

(4)

- (a) Find the pure strategy Nash equilibria of this game.
- (b) Suppose the game is repeated twice. The total payoffs of the repeated game are the sum of the payoffs obtained in each round. Is there a sub-game perfect Nash equilibrium in pure strategies in which (A,A) is played in the first round? 2+4
6. Two food trucks simultaneously choose one of 12 evenly spaced locations along a linear street. There are 10 students taking classes at each location, from location 0 to location 12, they will go the food truck that is the closest to their class. For the locations that equally close to both food trucks, half of the students in that location will go to each food truck. Each food truck tries to maximize the number of students going to his or her food truck.
- (a) Write down the complete best response functions.
- (b) Find one Nash equilibrium.
- (c) Either show that the equilibrium is unique or find another one. 2+2+2

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EX/ECO/UG/DSE/5.2/3/2025

BACHELOR OF ARTS EXAMINATION, 2025

(3rd Year, 1st Semester)

ECONOMICS

Course : ECO/UG/DSE/5.2/3

(Topics in Microeconomics I)

Time : Two Hours

Full Marks : 30

Answer *any five* questions

1. Anita and Vikash cannot decide where to go to dinner. Anita proposes the following procedure:

Anita will write on a piece of paper either the number 2 or the number 4 or the number 6, while Vikash will write on his piece of paper either the number 1 or 3 or 5. They will write their numbers secretly and independently. Then they will show each other what they wrote and choose a restaurant according to the following rule:

If the sum of the two members is 5 or less, they will go to a Mexican restaurant, if the sum is 7, they will go to an Italian restaurant and if the number is 9 or more, they will go to a Japanese restaurant.

Let Anita be Player 1 and Vikash Player 2. Represent this situation as a normal form game assuming

Anita's preference ordering is Mexican > Italian > Japanese with corresponding utility payoffs 3, 2, 1 respectively. For Vikash the preference ordering is Italian > Mexican > Japanese with utility payoffs 3, 2, 1 respectively.

(2)

Find the normal form of the game and equilibrium solution.

4+2

2. Suppose there are two oil-producing countries, X and Y . Both can operate at either of two production levels: 2 or 4 million barrels a day. Depending on their decisions, the total output on the world market will be 4, 6 or 8 million barrels in a day, and the price per barrel in these cases is 100, 60 and 40, respectively in monetary units. Costs of production are 8 per barrel for X and 16 per barrel for Y .

- (i) Find the normal form of the game.
- (ii) Suppose this game is repeated everyday, and both countries agree to cooperate by producing the low output, each one threatening the other with a trigger strategy: "If you produce high output, even once, I will produce high output forever." Find the range of discount rate that sustains cooperation as a Nash equilibrium. 2+4

3. Consider the normal form game below and find the rationalizable strategies :

	L	C	R
T	-7, 7	7, -7	7, -1
M	7, -7	-7, 7	-7, -1
B	-1, 2	-1, -2	-1, 7

After eliminating dominated strategies find the pure and mixed strategy Nash equilibrium of this game. 3+3

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(3)

4. Consider the following alternate offer bargaining game. A firm (F) and a syndicate (S) have to share the benefits generated by their economic activity. Assume that the overall benefit is equal to ₹20 lacs. The game has three stages. Offers are alternating between F , S and F . In each stage, the player who has not offered how to share the benefits has the choice of accepting or rejecting the proposal made by the other player. If she accepts the proposal, the game ends and if she rejects, in the next stage, she will become the proposer. If the players do not reach any agreement, after the third proposal, both of them get a zero payoff.

- (a) What will be the agreement reached in equilibrium and in which time period will be agreement be reached, if the discount factor of both players is $\delta = \frac{1}{4}$?
- (b) What will be the agreement reached in equilibrium and in which time period will the agreement be reached, if F has a discount factor $\delta_F = \frac{1}{4}$ and S has $\delta_S = \frac{1}{2}$?
- (c) Compare the two agreements and try to provide an intuitive argument to support the results you have found.

2+3+1

5. Consider the following normal form game.

		B		
		A	B	C
A	A	4, 4	1, 5	0, 3
	B	7, 1	3, 4	0, 1
	C	3, 0	2, 0	1, 1

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[Turn Over]