PREDICTED PAPER 2026

Artificial Intelligence

Paper / Subject Code: 48893

Time: 3 hours **Max. Marks: 80**

Note: (1) Question 1 is compulsory.
(2) Answer any three out of remaining questions.
(3) Assume suitable data where required.

Q. 1 - Solve any 4 [20 marks]

a) What is PEAS descriptor? Give PEAS descriptor for Autonomous Vehicle System. **[05]**

b) Differentiate between supervised and unsupervised learning with examples. **[05]**

c) Draw and explain architecture of Expert System with its components. **[05]**

d) Convert into FOPL:
(i) Everyone likes everyone
(ii) All graduates are unemployed
(iii) Every student smiles **[05]**

e) Explain problems faced by Hill Climbing algorithm. **[05]**

Q. 2 [20 marks]

a) Explain different types of AI agents (Simple Reflex, Model-based Reflex, Goal-based, Utility-based, Learning agent) with neat diagrams. Compare any two agents. **[10]**

b) Discuss different types of environments for Intelligent Agents. Explain environment properties for Tic-Tac-Toe problem in detail. **[10]**

Q. 3 [20 marks]

a) Explain Hill Climbing algorithm with an example. Discuss its inherent limitations (local maxima, plateau, ridges) and compare it with Simulated Annealing. Explain how simulated annealing overcomes these limitations. **[10]**

b) Give the comparative analysis of BFS, DFS, Iterative Deepening, and Bidirectional Search Strategies with respect to Time Complexity, Space Complexity, Optimality, and Completeness. Create a comparison table. **[10]**

Q. 4 [20 marks]

a) Illustrate forward chaining and backward chaining in propositional logic with example. Prove using both techniques:

"As per the law, it is a crime for an American to sell weapons to hostile nations. Country A, an enemy of America, has some missiles, and all the missiles were sold to it by Robert, who is an American citizen."

Prove that "Robert is criminal." **[10]**

b) Consider the following axioms:
(a) Ravi likes all kind of food.
(b) Apple and Chicken are food.
(c) Anything anyone eats and is not killed is food.
(d) Ajay eats peanuts and still alive.
(e) Rita eats everything that Ajay eats.

Prove that "Ravi likes Peanuts" using Resolution technique. Draw resolution tree. **[10]**

Q. 5 [20 marks]

a) Define chromosome, selection, fitness function, crossover and mutation as used in Genetic Algorithm. Explain how Genetic Algorithm works with a detailed example. **[10]**

b) Explain Alpha-Beta pruning algorithm with an example. Apply alpha beta pruning on a game tree with given values considering the first node as MAX. **[10]**

Q. 6 [20 marks]

a) Define Bayesian Belief Network. Describe the steps of constructing belief network with a detailed example. Explain how it is used for probabilistic reasoning. **[10]**

b) What is planning in AI? Explain Partial Order Planning and Total Order Planning in detail with suitable examples. Compare both approaches. **[10]**
