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## Seventh Semester B.Tech. Degree Examination, Dec.2023/Jan.2024 Artificial Intelligence and Machine Learning

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

### Module-1

- 1 a. What is Artificial Intelligence? Discuss the branches of Artificial Intelligence. (10 Marks)
- b. Explain any two AI techniques for solving tic-tac-toe problem. (10 Marks)

**OR**

- 2 a. What is state space? Explain concept of state space representation using water jug problem. (10 Marks)
- b. Discuss AO\* algorithm. (10 Marks)

### Module-2

- 3 a. List different types of knowledge representation. Explain inheritable knowledge representation in detail. (10 Marks)
- b. Explain concept learning task with example. (10 Marks)

**OR**

- 4 a. Explain Find-S algorithm with example. (10 Marks)
- b. Discuss candidate elimination algorithm with example. (10 Marks)

### Module-3

- 5 a. Explain briefly the features of Bayesian learning methods. (10 Marks)
- b. State and explain Bayes theorem. (10 Marks)

**OR**

- 6 a. Explain Maximum Likelihood (ML) Hypothesis and Maximum Likelihood (MAP) Hypothesis. (10 Marks)
- b. Explain Brute-force learning algorithm. (10 Marks)

### Module-4

- 7 a. Describe the minimum description length principle. (10 Marks)
- b. Explain Bayes optimal classifier. (10 Marks)

**OR**

- 8 a. Explain representation of Bayesian belief network with example. (10 Marks)
- b. Derive K-means algorithm with equations. (10 Marks)

### Module-5

- 9 a. Write K-nearest neighbor algorithm for approximation of discrete valued function. (10 Marks)
- b. Explain CADFT system using case based reasoning. (10 Marks)

**OR**

- 10 a. What is reinforcement learning? Explain concepts of reinforcement learning and characteristics. (10 Marks)
- b. Derive an expression for Q function. Using same, write algorithm for learning. (10 Marks)