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Barasat, Kolkata -700125

BRAINWARE UNIVERSITY

Term End Examination 2024-2025

Programme – Dip.CSE-2022

Course Name – Fundamentals of AI

Course Code - DCSE-PE602A

(Semester VI)

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) Identify the main goal of Artificial Intelligence.
 - a) To replace human intelligence
 - b) To develop systems that mimic human intelligence
 - c) To improve computer hardware
 - d) To increase internet speed
- (ii) Identify the game that is commonly used to explain AI techniques in decision-making.
 - a) Chess
 - b) Tic-Tac-Toe
 - c) Sudoku
 - d) Poker
- (iii) Identify the correct example of a production system.
 - a) Spreadsheet software
 - b) Expert Systems
 - c) Operating Systems
 - d) Social Media Platforms
- (iv) Identify the term used to describe AI techniques that search through all possible states to find a solution.
 - a) Decision Trees
 - b) State Space Search
 - c) Neural Networks
 - d) Genetic Algorithms
- (v) Identify the term used for AI systems that use a set of "if-then" rules to reach conclusions.
 - a) Reinforcement Learning
 - b) Expert System
 - c) Genetic Algorithms
 - d) Neural Networks
- (vi) Show the search technique that explores as deep as possible before backtracking.
 - a) Depth-First Search
 - b) Breadth-First Search
 - c) A* Search
 - d) Minimax Search
- (vii) Show the search strategy that uses heuristics to decide the best path.
 - a) Uniform Cost Search
 - b) Breadth-First Search
 - c) Minimax Search
 - d) Greedy Best-First Search
- (viii) Show the search algorithm that is commonly used in game-playing AI.
 - a) Breadth-First Search
 - b) A* Search

- c) Minimax Search
(ix) Select the technique that helps in reducing the number of nodes evaluated in minimax.
a) Heuristic Search
c) Bidirectional Search
(x) Select the main goal of supervised learning.
a) Finding hidden patterns
c) Maximizing rewards
(xi) Label the learning type where AI receives rewards for its actions.
a) Supervised Learning
c) Unsupervised Learning
(xii) Identify the algorithm mostly used in supervised learning.
a) K-Means Clustering
c) Decision Trees
(xiii) Identify a common technique used in unsupervised learning.
a) K-Means Clustering
c) Logistic Regression
(xiv) Select the best example of deductive learning.
a) Grouping images into clusters
c) AI following a set of predefined rules
(xv) State a limitation of deductive learning.
a) Requires labelled data
c) Needs reinforcement signals
d) Hill Climbing
b) Greedy Best-First Search
d) Alpha-Beta Pruning
b) Predicting outcomes
d) Applying logical rules
b) Reinforcement Learning
d) Deductive Learning
b) Q-Learning
d) Genetic Algorithms
b) Naïve Bayes
d) Decision Trees
b) AI learning from rewards
d) Predicting weather based on past data
b) Does not require training
d) Cannot generate new rules

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Define a production system in AI. (3)
3. Arrange the problem-solving steps in state space search. (3)
4. Describe the role of a goal stack in planning systems. (3)
5. Define learning in artificial intelligence. (3)
6. Categorize the main differences between Greedy Best-First Search and A Search in terms of heuristic usage.* (3)

OR

Classify the types of games where adversarial search is used and explain how the minimax algorithm applies to each type. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Explain Hill Climbing Search Algorithm. (5)
8. Explain the Minimax Algorithm. (5)
9. Analyze the advantages and limitations of inductive learning. (5)
10. Define Artificial Intelligence (AI) and describe its significance in solving real-world problems. (5)
11. Evaluate the Limitations of Hill Climbing in Solving Complex Optimization Problems (5)
12. Analyze the role of the different components of a planning system in solving a real-world problem, such as autonomous vehicle navigation or robotic path planning. Explain how each component contributes to achieving the final goal. (5)

OR

Evaluate the effectiveness of Goal Stack Planning in solving complex problems. Compare it with other planning techniques by identifying its advantages, limitations, and potential improvements. (5)