Duration: 3hrs **[Max Marks: 80]**

N.B.: 1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1		Attempt any FOUR	[20]
	a	What is supervised learning? How is regression different than classification?	[05]
	b	Explain the A* algorithm with admissibility conditions.	[05]
	c	Differentiate between propositional logic and first order predicate logic with suitable examples.	[05]
	d	What is machine learning? List and explain types of learning.	[05]
	e	State and explain prisoner's dilemma strategic game and discuss the Nash equilibrium strategy profile.	[05]

		Suspect 2	
		Quiet	Fink
Suspect 1	Quiet	2,2	0,3
	Fink	3,0	1,1

2	a	What is Game Theory? What are the properties of a Game? Discuss the following terms: (a) Pay off Matrix (b) Saddle point (c) Two Persons zero sum game (d) Strategies of a Game.	[10]
	b	Describe different types of environments applicable to AI agents. Characterize the task environment properties of a Part Picking Robot.	[10]
3	a	What is an agent? Explain basic building blocks of learning agent?	[10]
	b	Explain hill climbing algorithm with suitable example.	[10]
4	a	Explain the steps involved in converting the propositional logic statements into CNF with a suitable example.	[10]
	b	Discuss types of learning can be accomplished by Hidden Markov Model? Discuss state transition diagram of HMM.	[10]

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5 a Find optimal hyperplane for the set of data points: [10]

{(3,1), (3,-1), (6,1), (6,-1), (1,0), (0,1), (0,-1), (-1,0)}

Class 1: {(3,1), (3,-1), (6,1), (6,-1)}

Class 2: {(1,0), (0,1), (0,-1), (-1,0)}

b Explain the steps in developing the machine learning application considering any suitable example. [10]

6 a What is Heuristic Search? Explain Hill climbing policy with its drawbacks. [10]

b Apply Apriori algorithm for the given dataset on The Grocery Store to discover strong association rules, assume that With Minimum Support S = 40% and Minimum Confidence C = 70%, Generate association rules from the frequent itemsets. Calculate the confidence of each rule and identify all the strong association rules. [10]

Transaction ID	Items Bought
1	{ Bread, Butter, Milk }
2	{ Bread , Butter }
3	{ Egg, Cookies, Diapers }
4	{Milk, Diapers. Bread, Butter}
5	{ Egg, Diapers}

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