

MID-TERM EXAMINATION

*Write your name and ID number on the front of the blue book. Do not forget to **sign the waiver on the back**. Answer both parts of the exam. Write legibly. Good luck!*

A. Answer both of the following two questions. Show all your work.

QUESTION 1. Consider the following game:

		Player 2	
		<i>L</i>	<i>R</i>
Player 1	<i>U</i>	2, 4	0, 0
	<i>D</i>	1, 6	3, 7

- Find all pure-strategy Nash equilibria.
- Find the mixed strategy Nash equilibrium.
- Compute the players' expected utilities in the mixed strategy equilibrium.
- What is the probability of the worst outcome in the mixed strategy equilibrium?

QUESTION 2. THE ENVELOPE GAME. There are two players, player 1 and player 2, and two envelopes, one of which is marked for player 1, and the other is marked for player 2. At the beginning of the game, each envelope contains one dollar. Player 1 is given the choice between stopping, *S*, or continuing, *C*. If she chooses to stop, then each player receives the money in her own envelope and the game ends. If she chooses to continue, then one dollar is removed from her envelope and two dollars are added to player 2's envelope. This completes the first round of the game. Then player 2 must choose whether to stop or continue. If she chooses to stop, each player gets the money in her envelope. If she chooses to continue, then one dollar is removed from her envelope and two dollars are added to player 1's envelope. This completes the second round of the game. The game continues like this alternating between the players until either one of them decides to stop or k rounds of play have elapsed. If neither player chooses to stop by the end of the k th round, then both players obtain zero. Players want to earn as much money as possible.

- Draw the extensive form of this game for $k = 5$.
- Find the subgame perfect equilibrium by using backward induction.
- What is the subgame perfect equilibrium outcome?
- What do you think the backward induction outcome would be for any finite integer k ? Why do you think this outcome obtains?

B. Answer any five of the following six questions.

QUESTION 1. What two properties must an actor's preference ordering satisfy to be considered rational? What do these properties require?

QUESTION 2. In class it was argued that a theory must satisfy three requirements, one of which was **empirical validity**. What are the other two and what do they mean? How can we use equilibrium analysis to judge a theory?

QUESTION 3. In class it was argued that the assumption of **anarchy** really has two components. What are they and what do they imply for strategic behavior? How can we address them with formal models?

QUESTION 4. What problems do players face in games of pure cooperation? Games of pure conflict (zero-sum games)? Games of distributional conflict (mixed-motive games)? What methods may they use to address these problems?

QUESTION 5. Bargaining is the process of influencing expectations and has two functions. What are they? What conditions must they meet to influence expectations successfully? Why?

QUESTION 6. We discussed two basic ways of establishing credible commitments, one of which depends on strategic moves and the other on resolve and nerve. We also discussed two strategies for each of these ways. What are these ways and what are the strategies? How do they work to increase credibility?