CBCS SCHEME

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21AI54

Fifth Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Principles of Artificial Intelligence

Time: 3 hrs. Max. Marks: 100

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

Module-1

1 a. What are the four categories used to define Artificial Intelligence. Briefly explain each of them. **(10 Marks)**

b. What is an agent? How agent interacts with environment? Give few examples for agents. **(05 Marks)**

c. Write the PEAS description for automated taxi agent. **(05 Marks)**

OR

2 a. What is an intelligent agent? What are the different types of intelligent agent? Briefly explain each of them. **(10 Marks)**

b. Classify the environments based on their properties and characteristics. Briefly explain any five environments. **(10 Marks)**

Module-2

3 a. Define problem-solving agent. What is the primary objective of the problem-solving agents? **(07 Marks)**

b. Draw solution for vacuum cleaner world using state transition diagram. **(07 Marks)**

c. Write the general description of graph-search algorithms. **(06 Marks)**

OR

4 a. Explain any four uninformed search strategies provide examples to each of them. **(10 Marks)**

b. Write all the states of the tree to find out the path for the following Depth-First-Search tree with the initial node A and goal node M. [Refer Fig.Q4(b)]

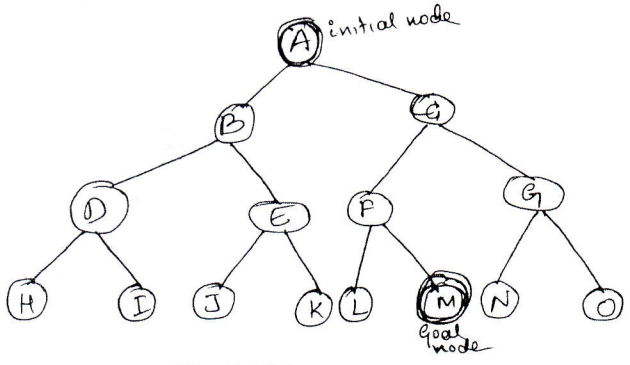

Fig.Q4(b) **(05 Marks)**

c. Define infrastructures of search algorithms and also explain how to evaluate the performance of search algorithms. **(05 Marks)**

Module-3

5 a. Define Heuristic search strategies. Explain A* search with suitable example. **(08 Marks)**

b. Explain Greedy Breadth First search, with an example. **(08 Marks)**

c. Explain heuristic function with respect to 8-puzzle problem. **(04 Marks)**

OR

6 a. Define the following :
(i) Knowledge base (ii) Knowledge base agents (iii) Levels of knowledge base agents. **(07 Marks)**

b. Write the PEAS description for WUMPUS world task environment. **(07 Marks)**

c. Define the following propositional logic:
(i) Syntax (ii) Semantics **(06 Marks)**

Module-4

7 a. Explain the symbols and interpretations of First Order Logic. **(06 Marks)**

b. Explain the following with respect to first order logic:
(i) Terms (ii) Atomic sentences (iii) Complex sentences (iv) Qualifiers **(10 Marks)**

c. Define the sets, numbers and list with respect to first order logic. **(04 Marks)**

OR

8 a. Explain the inference rule for qualifiers of inference in first order logic. **(05 Marks)**

b. Define Unification and Lifting **(08 Marks)**

c. Explain forward and backward chaining with example. **(07 Marks)**

Module-5

9 a. Explain how the agent acting under uncertainty? Explain uncertainty for dental patient toothache diagnosis problem. **(10 Marks)**

b. Discuss how uncertainty is modeled in WUMPUS world and how probabilistic reasoning enhances the decision making in such environments. **(10 Marks)**

OR

10 a. State Baye's rule. Write the Baye's rule for multivalued variable. **(05 Marks)**

b. Explain agents use the basic probability notations to handle uncertainty. **(05 Marks)**

c. Briefly explain Full Joint Distribution. **(05 Marks)**

d. With an example explain the events that are independent on probability calculations. **(05 Marks)**

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