

Time: 3 hours

Max. Marks: 80

- N.B. (1) Question No. 1 is compulsory.
 (2) Attempt any three questions from remaining five questions.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

Q1. Attempt any four. 20

- a. List and describe the essential elements of a game in the context of game theory
- b. Compare non-cooperative games with cooperative games.
- c. Explain the significance of the discount factor in the context of repeated games. How does it affect the players' strategies and outcomes over multiple rounds?
- d. Define what is meant by "mechanism design" in the context of aggregating preferences.
- e. What do you mean by bargaining in context of game theory.

Q2.a) Write two real-world applications of game theory and explain how it has been used to analyze strategic decision-making in those contexts. 20

b) Explain in detail the prisoner's dilemma (PD) with payoff matrix and with suitable examples.

Q3.a) Define Bayesian Nash Equilibrium and find the value of p according to BNE in below given payoff matrices. 20

	a type = p		b type = $1-p$	
	Left	Right	Left	Right
Up	3, 4	1, 0	6, 2	0, 4
Down	4, 3	2, 0	5, 1	-1, 4

b) Refer the below payoff matrix and identify the strategic game involved in it and describe it in brief.

	Head	Tail
Head	1, -1	-1, 1
Tail	-1, 1	1, -1

- Q4 a) Explain zero sum games in non-cooperative games 20
- b) Discuss the concept of optimality and concept of Pareto efficiency in the context of game theory.
- Q5.a) Explain subgame perfect Nash equilibrium in game theory 20
- b) What do you mean games with Perfect Information and games with imperfect information. Explain with examples.
- Q6. Write short note on any **two** 20
- a) VCG mechanisms.
- b) Repeated Games
- c) Computing Solution Concepts of Normal – Form Games
