

**K. J. Somaiya Institute of Technology, Sion, Mumbai-22**  
(Autonomous College Affiliated to University of Mumbai)

April – May 2023		
(B.Tech.) Program: <u>Computer Engineering</u> Scheme :II		
Examination: TY Semester: VI		
Course Code: <u>HAIMLC601</u> Course Name: <b>Game Theory using AI &amp; ML</b>		
Date of Exam: 24/05/2023	Duration: 2.5 Hours	Max. Marks: 60

Instructions:  
 (1) All questions are compulsory.  
 (2) Draw neat diagrams wherever applicable.  
 (3) Assume suitable data, if necessary.

		Max. Marks	CO	BT level																					
<b>Q 1</b>	<b>Solve any six questions out of eight.</b>	<b>12</b>																							
i)	Define Bayesian Games.	2	CO1	R																					
ii)	List the advantages of Propositional logic?	2	CO4	U																					
iii)	State the Properties of Simulated Annealing.	2	CO3	R																					
iv)	What are the Applications of Local Beam search.	2	CO5	Ap																					
v)	What are the Characteristics of Heuristic Search?	2	CO2	U																					
vi)	Find The Nash Equilibrium of The Following Game the Payoff matrix is as follow, <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <tr> <td colspan="2" rowspan="2"></td> <td colspan="3" style="text-align: center;"><b>Player 2</b></td> </tr> <tr> <td style="text-align: center;">L</td> <td style="text-align: center;">C</td> <td style="text-align: center;">R</td> </tr> <tr> <td rowspan="3" style="text-align: center;"><b>Player 1</b></td> <td style="text-align: center;">T</td> <td style="text-align: center;">3,2</td> <td style="text-align: center;">6,0</td> <td style="text-align: center;">6,1</td> </tr> <tr> <td style="text-align: center;">M</td> <td style="text-align: center;">1,2</td> <td style="text-align: center;">8,4</td> <td style="text-align: center;">3,6</td> </tr> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;">2,0</td> <td style="text-align: center;">7,5</td> <td style="text-align: center;">7,4</td> </tr> </table>			<b>Player 2</b>			L	C	R	<b>Player 1</b>	T	3,2	6,0	6,1	M	1,2	8,4	3,6	B	2,0	7,5	7,4	2	CO1	U
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vii)	What is Uncertainty? Explain Bayesian network with example.	2	CO4	U																					
viii)	Differentiate K-mean and Hierarchical Clustering.	2	CO6	An																					
<b>Q.2</b>	<b>Solve any four questions out of six.</b>	<b>16</b>																							
i)	Explain rules of dominance in game theory by taking suitable example.	4	CO1	U																					
ii)	Explain Problem Reduction technique with example.	4	CO3	U																					
iii)	Discuss the Need of probabilistic reasoning in AI.	4	CO4	U																					
iv)	Explain the use of Computing the SVM for Classification.	4	CO5	U																					
v)	Demonstrate K-means clustering algorithm with an example	4	CO6	Ap																					



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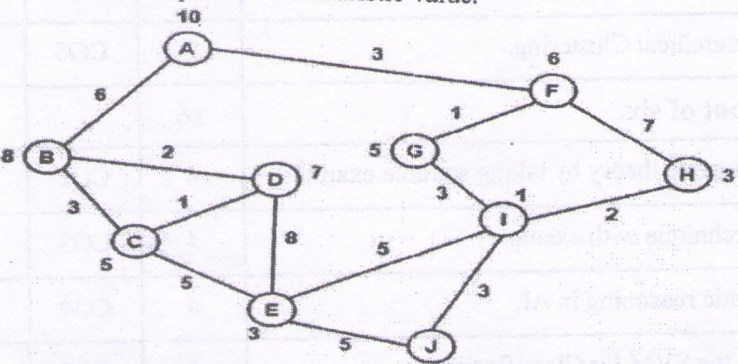
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vi)	<p>Find the optimal strategy if any, considering (Two person, zero sum) game which represent payoff matrix</p> <table border="1" data-bbox="406 541 997 752"> <tr> <td colspan="2" rowspan="2"></td> <td colspan="3">Player 2</td> </tr> <tr> <td>I</td> <td>II</td> <td>III</td> </tr> <tr> <td rowspan="3">Player 1</td> <td>I</td> <td>-3</td> <td>-2</td> <td>6</td> </tr> <tr> <td>II</td> <td>2</td> <td>0</td> <td>2</td> </tr> <tr> <td>III</td> <td>5</td> <td>-2</td> <td>-4</td> </tr> </table>			Player 2			I	II	III	Player 1	I	-3	-2	6	II	2	0	2	III	5	-2	-4	4	CO2	Ap
				Player 2																					
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Player 1	I	-3	-2	6																					
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	III	5	-2	-4																					
<b>Q.3</b>	<b>Solve any two questions out of three.</b>	16																							
i)	Examine A* algorithm with its merits and demerits. Prove optimality of A* algorithm	8	CO5	An																					
ii)	Explain the steps involved in converting the propositional logic statements into CNF with a suitable example.	8	CO4	U																					
iii)	Describe different types of environments applicable to AI agents; Characterize the task environment properties of a Part Picking Robot.	8	CO3	U																					
<b>Q.4</b>	<b>Solve any two questions out of three.</b>	16																							
i)	What is game theory? Describe various approaches in solving game problem	8	CO2	U																					
ii)	<p>Find the most cost-effective path to reach from start state A to final state J using A* Algorithm, considering the following graph the numbers written on edges represent the distance between nodes and the numbers written on nodes represent the heuristic value.</p> 	8	CO3	Ap																					
iii)	Discuss types of learning can be accomplished by Hidden Markov Model? Discuss state transition diagram of HMM.	8	CO6	U																					