

Time: 3 Hours

Max. Marks: 80

Note:

- (1) Question No. 1 is **Compulsory**.
- (2) Attempt any **three** questions out of the remaining **five** questions.
- (3) Each question carries 20 Marks.
- (4) Assume suitable data if required.

1. Attempt **any four**.
 - (a) Define Intelligent Agent. What are the characteristics of an Intelligent Agent? **5**
 - (b) Write applications of the Breadth First Search (BFS) algorithm. **5**
 - (c) What is FOPL? Represent the following sentences using FOPL **5**
 - i) John has at least two friends
 - ii) If two people are friends then they are not enemies.
 - (d) Differentiate between forward and backward chaining. **5**
 - (e) Explain PEAS with the help of one example. **5**
2. (a) Draw and Describe the Architecture of the Utility-based agent. How is it different from a Model-based agent? **10**
 - (b) Explain A* Algorithm with an example. **10**
3. (a) Explain the Resolution by Refutation with a suitable example. **10**
 - (b) State the limitations of the steepest-ascent Hill climbing algorithm. **10**
4. (a) Describe the Min-Max algorithm in detail with the help of one example. Also, discuss the properties of the Min-Max algorithm. **10**
 - (b) Explain different inference rules for First Order Predicate Logic (FOPL). **10**
5. (a) Define the terms chromosome, fitness function, crossover and mutation as used in Genetic algorithms. Explain how Genetic algorithms work. **10**
 - (b) Explain the following **10**
 - i) Static and Dynamic Environment
 - ii) Single-agent and Multi-agent Environment.
6. Write a short note on **any two** of the following.
 - (a) Expert System Architecture and Applications **10**
 - (b) Local Search Algorithms **10**
 - (c) Decision Tree learning **10**