2007

ECONOMICS

PAPER-VII

Full Marks : 40

Time : **2 hours**

The figures in the right-hand margin indicate marks

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

Illustrate the answers wh ere ver necessary

1. Answer any *five* questions : **2x5**

(**a) Define countability of a non-empty set.**

(b) What is a lattice?

(c) State the triangle inequality property of a metric space.

(**d) Define an information set.**

(e) Give an example of complete and perfect information dynamic game from the field of economics.

(**f) State local global theorem.**

(g) Define saddle point in NLP.

(**h) Mention distinguishing** features of NLP with LP.

(i) What is transversality condition?

(j) What is functional?

2. Answer any *two* questions : 5x2

(a) Find out the Best Response Function for the player, 1 for the following game : 5

s,

2,1	3,1/2
3,2	2,3

(h) Show that the following is a partially ordered set (P.O.((Set), a lattice and also a complete lattice as well:

$\{2x, N r$ where X is a non-empty set, $2x$ is the power settt of X *and* $V A, B c 2x, A > B$ implies A ;2B.

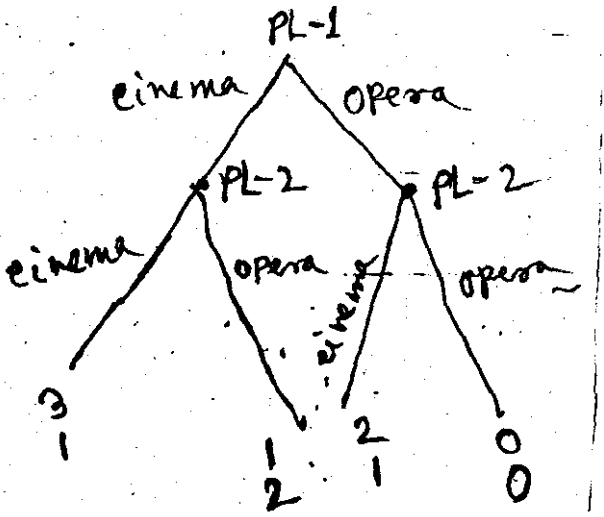
21 +-11+1
2 2

(c) Give economic interpretations of Kuhn-Tucker **conditions.** **5**

(d) State and prove Kuhn-Tucker sufficiency theorem. 5

3. Answer any two questions : l O x 2

(a) Prove that Nash equilibrium **strategies survive the iterated process of eliminating** the strictly **dominated strategies**. **Illustrate** your **proposition**. **Determine the strategy** profile of the players for the game **below and calculate the** Subgame Perfect Nash Equilibrium : S+5



(b) **Showthatf(A)cf(B)iff:X-> *Y* andAcBt=X. Define cardinality of a - set. Show that *n ((0, 1))* n ((co, +w))-where *n (A)* means the cardinality of the set A. Show that in the theory of consumer preferences indifference space is a pseudometric** space. 2+4+4

(c) Whataze constraint-qualification conditions ? You are given the following NLP problem :

Max. n=x,

s.t. ***x,2+4-1***

and x, , x2 30.

Solve graphically and check whether the optimal solution satisfies constraint qualification and Kuhn-Tucker maximum conditions. 3+7

(d) Define Hamiltonian function for a dynamic optimisation problem. What are the necessary conditions to have optimal solution path for the control variable? Solve the following problem:

$$\text{Max} \int_{0}^{1} (x - y^2)\,dt$$

$$\text{s.t} \quad z = y$$

$$x(0) = 2.$$

4+6