2008

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) Define inverse function.

(b) What is the property of 'Reflexivity'?

(c) Give an example of Nash equilibrium strategy.

(d) Distinguish between action and a strategy of a player.

(e) Construct the power set of the following set.

$A = \{1, 2, 3\}$

(f) What are the basic ingredients of dynamic optimisation problem ?

(g) What are the different types of variable terminal points ?

(h) Give a macroeconomic example of functional.

(i) What is current value Hamiltonian ?

(j) Mention the features of NLP.

2. Answer any *two* questions : 5×2

(a) Find 1+4

(i) Nash equilibrium and

(ii) Mixed strategy equilibrium for the player in the following game

		Player–2	
		Left	Right
Player–1	Top	6, 8	8, 9
	Bottom	7, 9	7, 8

(b) State and prove Galileo's Theorem. 1+4

(c) State and prove Kuhn-Tucker sufficiency theorem.

(d) Draw the phase diagram for the following differential equation system.

$$\dot{y}_1 = -3y_1 + 6$$

$$\dot{y}_2 = -2y_2 + 2$$

3. Answer any *two* questions : 10×2

(a) (i) Describe in a simplest way the dynamic games of complete and perfect information. Illustrate Backward Induction outcome.

(ii) Explain the following with a suitable example.

Subgame, Information set, Perfect Recall. 4+6

(b) Prove that $f(A_1 \cap A_2) \subseteq f(A_1) \cap f(A_2)$ where symbols carry their usual meanings. Let $\{X, \geq\}$ be a set of integers with $x, y \in x$ such that $x \geq y$ means x is divisible by y for all x and y. 5+5

(c) You are given the following problem

$$\begin{aligned} \text{Minimise} \quad & C = x_1 \\ \text{s. t.} \quad & x_1^2 - x_2 \geq 0 \\ \text{and} \quad & x_1, x_1 \geq 0 \end{aligned}$$

Solve graphically.

Does the optimal solution occur at a cusp ? Check whether the optimal solution satisfies (a) the constraint qualification and Kuhn-Tucker necessary and sufficient conditions.

(d) What is meant by Hamiltonian ? What is maximum principle ? Find the optimal paths of control, state and co-state variables for the following problem :

$$\text{Max} \quad \int_0^1 \left(y - u^2\right) dt$$

subject to $y' = u$

$y(0) = 2$

$y(1)$ free.

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