I - \delta K$$

$$K(0) = K_0 \quad \text{(given)}$$

If the discounting factor is taken into consideration, give the conditions for optimisation.

7+3

(b) In a duopoly market firms 1 and 2 produce the same commodity and face the demand curve

$$p = 8 - (q_1 + q_2).$$

Each has a cost function given by $c_i = 4q_i$. Suppose the duopolists make a cartel to sell the product at monopoly price. Will the duopolists stick to their agreement ? Give arguments in favour of your answer stating the game problem.

10

(c) (i) What are the problems of Nash equilibrium? 5

(ii) Define the following in topology with suitable examples :

closure of a set, interior and exterior point. 5

(d) State and prove Kuhn-Tucker sufficiency theorem. 10