Undergraduate Program in Economics
Faculty of Economics and Business, Universitas Indonesia
Midterm Exam

Course : Introduction to Game Theory
Instructor : Teguh Dartanto
Time : 3 hours
Type of Exams : Open Book/Note (electronic devices are not allowed)

All points are 115.

1. **PDKT Game (25 point).** Abdi-kun, a single FEB student, is looking forward girlfriend. He is approaching Nikita-chan, a smart and beautiful FEB student (a high quality "Jomblo"). Abdi-kun has three strategies in approaching Nikita: flower, love poem, STATA (programming), while Nikita-chan is always responding to all male student with three strategies: smiling, chatting, and stay cool. Nikita's hobbies are flower gardening and STATA mania. The matrix form of game is the following:

		Nikita		
		Smile	Chatting	Stay Cool
Abdi	Flower	5,2	2,2	5,4
	Poem	4,2	5,3	3,3
	STATA	4,3	6,2	5,3

Note: All name are fiction.

a. Write down the matrix form into the normal form of game! (5 point)
b. Is there any dominant strategy or dominated strategy? (5 Point)
c. Find the Nash Equilibrium of PDKT Game using Iterated Elimination of Strictly Dominated Strategies (IESDS) and Best Response! (10 point)
d. Why is the strategy of (Poem, Smile) not the equilibrium? (Explain!) (5 point)

2. **Matrix Form of Game (20 point):** below the matrix form of the game.

		Player 2		
		L	C	R
Player 1	U	5, 1	1, 4	1, 0
	M	3, 2	0, 0	3, 5
	D	4, 3	4, 4	0, 3

Then answer the following question!
a. Is there a strictly dominated strategy? (6 point)
b. Is there a pure strategy in the equilibrium? (6 point)
c. Find the Nash Equilibrium! (8 point)

3. **The 2019 presidential election (30 point).** Prabowo is the real challenger in the Indonesian politic. He plans to beat Jokowi in the 2019 presidential election. However, Prabowo is still calculating the political situation and calculation. Therefore, he has to choose three strategies: running as candidate (M), doubt (R) and quit (Md). The voter of Indonesian sees the Prabowo's candidacy as: ignore (A), support (D) and bully (B). The payoff of Prabowo (V1) responds to the voter is the following: V1(M,A)=(-3,0), V1(M,D)=(5,5), V1(M,B)=(1,3), V1(R,A)=(-1,0), V1(R,D)=(2,2), V1(R,B)=(2,3), V1(Md,A)=(-1,0), V1(Md,D)=(-1,0), V1(Md,B)=(-1,0).
   a. Write down the matrix form of this game! (5 point)
   b. Is there any dominance strategy? (5 point)
   c. Change the matrix game into Game Tree (extensive game) with the first node (mover) is Prabowo! (5 point)
   d. With the Backward Induction, find the Nash Equilibrium! (5 point)
   e. If there is a change in payoff for instance V1(Md,A)=(2,1), V1(Md,D)=(2,2), V1(Md,B)=(2,3), then is there any dominance strategy? Find the new Nash Equilibrium! (10 point)

4. **Cops and Robbers (25 point):** Player 1 is a police officer who must decide whether to patrol the streets or to hang out at the coffee shop. His payoff from hanging out at the coffee shop is 10, while his payoff from patrolling the streets depends on whether he catches a robber, who is player 2. If the robber prowls the streets then the police officer will catch him and obtain a payoff of 20. If the robber stays in his hideaway then the officer's payoff is 0. The robber must choose between staying hidden or prowling the streets. If he stays hidden then his payoff is 0, while if he prowls the streets his payoff is −10 if the officer is patrolling the streets and 10 if the officer is at the coffee shop.
   a. Write down the matrix form of this game. (7 point)
   b. Draw the best-response function of each player. (9 point)
   c. Find the Nash equilibrium of this game. What kind of game does this game remind you of? (9 point

5. **Your experience (15 point):** explain the following statement
   a. Why are beliefs and rationality very important in decision making and Nash equilibrium! (6 point)
   b. Analyze your experience in decision making process using a game theory. Write down your experience in the matrix form of game and find the Nash Equilibrium! (9 point).