

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: [10]
- (a) Pay off Matrix
- (b) Saddle point
- (c) Two Persons zero sum game
- (d) Strategies of a Game.
- b Describe different types of environments applicable to AI agents. [10]
- Characterize the task environment properties of a Part Picking Robot.
- 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? [10]
- Discuss state transition diagram of HMM.

- 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}
