CBCS SCHEME

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21CS752

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Introduction to 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 Artificial Intelligence. Explain the below approaches to Artificial Intelligence with respective definitions.
i) Acting Humanly ii) Thinking Humanly **(10 Marks)**

b. Define Agent. With a neat diagram, explain how agents interact with environment through sensors and actuators. **(10 Marks)**

OR

2 a. Explain the structure of an agent program with an example agent program. **(10 Marks)**

b. With a neat diagram and agent function, explain the following :
i) Simple Reflex Agents ii) Goal Based Agents **(10 Marks)**

Module-2

3 a. Illustrate with an example, the components of a Well-defined problem. **(10 Marks)**

b. What are Toy problems and Real-world problems? Explain the formulation of vacuum world problem with a neat diagram of its state space. **(10 Marks)**

OR

4 a. Explain Breadth-First search strategy with a pseudocode for BFS on a graph and simple binary tree. **(10 Marks)**

b. What is Heuristic search? Explain greedy best-first search with an example. **(10 Marks)**

Module-3

5 a. Discuss different types of Machine Learning with example. **(10 Marks)**

b. Explain Machine Learning process with a neat diagram. **(10 Marks)**

OR

6 a. Write a note on :
i) Elements of big data ii) Types of data **(10 Marks)**

b. Explain 4-layer architecture of big data analysis framework. **(04 Marks)**

c. Write a note on Data Preprocessing step of Big Data processing cycle. **(06 Marks)**

Module-4

7 a. Explain Bivariate data with an example. **(03 Marks)**

b. Define covariance and correlation. Find the covariance and correlation coefficient of data.
$X = \{1, 2, 3, 4, 5\}$ and $Y = \{1, 4, 9, 16, 25\}$ **(07 Marks)**

c. Write the procedure for applying Gaussian elimination method. Solve the following set of equations using Gaussian elimination method:

$$2x_1 + 4x_2 = 6$$
$$4x_1 + 3x_2 = 7$$

(10 Marks)

OR

8 a. Write Find-S algorithm. Apply Find-S algorithm on the below dataset that contains details of the performance of students and their likelihood of getting a job offer or not in their final semester.

CGPA	Interactiveness	Practical Knowledge	Communication Skills
≥ 9	Yes	Excellent	Good
≥ 9	Yes	Good	Good
≥ 8	No	Good	Good
≥ 9	Yes	Good	Good

Logical Thinking	Interest	Job Offer
Fast	Yes	Yes
Fast	Yes	Yes
Fast	No	No
Slow	No	Yes

(10 Marks)

b. List the limitations of Find-S algorithm. **(03 Marks)**

c. Write K-Nearest-Neighbors (K-NN) algorithm. **(07 Marks)**

Module-5

9 a. What are artificial neurons? Describe the structure of a single neuron with a neat diagram. **(04 Marks)**

b. Explain simple model of an artificial neuron. **(08 Marks)**

c. Write and explain Perceptron algorithm. **(08 Marks)**

OR

10 a. Elaborate on the types of Artificial Neural Networks. **(10 Marks)**

b. Write and explain the algorithm for Radial Basis Function Neural Network. **(10 Marks)**

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