Model Question Paper-I with effect from 2022(CBCS Scheme)

USN | | | | | | | | | | |

Fourth Semester B.E Degree Examination

ALGORITHMIC GAME THEORY (BAI405D)

TIME:03Hours **Max.Marks:100**

Note:

1. Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**
2. M: Marks, L: RBT levels, C: Course outcomes.

		Module - 1	M	L	C
Q.1	a	Analyze the game theoretical model- 'Bach or Stravinsky' and hence find the pure Nash equilibrium, if it exists.	7	L4	CO2
	b	For the below payoff matrix, find the Nash Equilibria and check whether it is a Strict Nash Equilibrium or not, with appropriate reasoning.	7	L3	CO4
	c	Explain the terms: (i) Strategic Game (ii) Nash Equilibrium with suitable examples.	6	L2	CO1

		Player 2		
		L	M	R
Player 1	T	1,1	1,0	0,1
	B	1,0	0,1	1,0

OR

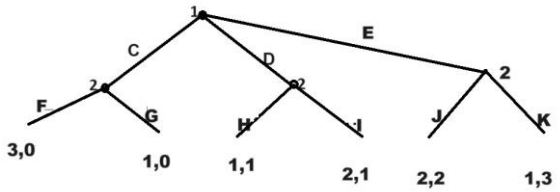
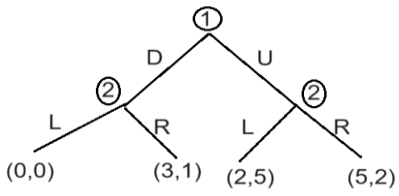
Q.2	a	Analyze the game theoretical model- 'Stag Hunt' and hence find the pure Nash equilibrium, if it exists.	7	L4	CO2
	b	Apply best response functions to find Nash Equilibrium in	7	L3	CO4
	c	Explain the terms: (i) Best Response function (ii) Strict Domination with suitable examples.	6	L2	CO1

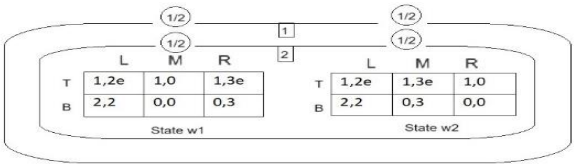
		Player 2		
		L	C	R
Player 1	U	13,3	1,4	7,3
	M	4,1	3,3	6,2
	D	-1,9	2,8	8,-1

Module – 2

Q.3	a	Analyze the game of 'Matching Pennies' and apply method of best responses to find mixed strategy Nash Equilibrium.	7	L4	CO2
	b	Apply mixed strategy algorithm to find the expected payoffs for each player in the following game.	7	L3	CO4
	c	Analyze whether a mixed strategy (3/4,0, 1/4) for player 1 and (0, 1/3, 2/3) for player 2 in the following game is a mixed strategy nash equilibrium.	6	L4	CO2

		Player 2	
		L	C
Player 1	T	3,-3	-2,2
	D	-1,1	0,0

				Player 2						
					L(0)	C(1/3)	R(2/3)			
			Player 1	U(3/4)	3,2	3,3	1,1			
				M(0)	2,2	0,1	2,0			
				D(1/4)	-1,4	5,1	0,7			
			OR							
Q.4	**a**	Analyze the game theoretical model – 'Expert diagnosis model' and hence find the pure and mixed Nash equilibrium.						**7**	**L4**	**CO2**
	b	Find all the mixed strategy Nash Equilibria of the game by eliminating any strictly dominated actions and then constructing the player's best response functions.						**7**	**L3**	**CO4**
				Player 2						
					L	C	R			
			Player 1	T	1,2	2,0	4,3			
				D	2,3	2,1	1,2			
	c	Analyze whether the mixed strategy (0,1/2,1/2) yields a better payoff to Player 1 than pure strategy.						**6**	**L4**	**CO2**
				Player 2						
					P	S				
			Player 1	P	1,0	1,0				
				S	4,1	0,1				
				R	0,1	3,1				
			Module – 3							
Q.5	**a**	Analyze the game theoretical model – 'The Ultimatum game' and hence find its subgame perfect equilibrium.						**10**	**L4**	**CO2**
	b	Find all the subgames of the following game. Also using Backward induction, find the subgame perfect equilibrium 						**10**	**L3**	**CO4**
			OR							
Q.6	**a**	Analyze the game theoretical model – 'Stackelberg's model of duopoly' and hence find its subgame perfect equilibrium.						**10**	**L4**	**CO2**
	b	Find all the subgames of the following game. Also using Backward induction, find subgame perfect equilibrium 						**10**	**L3**	**CO4**
			Module – 4							
Q.7	**a**	Find the Bayesian Nash equilibrium of BoS model –where both the players are unsure whether other player wants to meet or avoid him.						**10**	**L3**	**CO4**
	b	Develop a model in case of 'Cournet's game with imperfect information' about both cost and information.						**10**	**L4**	**CO2**
			OR							

Q.8	**a**	Find the Nash Equilibrium for the following Bayesian model, in which Player 1 chooses T with probability 1/2 and e is a real number between 0 and ½.  	**10**	**L3**	**CO4**
	b	Develop a model in case of 'Providing public good' game where each person knows only his valuation.	**10**	**L4**	**CO2**
		Module – 5			
Q.9	**a**	Find the maxminimization strategy for each player, both pure and mixed, for the following game. Player 2: L, R Player 1: L (4,1 / 1,3); R (7,0 / 2,2)	**6**	**L3**	**CO4**
	b	Determine whether the following games are strictly competitive or not in (i) Pure Strategies (ii) Mixed strategies Player 2: L, R Player 1: L (2,2 / 0,3); R (3,0 / 1,1)	**7**	**L3**	**CO4**
	c	Analyze 'Infinitely repeated prisonner's dilemma' with Tit for Tat strategy and hence find the Nash Equilibrium. Player 2: Quiet, Confess Player 1: Quiet (2,2 / 0,3); Confess (3,0 / 1,1)	**7**	**L4**	**CO2**
		OR			
Q.10	**a**	Find the maxminimization strategy for each player, both pure and mixed, for the following game. Player 2: L, R Player 1: L (2,-2 / -3,3); R (0,0 / 1,-1)	**6**	**L3**	**CO4**
	b	Determine whether the following games are strictly competitive or not in (i) Pure Strategies (ii) Mixed strategies Player 2: L, R Player 1: U (1,-1 / 3,-5); D (2,-3 / 1,-1)	**7**	**L3**	**CO4**
	c	Analyze 'Infinitely repeated prisonner's dilemma' with Grim Trigger Strategy-with limited punishment and hence find the Nash Equilibrium. Player 2: Quiet, Confess Player 1: Quiet (2,2 / 0,3); Confess (3,0 / 1,1)	**7**	**L4**	**CO2**