2015

M.A. / M.Sc.

1st Semester Examination

ECONOMICS

PAPER—ECO-104

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.

Group—A

1. Answer any *two* questions of the following : 2×2

(a) Explain the difference between linear and non linear programming problem.

(b) Find the solution of the inequality :

$$S_1 = \left\{ x : 2x - 6 > 0 \text{ and } -1 \le \frac{x+3}{2x-6} \le 1 \right\}$$

(c) What Surjective function ?

(d) Give an example of an equal function.

2. Answer any *one* question of the following : 1×6

(a) Explain the statement that "Boundary irregularities will not occur if a Certain Constraint qualification is Satisfied". 6

(b) Compare between the Kuhn-Tucker sufficiency Theorem and The Arrow-Enthoven Sufficiency Theorem. 6

3. Answer any *one* question of the following : 1×10

(a) Derive the Kuhn-Tucker Condition for a maximisation problem.

(b) Solve the following minimization problem :

Minimize $C = (x_1-4)^2 + (x_2-4)^2$

Subject to $2x_1 + 3x_2 \geq 6$

$-3x_1 - 2x_2 \geq -12$

and $x, x_2 \geq 0$

Group—B

4. Answer any *two* questions of the following : 2×2

(a) What do you mean by repeated game. Give example.

(b) Which kind of Nash equilibrium can be eliminated by backward induction ?

(c) Distinguish between function and functional.

(d) What is current valued Hamiltonian ?

5. Answer any *one* question of the following : 1×6

(a) Define Nash equilibrium. Explain the problems associated with it.

(b) Using a two variable model illustrate the concept of phase diagram.

6. Answer any *one* question : 1×10

(a) Present the problem of Prisoners Dilemma. Show how does the 'co-operation' possible for an infinitely repeated Prisoners Dilemma game. 4+6

(b) What is Hamiltonian function ? Write the conditions to obtain optimal solution path for the control variable. Find the optimal paths of control, state and costate variables for the following problem.

$$\text{Max} \int_0^T -\left(t^2 + u^2\right) dt$$

$$\text{s.t.} \quad \dot{y} = u$$

and $y(0) = 4$, $y(T) = 5$, T free.