

B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2024

Third Semester

Computer Science and Engineering (AIML)

20AIPC401 - FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (MCQ) (20 × 1 = 20 Marks)

Answer ALL Questions

- | | <i>Marks</i> | <i>K-
Level</i> | <i>CO</i> |
|---|--------------|---------------------|-----------|
| 1. The _____ agents try to maximize their own expected "happiness."
(a) Simple Reflex agent (b) Model Based Reflex agent
(c) Goal Based agent (d) Utility Based agent | 1 | K1 | CO1 |
| 2. A _____ environment is one in which actions are characterized by their possible outcomes, with no probabilities are attached to them.
(a) Nondeterministic (b) Deterministic (c) Stochastic (d) Discrete | 1 | K1 | CO1 |
| 3. In a chess-playing environment, Tick the appropriate one
(a) Observable: Fully or Partially (b) Agents: Single or Multi
(c) Episodic: Episodic or sequential (d) Nature: Discrete or continuous. | 1 | K1 | CO1 |
| 4. _____ operate on complete-state formulations, keeping only a small number of nodes in memory.
(a) Hill climbing (b) Simulated annealing
(c) Genetic algorithm (d) Convex optimization | 1 | K1 | CO2 |
| 5. When the agent's percepts provide no information at all is called a _____ problem
(a) Exploration (b) Exploitation (c) Sensor less (d) All the above | 1 | K1 | CO2 |
| 6. _____ allows us to ignore portions of the search tree that make no difference to the final choice.
(a) Backtracking (b) Pruning (c) Random selection (d) Pathfinding | 1 | K1 | CO2 |
| 7. Knowledge is contained in agents in the form of sentences are stored in _____
(a) knowledge base (b) Environment (c) Database (d) All the above | 1 | K1 | CO3 |
| 8. Propositional logic is a simple language consisting of _____ and logical connectives.
(a) Logical symbols (b) Proposition symbols (c) Semantics (d) Predicates | 1 | K1 | CO3 |
| 9. Which of the following logical expressions accurately represents the statement "All surgeons are doctors"?
(a) $\exists x (\text{Surgeon}(x) \wedge \text{Doctor}(x))$ (b) $\forall x (\text{Surgeon}(x) \rightarrow \text{Doctor}(x))$
(c) $\forall x (\text{Doctor}(x) \rightarrow \text{Surgeon}(x))$ (d) $\exists x (\text{Doctor}(x) \wedge \text{Surgeon}(x))$ | 1 | K1 | CO3 |
| 10. What is the primary objective of planning in AI?
(a) To optimize the machine learning model
(b) To generate a sequence of actions to achieve a goal
(c) To classify data into categories
(d) To detect objects in an image | 1 | K1 | CO4 |
| 11. Which of the following is a common approach to AI planning?
(a) Forward chaining (b) Reinforcement learning
(c) Genetic algorithms (d) STRIPS (Stanford Research Institute Problem Solver) | 1 | K1 | CO4 |
| 12. What is the difference between "planning" and "search" in AI?
(a) Search is a part of planning
(b) Planning is a part of search
(c) Search involves reasoning, while planning doesn't
(d) There is no difference between planning and search | 1 | K1 | CO4 |

