15504

# BRAINWARE UNIVERSITY



## Term End Examination 2025-2026
## Programme – B.Tech.(CSE)-AIML-2021/B.Tech.(CSE)-AIML-2022
## Course Name – AI with Robotics
## Course Code - OEC-CSM701A
## ( Semester VII )

**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 cause of flexible Knowledge Representation system is important for a robot

a) Increase battery life. b) Improve physical durability.
c) Adapt to new and unforeseen situations. d) Perform faster calculations.

(ii) Select the structure of a Horn clause typically includes:

a) A head and a body with logical implications. b) A list of mechanical parts.
c) A set of numerical equations. d) A group of sensory inputs.

(iii) Identify generation robots equipped with artificial intelligence, self-learning, and conclusion-drawing capabilities based on past experiences.

a) First Generation b) Second Generation
c) Third Generation d) Fourth Generation

(iv) Explain models give the relation between the position and orientation of the end-effector and spatial positions of joint-links.

a) Kinematic model b) Differential model
c) Integral model d) Static model

(v) Apply robot programming language is known for its syntax similar to basics and is used for mitsubishi robot

a) VAL b) KRL
c) MELFA BASIC d) V+

(vi) Identify the main principle behind Best-First Search in AI?

a) It expands the node with the highest cost first. b) It expands the node with the lowest cost first.
c) It expands the node with the best heuristic value first. d) It expands nodes in a random order.

(vii) Determine the key characteristic of Breadth-First Search.

a) It explores nodes in depth-first order. b) It explores all nodes at the present depth level before moving on to the nodes at the

c) It is guaranteed to find the shortest path in an unweighted graph.

d) It is an incomplete search algorithm.

(viii) Illustrate that Problem reduction typically involves breaking a problem into sub-problems that are:

a) Equally complex as the original problem.
b) Easier to solve than the original problem.
c) More complex than the original problem.
d) Unrelated to the original problem.

(ix) Identify AI technique is primarily concerned with enabling computers to learn from data and improve their performance over time.

a) Natural Language Processing
b) Machine Learning
c) Expert Systems
d) Genetic Algorithms

(x) Identify AI technique involves the use of decision trees, rules, and logic to make decisions based on input data.

a) Genetic Algorithms
b) Expert Systems
c) Reinforcement Learning
d) Deep Learning

(xi) Classify AI technique is primarily concerned with enabling computers to learn from data and improve their performance over time:

a) Natural Language Processing
b) Machine Learning
c) Expert Systems
d) Genetic Algorithms

(xii) Identify an example of Association process from the following

a) Semi-supervised learning models.
b) Reinforcement learning models
c) Supervised learning models
d) Unsupervised learning models.

(xiii) 'John is very intelligent' – relate the method by which this statement can be completely represented

a) FOPL
b) Default logic
c) Fuzzy logic
d) Propositional logic

(xiv) Identify Knowledge based inductive learning (KBIL) is example of which of the following.

a) Inductive learning
b) Deductive learning
c) Supervised learning
d) Unsupervised learning

(xv) Identify the primarily concern of Natural Language Processing (NLP)

a) Human-computer interaction
b) Understanding and generating human languages by machines
c) Data visualization techniques
d) Machine learning model tuning



## Group-B

(Short Answer Type Questions) 3 x 5=15

2. Explain Partitioned Nets, and how do they differ from Semantic Nets? (3)
3. Employ the methods of Robot Programming. (3)
4. Illustrate the principle behind branch and bound. Explain how is it different from other search algorithms. (3)
5. Explain the concept of the environment in the context of agent-based systems and provide an example of a simple environment. (3)
6. Justify the main challenges associated with knowledge representation in AI. (3)

**OR**

Justify Horn Clauses, and why are they important in AI. (3)

## Group-C

(Long Answer Type Questions) 5 x 6=30

7. Explain breadth-first search and depth-first search strategies, analyzing their differences in search space control and application. (5)

8. Justify that CNN is used for image related analysis. (5)
9. Describe First-Order Predicate Calculus (FOPC) and its role in knowledge representation in AI. What are its main components, and how is it applied in robotics for problem-solving? Provide a detailed example. (5)
10. Explain how Natural Language Processing (NLP) is an application of AI, highlighting its importance and challenges. (5)
11. Establish Irregular smooth motions of Robot (5)
12. Analyze the difference between clustering and classification with suitable example. (5)

**OR**

Compare between perceptron and other ANN. (5)

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