BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – M.Tech.(CSE)-AIML-2024
Course Name – Artificial Intelligence and Knowledge Representation
Course Code - MTA10102
(Semester I)

Full Marks : 60   **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)   1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Select correct option: AI stand for _____
   a) Advanced Intelligence
   b) Artificial Imagination
   c) Artificial Intelligence
   d) All Intelligence

(ii) Select an environment that is NOT typically considered a part of an agent's environment.
   a) Sensors
   b) Actuators
   c) The memory space allocated to an AI program
   d) External entities and objects

(iii) Predict the primary purpose of representing facts in logic.
   a) To store information in a database
   b) To enable automated reasoning and inference
   c) To create graphical representations
   d) To facilitate natural language processing

(iv) Identify the term that describes the process of converting a fuzzy output into a crisp value.
   a) Fuzzification
   b) Defuzzification
   c) Normalization
   d) Aggregation

(v) Choose the form of learning is based on the idea that behaviors followed by rewards are more likely to be repeated, while behaviors followed by punishments are less likely to be repeated.
   a) Classical conditioning
   b) Observational learning
   c) Operant conditioning
   d) Habituation

(vi) Choose the term for the tendency to respond to a stimulus that is similar to the conditioned stimulus as if it were the conditioned stimulus itself.
   a) Generalization
   b) Discrimination
   c) Extinction
   d) Spontaneous recovery

(vii) Choose the meaning of "tokenization" in NLP.

a) Breaking down a document into individual words or tokens

b) Encrypting sensitive information in a text

c) Generating human-like text using deep learning

d) Analyzing the tone and mood of a text

(viii) Select the inductive learning algorithms that is often used for text classification and spam detection.

a) K-means clustering

b) Support Vector Machines (SVM)

c) Principal Component Analysis (PCA)

d) Naive Bayes

(ix) Define a problem space in the context of problem-solving.

a) A physical space where problems occur

b) The set of all possible states from the initial state to the goal state

c) The space where problems are stored

d) The space where problems are generated

(x) Identify the primary objective of a search algorithm.

a) To find the optimal solution

b) To find any solution

c) To find the most efficient solution

d) To generate new problems

(xi) Identify the search algorithm that uses an open and closed list to keep track of visited and unvisited states.

a) Uniform-Cost Search

b) Greedy Best-First Search

c) A* Search

d) Breadth-First Search

(xii) Classify the best describes in the complete nature of Greedy Best-First Search.

a) It is always complete.

b) It is complete when using admissible heuristics.

c) It is never complete.

d) Completeness depends on the search space.

(xiii) Identify the type of search algorithm in Hill Climbing.

a) Uninformed search algorithm

b) Informed search algorithm

c) Random search algorithm

d) Depth-First Search

(xiv) Select type of nodes that are pruned in Alpha-Beta Pruning.

a) Only nodes with odd values

b) Nodes with equal values

c) Nodes that cannot affect the final decision

d) All leaf nodes

(xv) Select the types of games that is primarily used in Alpha-Beta Pruning.

a) Games with no uncertainty or chance elements

b) Games with random elements and dice rolls

c) Board games with a fixed number of pieces

d) Card games with hidden hands

Group-B
(Short Answer Type Questions)   3 x 5=15

2. Define the optimal strategy to win or at least tie in Tic-Tac-Toe   (3)
3. Explain the concept of the environment in the context of agent-based systems and provide   (3)
   an example of a simple environment.
4. Explain Depth-Limited Search Algorithm   (3)
5. Compare Propositional Logic and Predicate Logic when representing simple facts. (3)
6. Differentiates between symbolic and sub-symbolic representations in AI.   (3)

OR

Analyze issue of "Ontological Commitment" in Knowledge Representation.   (3)

Group-C
(Long Answer Type Questions)   5 x 6=30

7. Explain Hill climbing search with it's advantages and disadvantages.   (5)

8. Explain the characteristics of procedural knowledge. Provide practical examples to support (5) your explanation.
9. Explain the advantages and disadvantages of using decision trees in machine learning. (5)
10. Compare the concept of computable functions and predicates in logic. Provide examples to (5) illustrate both.
11. Explain the odds ratio in the context of logistic regression and its significance. (5)
12. Estimate the advantages and disadvantages of Fuzzy Logic in real-world applications. (5) Provide examples to illustrate your points.

OR

Evaluate the steps involved in the fuzzy inference process. Provide an example to illustrate (5) your explanation.

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