

**Dr. Babasaheb Ambedkar Open University**  
**Term End Examination January – 2026**

|                     |                                                           |                   |                             |
|---------------------|-----------------------------------------------------------|-------------------|-----------------------------|
| <b>Course</b>       | <b>: MCA</b>                                              | <b>Date</b>       | <b>: 26/02/2026</b>         |
| <b>Subject Code</b> | <b>: MCA-E2305</b>                                        | <b>Time</b>       | <b>: 03:00pm to 05:15pm</b> |
| <b>Subject</b>      | <b>: Artificial Intelligence and<br/>Machine Learning</b> | <b>Duration</b>   | <b>: 02.15 Hours</b>        |
|                     |                                                           | <b>Max. Marks</b> | <b>: 70</b>                 |

---

**Section A**

**Answer the following (Attempt any three) (30)**

1. Define Artificial Intelligence. Explain the differences between Strong AI and Weak AI, and discuss the various applications of AI in modern society.
2. What is Machine Learning? Explain the three main types: Supervised, Unsupervised, and Reinforcement Learning with suitable examples for each.
3. Describe the architecture and working of an Artificial Neural Network (ANN). Explain how the Back propagation algorithm is used for training
4. Explain the concept of State Space Search. Discuss the working of the A\* Search algorithm and its significance in problem-solving
5. What are Multi-Agent Systems (MAS)? Discuss the role of decentralized decision-making and coordination in multi-agent environments.

**Section B**

**Answer the following (Attempt any four) (20)**

1. Explain the concept of Turing Test. What are its limitations in determining machine intelligence?
2. Discuss the "Emergent Behavior" in multi-agent systems and how it contributes to solving complex problems.
3. What is Over fitting and Under fitting in Machine Learning? Suggest methods to prevent these issues.
4. Explain the working of Genetic Algorithms (GA) and the importance of operators like Crossover and Mutation.
5. Describe the concept of Simultaneous Localization and Mapping (SLAM) in autonomous robots.
6. Differentiate between Depth-First Search (DFS) and Breadth-First Search (BFS) in terms of time and space complexity.

**Section C**

**Part – A (Multiple Choice Questions) (10)**

- 1 Who is often referred to as the "Father of Artificial Intelligence"?  
A. Alan Turing                      B. John McCarthy  
C. Marvin Minsky                    D. Elon Musk
- 2 In which search algorithm is the heuristic function used to estimate the cost to the goal?  
A. BFS                                  B. DFS  
C. A\* Search                         D. Linear Search
- 3 A dataset used to train a model is known as:  
A. Test Set                            B. Validation Set  
C. Training Set                       D. Sample Set

- 4 Which type of learning is used for clustering unlabeled data?  
A. Supervised B. Unsupervised  
C. Semi-supervised D. Reinforcement
- 5 The process of mimicking the human brain's structure in AI is known as:  
A. Logic Programming B. Expert Systems  
C. Neural Networks D. Data Mining
- 6 In a Genetic Algorithm, the process of selecting the best individuals for reproduction is based on:  
A. Mutation Rate B. Fitness Function  
C. Crossover Point D. Random Selection
- 7 NLP stands for:  
A. Neural Logic Processing B. Natural Language Processing  
C. Network Layer Protocol D. Normal Language Programming
- 8 Which of the following is an example of an agent in AI?  
A. A Robot B. A Software Program  
C. A Human D. All of the above
- 9 In Reinforcement Learning, the feedback provided to the agent is called:  
A. Input B. Reward/Penalty  
C. Prediction D. Bias
- 10 Which algorithm is commonly used for classification problems?  
A. K-Means B. Support Vector Machines (SVM)  
C. Apriori D. PageRank

**Part – B (Do as Directed)**

**(10)**

**State whether the following statements are true or false**

- 1 Machine Learning is a subset of Artificial Intelligence.
- 2 Expert Systems are designed to solve complex problems by reasoning through bodies of knowledge.
- 3 Heuristic search guarantees the shortest path in every scenario without a cost function.
- 4 Back propagation is used in Unsupervised Learning.
- 5 Deep Learning uses multiple layers of neural networks to extract high-level features.
- 6 Swarm Intelligence is based on the collective behavior of decentralized systems.
- 7 Policy iteration and Value iteration are techniques used in Supervised Learning.
- 8 A decision tree is a type of graphical representation of possible solutions.
- 9 Big Data is not relevant to the performance of Machine Learning models.
- 10 Adaptive agents can adjust their strategies based on dynamic environments.

**\*\*\*\*\***