13. A model of the probability distribution of n-letter sequences is thus called a _____. 1 K1 CO5
 (a) language model (b) n-gram (c) Markov chain model (d) Corpus
14. _____ is the task of finding documents that are relevant to a user's need for information. 1 K1 CO5
 (a) Categorization (b) Information retrieval
 (c) Information Extraction (d) Information Processing
15. Which of the following is a common task in NLP? 1 K1 CO5
 (a) Speech Recognition (b) Image Segmentation
 (c) Object Detection (d) Video Classification
16. What is a 'Stop Word' in NLP? 1 K1 CO5
 (a) A word that stops the sentence from continuing
 (b) A frequently used word that is often removed from text during preprocessing
 (c) A word that has no meaning
 (d) A rare word found in text
17. Robots are equipped with _____ for perceiving their environment and with _____ which they can assert physical forces on their environment. 1 K1 CO6
 (a) Sensors and effectors (b) Effectors and sensors
 (c) Sensors and Anchors (d) Anchors and Sensors
18. Calculating the configuration of a robot whose effector location is specified in workspace coordinates is known as _____. 1 K1 CO6
 (a) kinematics (b) Inverse kinematics (c) Configuration (d) Inverse configuration
19. _____ actuation uses compressed gas in end effector. 1 K1 CO6
 (a) Pneumatic (b) Hydraulic (c) Electric (d) Gaseous
20. Which of the following components is responsible for controlling the mechanical movement of a robot? 1 K1 CO6
 (a) Sensor (b) Actuator (c) Processor (d) Power supply

PART - B (10 × 2 = 20 Marks)

Answer ALL Questions

21. List the criteria to measure the performance of search strategies. 2 K1 CO1
22. Differentiate Informed & Uninformed search. Give examples. 2 K2 CO1
23. List out the types of hill climbing algorithm. 2 K1 CO2
24. What is a local search algorithm and how does it differ from global search algorithms? 2 K1 CO2
25. What are quantifiers? 2 K1 CO3
26. What are categories and objects? 2 K1 CO3
27. List the components of a planning system. 2 K1 CO4
28. Define reactive planning. 2 K1 CO4
29. What is tokenization in NLP? 2 K1 CO5
30. Draw the figure showing the robot's perception. 2 K1 CO6

PART - C (6 × 10 = 60 Marks)

Answer ALL Questions

31. a) Generalize the different search algorithms used in Local Search Technique. 10 K2 CO1
- OR**
- b) Categorize the different types of Intelligent Agent with a neat diagram. 10 K2 CO1
32. a) Build Map coloring problem with an example. 10 K3 CO2

OR

- b) Apply the logic in crypt arithmetic problem for the below Problem: No two letters have the same value. The sums of the digits must be shown in the problem. 10 K3 CO2

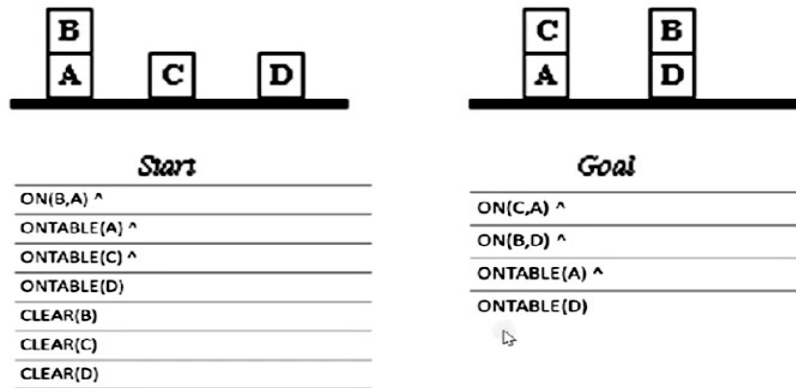
SEND
+MORE
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MONEY

33. a) Build forward and backward chaining with an example. 10 K3 CO3

OR

- b) Choose the steps associated with the Knowledge Engineering process and outline the concept of semantic networks in detail. 10 K3 CO3

34. a) Solve the logic with step in Goal stack problem. 10 K3 CO4



OR

- b) Develop in detail about the representation of languages for flying a plane using STRIPS language. 10 K3 CO4

35. a) Describe Natural Language Processing and its applications in detail. 10 K2 CO5

OR

- b) Explain word embeddings. What are the advantages and limitations of each approach? 10 K2 CO5

36. a) Discuss planning and control in Robot with a diagram. 10 K2 CO6

OR

- b) Explain how data from multiple sensors is combined for a beneficial robotic application. 10 K2 CO6