UCSE513 ARTIFICIAL INTELLIGENCE

Full Marks: 100

Time: Three Hours

Answer any FIVE questions

- Q. 1 a What are the key steps involved in problem formulation in AI? Explain with 10 an example.
 - b Define intelligent agents and explain the role of environments in the 10 functioning of an agent. Provide examples to illustrate your answer.
- Q. 2 a Compare Breadth-First Search (BFS) and Depth-First Search (DFS) in terms 10 of completeness, time complexity, space complexity, and optimality.
 - b What is a heuristic function in AI search? Explain its role in A* search with 10 an example.
- Q. 3 a Explain the Minimax algorithm. How is it used to make optimal decisions in 10 two-player games?
 - b What is Alpha-Beta pruning? How does it improve the efficiency of the 10 Minimax algorithm? Illustrate with an example.
- Q. 4 a What is the Wumpus World? Describe how knowledge-based agents use 10 logic to make decisions in the Wumpus World environment.
 - b Differentiate between Forward Chaining and Backward Chaining in 10 propositional logic. Provide an example for each.
- Q. 5 a What is the classical planning problem in AI? Explain the basic components 10 required to represent a planning problem.
 - b Describe the difference between Forward State Space Search and Backward 10 State Space Search in planning. Provide an example for each approach.
- Q. 6 a What is Decision Tree Learning? Explain its key components with an 10 example.
 - b What is the EM (Expectation-Maximization) Algorithm? Describe its role in 10 learning with hidden variables.