

CBCS SCHEME

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21AI71

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025 Advanced AI and ML

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define AI. Explain the foundation of AI in detail. (10 Marks)
b. Explain history of AI in detail. (10 Marks)

OR

- 2 a. Briefly explain the properties of task environment. (10 Marks)
b. Explain the following with respect to structure of agents:
i) Simple reflex agents
ii) Model based reflex agents
iii) Utility based agents (10 Marks)

Module-2

- 3 a. What is decision theory? Describe the decision theoretic agent that selects rational actions. (10 Marks)
b. What is Baye's rule? Explain with a relevant example. (10 Marks)

OR

- 4 a. Explain the following with examples:
i) Kolmogorov's axioms
ii) Inclusion – Exclusion principle
iii) Probability density function
iv) Joint Probability distribution
v) Independence (10 Marks)
b. Prove that probabilistic agent can perform better than logical agent by concept of wumpus world. (10 Marks)

Module-3

- 5 a. Define perceptrons. How the perceptrons are represented? Explain perceptron training rule. (08 Marks)
b. Derive the gradient descent rule. (08 Marks)
c. Write the stochastic gradient descent version of the BACKPROPAGATION algorithm for feedforward network containing 2 layers of sigmoid units. (04 Marks)

OR

- 6 a. Write the prototypical genetic algorithm. (05 Marks)
b. Explain the different operators with relevant bit strings. (06 Marks)
c. Illustrate program tree representation in genetic programming. Explain block stacking problem. (09 Marks)

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-4

- 7 a. What is association rule mining? Explain support, confidence and lift. (10 Marks)
b. What is collaborative filtering? Explain the types. (10 Marks)

OR

- 8 a. What is BOW model? What are the 3 ways to identify the importance of words in BOW model? (08 Marks)
b. Explain Naïve – Baye’s model for sentiment classification. (08 Marks)
c. Brief stemming and lemmatization process. (04 Marks)

Module-5

- 9 a. Define Clustering. What are the different types of clustering? (06 Marks)
b. Explain k-medoids clustering with relevant example. (08 Marks)
c. Write the k-nearest neighbor algorithm using voronoi diagram. (06 Marks)

OR

- 10 a. Explain distance weighted Nearest neighbor algorithm. (05 Marks)
b. Derive and explain locally weighted Linear Regression. (10 Marks)
c. Briefly explain radial basis function. (05 Marks)
