



43314

Library
Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125



BRAINWARE UNIVERSITY

Term End Examination 2025-2026

Programme – Dip.RA-2024

Course Name – AI in Robotics

Course Code - DEC40201A

(Semester IV)

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) Indicate the field that deals with creating intelligent machines.
 - a) Robotics
 - b) Artificial Intelligence
 - c) Data Mining
 - d) Cyber Security
- (ii) List a core capability of Artificial Intelligence systems.
 - a) Reasoning
 - b) Formatting
 - c) Encryption
 - d) Compression
- (iii) Name the AI application used for decision-making support.
 - a) Expert systems
 - b) Speech coding
 - c) Image filtering
 - d) Signal modulation
- (iv) Indicate a heuristic search technique.
 - a) Depth-first search
 - b) Best-first search
 - c) Breadth-first search
 - d) Linear search
- (v) Identify the search method that uses heuristic evaluation.
 - a) Hill climbing
 - b) DFS
 - c) BFS
 - d) Backtracking
- (vi) List a feature of branch and bound technique.
 - a) Random selection
 - b) Cost-based pruning
 - c) Depth limitation
 - d) No heuristic
- (vii) Identify the use of CSP in scheduling problems.
 - a) Random choice
 - b) Constraint-based assignment
 - c) Fact storage
 - d) Resolution
- (viii) Choose AO* algorithm for solving problems with AND-OR conditions.
 - a) DFS
 - b) BFS
 - c) AO*
 - d) Hill climbing

- (ix) Identify the learning technique using labeled data.
- | | |
|--------------------------|---------------------------|
| a) Unsupervised learning | b) Reinforcement learning |
| c) Supervised learning | d) Clustering |
- (x) List a learning approach based on reward and penalty.
- | | |
|--------------------------|---------------------------|
| a) Supervised learning | b) Reinforcement learning |
| c) Unsupervised learning | d) Regression |
- (xi) Choose the main feature of CNN architecture.
- | | |
|-------------------|--------------------------|
| a) Feedback loops | b) Convolution operation |
| c) Reward signals | d) State transitions |
- (xii) Choose reinforcement learning for adaptive control.
- | | |
|-------------------------|------------------------|
| a) Fixed rule execution | b) Policy optimization |
| c) Data storage | d) Image filtering |
- (xiii) Apply text preprocessing to remove stop words.
- | | |
|----------------------|------------------------|
| a) Semantic analysis | b) Text cleaning |
| c) Parsing | d) Sentence generation |
- (xiv) Select lexical analysis to tokenize a paragraph.
- | | |
|----------------------|---------------------|
| a) Parsing | b) Lexical Analysis |
| c) Semantic Analysis | d) Grammar learning |
- (xv) Choose syntactic parsing to analyze sentence structure.
- | | |
|------------------------|------------------|
| a) Tokenization | b) Parsing |
| c) Sentence generation | d) Preprocessing |

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Describe State Space Search. (3)
3. Identify the role of abstraction in Artificial Intelligence. (3)
4. Explain the concept of Grammar-Free Analyzers in NLP and their advantages. (3)
5. Describe the concept of single-layer feedback networks and their applications in dynamic system modeling. (3)
6. Analyze the difference between supervised and reinforcement learning in robotic control. (3)

OR

- Illustrate a basic learning approach for a robot using reinforcement learning. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Define Artificial Intelligence and list its key objectives. (5)
8. Describe various applications of Artificial Intelligence in detail. (5)
9. Explain the best first search algorithm with an example. (5)
10. Analyze the role of probability theory in handling uncertainty in AI systems. (5)
11. Describe machine learning techniques used in robotics. (5)
12. Explain the definition of Natural Language Processing (NLP) and discuss the role of semantic analysis in understanding natural language. (5)

OR

Explain transition nets and describe how context-free and transformational grammars are used in syntactic parsing. (5)

Library
Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125