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:

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

(Turn Over)
(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”.

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

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 \( x, x_2 \geq 0 \)
4. Answer any two questions of the following: 2x2

(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: 1x6

(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: 1x10

(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.

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

s.t. \( \dot{y} = u \)

and \( y(0) = 4, y(T) = 5, T \text{ free} \)