2011

M.A/M.Sc.

2nd Semester Examination

ECONOMICS

PAPER—VII (ECO-203)

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 *five* of questions : 2×5

(a) What is saddle point in a game problem ?

(b) What is dominant strategy in a game problem ?

(c) What is decision graph ?

(d) Give an example of an optimum control problem.

(e) Distinguish horizontal terminal line and truncated vertical line in optimum control problem.

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

(g) Give an example of a simultaneous differential equation system.

(h) What is metric?

(i) What do you mean by topology of the plane?

(j) What are the requirements of constraint qualification in the context of non liner programming problem?

Group—B

2. Answer any *two* questions : 5×2

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

$$y_1' = y_2 - 3 \qquad y_2' = \frac{y_1}{4} - \frac{1}{2}.$$

(b) Explain the problems of Nash equilibrium.

(c) What is the significance of maximum value function or indirect objective function in the envelope theorem.

(d) Show that the fulfillment of saddle point criterion implies constrained maximum at that point.

Group—C

3. Answer any *two* questions : 10×2

(a) What is Hamiltonian function ? State the necessary conditions for optimisation with Hamiltonian. Solve the following problem using Hamiltonian.

Maximise $\int_0^1 \left(x - u^2\right) dt$

Subject to $\dot{x} = u$ and $x(0) = 2$ and $x(1) = 0$.

(b) Explain carefully the following terms in topology:

Topological space, limit point, closed set, boundary point, finer topology.

(c) (i) Reduce the following game to an LPP :

Player B

$$\text{Player A} \begin{bmatrix} 1 & -1 & 3 \\ 4 & 5 & -3 \\ 7 & 3 & -2 \end{bmatrix}$$

(ii) Using game theory show why common property resources will always be exploited beyond the point that is most desirable from the collective viewpoint.

(d) Derive the Kuhn–Tuckev conditions in case of a maximisation problem.

Consider a consumer who maximizes utility $U=x_1x_2$ subject to $p_1x_1+p_2x_2\leq M$. Check whether the constrained maximum point and the saddle point of the Lagrangian function are same or not. 5
