CBCS SCHEME

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21AI71

Seventh Semester B.E./B.Tech. Degree Examination, June/July 2025

Advanced AI and ML

Time: 3 hrs. Max. Marks: 100

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Explain the task environment and properties of task environments. **(10 Marks)**

b. Describe and compare the four basic types of agent programs. **(10 Marks)**

OR

2 a. Explain the concept of adversarial search in game playing agents. How does minimax algorithm help an agent make decisions in a competitive environment? **(10 Marks)**

b. Explain the alpha beta search algorithm also write the effectiveness of alpha beta pricing. **(10 Marks)**

Module-2

3 a. Describe the quantification problem in the context of logical agents acting under uncertainty. **(10 Marks)**

b. How does an agent uses degrees of belief to handle uncertainty in decision making? **(10 Marks)**

OR

4 a. Describe the naïve Bayes model and its assumptions about conditional independence. **(10 Marks)**

b. What is Bayes 'theorem' and how it is applied in combining multiple source of evidence? **(10 Marks)**

Module-3

5 a. Explain the concept of a Perceptron with a neat diagram. Discuss the Perceptron training rule. **(10 Marks)**

b. Explain the derivation of the Back propagation rule. **(10 Marks)**

OR

6 a. Explain the prototypical of a genetic algorithm. **(10 Marks)**

b. Explain the Hypothesis space search in the genetic algorithm. **(10 Marks)**

Module-4

7 a. Explain the association rule mining with an example. **(10 Marks)**

b. Explain the application of collaborative filtering in building recommendation systems. Illustrate with python code Implementation. **(10 Marks)**

OR

8 a. Explain the Naïve Baye's Model for sentiment classification in Python? Illustrate with code implementation. **(10 Marks)**

b. What is the TF-IDF vectorizer, and how is it used in text analytics? Discuss its role in improving the performance of text classification tasks. What challenges are associated with text analytics? **(10 Marks)**

Module-5

9 a. Explain the following clustering technique with an algorithm.
i) K-means method ii) K-medoids method. **(10 Marks)**

b. Explain how hierarchical clustering works, including the differences between building clustering from the bottom up (agglomerative) and top down (divisive). **(10 Marks)**

OR

10 a. What is instance – based learning? Explain K-nearest Neighbour learning algorithm. **(10 Marks)**

b. Explain the following :
i) Locally weighted Linear Regression
ii) Radial basis functions. **(10 Marks)**

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