INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR
Mid-Autumn Semester Examination 2023-24

Full Marks: 30 **Duration: 2 hrs**
Subject No.: HS60247 **Subject Name: Advanced Microeconomics**
Department/Center/School: Humanities & Social Sciences
Specific charts, graph paper, log book etc., required. No
Special Instruction: All the questions are compulsory. Read the question paper carefully. No queries will be entertained during examination.

1. Argue whether the following statements are true or false giving appropriate reason(s) in favour of your answer. If required, prove or disprove the statement: 3x2 = 6

a) Backward induction can be used to solve the problem of multiple Nash equilibrium (NE) by eliminating NE based on non-credible threats.

b) If a strategy profile survives IESDS (Iterated Elimination of Strictly Dominated Strategy) solution method then it is the unique Nash Equilibrium (NE) of the game and vice-versa.

2. (a) What are the criteria for subgame? Define a Subgame Perfect Nash Equilibrium (SPNE) strategy profile.

(c) Suppose two coins are tossed simultaneously and two players announce heads or tails. If the announcements match, Player 1 will receive payoff of one and Player 2 will lose one; the pay-offs will be reversed if the announcements differ. Find out the Nash equilibrium in pure strategy and mixed strategy and draw the best response functions. 3+5

3. "A one-shot game with a unique non-cooperative Nash Equilibrium can have a cooperative SPNE when it is infinitely played." Prove the statement with the Prisoners' Dilemma game when it is played once vis-à-vis played repeatedly. Under what condition will it be possible to sustain collusion? Further, discuss in this context how the outcome of the game will differ if the game is played infinite times vis-à-vis the game played finite times, though over a very long period. 8

4. If there are two Nash equilibria with one Pareto dominating the other, should we conclude that the Pareto efficient one will be the more reasonable outcome? Use Focal Point Theorem and its properties applicable in the given circumstances. Illustrate with suitable examples considering risk averse players. 8

INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR
End-Autumn Semester Examination 2023-24

Full Marks: 50 Duration: 3 hrs

Subject No.: HS60247 Subject Name: Advanced Microeconomics

Department/Center/School: Humanities & Social Sciences

Specific charts, graph paper, log book etc., required. No

Special Instruction: All questions are compulsory. No queries will be entertained during examination.

1. Argue whether the following statements are true or false giving appropriate reasons in favour of your answer. If required develop **the appropriate theoretical model with the required underlying assumptions**:

$5 \times 4 = 20$

(a) Two firms selling identical product and simultaneously choosing prices in a linear city of unit length will lead to the Cournot outcome. Assume positive transport cost.

(b) Bertrand paradox holds when the firms are capacity constrained.

(c) Lemon used cars drive good used cars out of the market.

(d) All monotonic transformations of the utility function are permissible in a world with certainty, while only positive linear transformations are allowed for risky choices. Hence, the utility function obtained by the Expected Utility Rule is ordinal (probability weighted average) whereas the elementary utility functions are cardinal.

2. Discuss how sunk costs can generate entry barrier. Do you think that the firms will over invest in capacity to deter entry? Discuss following the Bain-Sylos postulate as developed by Spence. In this light, illustrate Dixit's critique that overinvestment in capacity may not be a credible commitment by the incumbent firm. 10

3. Define Bayesian NE and mention the steps of finding out Bayesian NE. Comment on the following statement and prove: "A pure strategy NE in a game of incomplete information is a mixed strategy NE in a closely related game of complete information". 10

4. Consider the following "Portfolio Choice" problem.

The investor has initial wealth W and utility $V(c) = \ln c$. There is a safe asset (such as government bond) hat has net real return of 0. There is also a risky asset with a random net return that has only two possible returns, R_1 with probability q and R_0 with probability (1-q). Let A be the amount invested in risky asset. Therefore, (W-A) will be the amount invested in safe asset.

10

i. Find A as a function of W. Does the investor put more or less of his portfolio into the risky asset as his wealth increases?

ii. Another investor has the utility function $V(c) = -e^{-c}$. How does her investment in the risky asset change with wealth?

iii. Find the coefficients of absolute risk aversion $A(c) = \frac{v''(c)}{v'(c)}$ for the two investors. How does this account for the qualitative difference in the answers you obtain in parts 1 and 2?