

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 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

b What is supervised learning? How is regression different than classification? [05]

c Explain the A* algorithm with admissibility conditions. [05]

d Differentiate between propositional logic and first order predicate logic with suitable examples. [05]

e What is machine learning? List and explain types of learning. [05]

2 a State and explain Cournot’s model of oligopoly. [10]

b Explain Bayesian game with suitable example. Discuss the Nash equilibrium condition of a Bayesian game. [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 planning in AI and discuss role of planning in AI with suitable example. [10]

b Write first order logic statements for the following [10]

- i. If a perfect square is divisible by a prime p then it is also divisible by square of p.
- ii. Every perfect square is divisible by some prime
- iii. Alice does not like Chemistry and History
- iv. If it is Saturday and warm, then Sam is in the park.
- v. Anything anyone eats and is not killed is a food

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 types of learning can be accomplished by HMM? Discuss state transition diagram of HMM. [10]

b Trace the results of using Apriori algorithm on the grocery store example with support threshold $s=33.34\%$ and confidence threshold $c=60\%$. Show the candidate and frequent item sets for each database scan. Enumerate all the final item sets. Also indicate the association rules that are generated and highlight the strong ones, sort them by confidence. [10]

Transaction ID	Items
T1	HotDogs, Buns, Ketchup
T2	HotDogs, Buns
T3	HotDogs, Coke, Chips
T4	Chips, Coke
T5	Chips, Ketchup
T6	HotDogs, Coke, Chips