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BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – B.Tech.(CSE)-DS-2021/B.Tech.(CSE)-DS-2022/B.Tech.(CSE)-DS-2023/B.Tech.(CSE)-2023
Course Name – Artificial Intelligence
Course Code - PEC-CSD501B/PEC-CSG501B
(Semester V)

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 the goal of Artificial Intelligence.
- a) To solve artificial problems
- b) To extract scientific causes
- c) To explain various sorts of intelligence
- d) To solve real-world problems

(ii) Choose a significant application of AI in real-world scenarios.
- a) Natural language processing for automated translations.
- b) Spreadsheet management and data organization.
- c) Basic image editing and enhancement.
- d) Web browsing and information retrieval.

(iii) Select a skill crucial for AI practitioners to excel in the field.
- a) Problem-solving and critical thinking.
- b) Basic data entry and clerical tasks.
- c) Social media management and engagement.
- d) Conducting routine maintenance on computer hardware.

(iv) Identify a characteristic of Breadth-First Search (BFS).
- a) Complete
- b) Optimal
- c) Admissible
- d) Heuristic

(v) Select an advantage of Depth-First Search (DFS).
- a) Less memory usage
- b) Complete
- c) Optimal
- d) Admissible

(vi) Identify a drawback of Breadth-First Search (BFS).
- a) Memory usage
- b) Completeness
- c) Optimality
- d) Heuristics

(vii) Choose the heuristic that estimates the cost from the current state to the goal.
- a) Manhattan Distance
- b) Euclidean Distance
- c) Hamming Distance
- d) Chebyshev Distance

(viii) Select a common application of the A* algorithm.
- a) Pathfinding
- b) Sorting

c) Graph Traversal
d) Data Compression

(ix) Choose the algorithm that guarantees the shortest path in a weighted graph.

a) Dijkstra's Algorithm
b) A* Algorithm
c) Greedy Best-First Search
d) Depth-First Search

(x) Choose the correct statement that represents a valid propositional logic formula.

a) $(p \land q) \lor (\neg p \land \neg q)$
b) $p \rightarrow q$
c) $\neg(p \land \neg q)$
d) $(p \rightarrow q) \land (q \rightarrow p)$

(xi) Choose the correct translation of "Everyone loves someone" into first-order logic.

a) $\forall x \forall y$ Loves(x, y)
b) $\exists x \exists y$ Loves(x, y)
c) $\exists x \forall y$ Loves(x, y)
d) $\forall x$ Loves(x, y)

(xii) Choose the statement that is equivalent to $\neg(p \land q)$ in propositional logic.

a) $\neg p \lor \neg q$
b) $\neg p \land \neg q$
c) $p \lor q$
d) $p \land q$

(xiii) Identify a popular activation function used in neural networks.

a) ReLU
b) Sigmoid
c) Tanh
d) Linear

(xiv) Select a technique used to prevent overfitting in neural networks.

a) Dropout
b) Batch Normalization
c) L1 Regularization
d) Gradient Descent

(xv) Identify a method used for updating weights in neural network training.

a) Backpropagation
b) Genetic Algorithms
c) Simulated Annealing
d) K-nearest Neighbors

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Define State Search Space and list down its components. (3)
3. Explain the architecture of a knowledge-based agent. (3)
4. Compare the efficiency of Breadth-First Search and Depth-First Search on a given problem. (3)
5. Construct a state space representation for a TSP (Traveling Salesman Problem) instance. (3)
6. Evaluate the performance of the AO* algorithm compared to the A* algorithm in terms of solution optimality and computational efficiency. (3)

OR

Evaluate the impact of using an inadmissible heuristic in the A* algorithm on solution quality and computational efficiency. (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Illustrate how the representation of goals and problems affects AI problem-solving. (5)
8. Describe Sensorless problems . (5)
9. Develop a structured approach to formulate real-world problems for AI. (5)
10. Develop an understanding of how variations like Iterative Deepening Minimax improve Minimax Search. (5)
11. Analyze the A* algorithm and its significance in pathfinding and search. (5)
12. Explain the role of perception and knowledge representation in an intelligent agent. (5)

OR

Analyze the importance of learning and adaptation in intelligent agents. (5)

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