BRAINWARE UNIVERSITY

Term End Examination 2023-2024

Programme – M.Tech.(CSE)-AIML-2022/M.Tech.(CSE)-AIML-2023

Course Name – Artificial Intelligence and Knowledge Representation

Course Code - PCC-MCSM102

(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) Identify what does AI stand for?

a) Advanced Intelligence
b) Artificial Imagination
c) Artificial Intelligence
d) All Intelligence

(ii) What is the term for AI systems that can improve themselves over time without human intervention?

a) Static AI
b) Self-contained AI
c) Autonomous AI
d) Self-improving AI

(iii) Identify Which type of AI system is designed to perform a specific task and does not possess general intelligence?

a) Narrow AI (Weak AI)
b) Strong AI (General AI)
c) Superintelligent AI
d) Sentient AI

(iv) Choose In classical conditioning, what is the unconditioned response (UR)?

a) The response that is learned through association with a conditioned stimulus
b) The response that naturally occurs in reaction to an unconditioned stimulus
c) The response that the individual consciously chooses
d) The response that is learned through reinforcement

(v) Identify Which 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

(vi) Choose What type of learning involves forming associations between stimuli and responses based on the principles of contiguity and contingency?

a) Classical conditioning
b) Operant conditioning
c) Observational learning
d) Insight learning

(vii) Identify Which of the following is a supervised learning algorithm?

a) K-Means
b) Decision Tree

c) Genetic Algorithm
d) Reinforcement Learning

(viii) Analyze Inductive learning is often used for:

a) Teaching robots to perform complex tasks
b) Predicting future stock market prices
c) Diagnosing medical conditions based on symptoms
d) Determining the exact values of mathematical constants

(ix) Analyze What is the term for the process of finding the best hypothesis that fits the training data and can be used for making predictions?

a) Classification
b) Generalization
c) Overfitting
d) Regression

(x) Classify What does the Minimax algorithm assume about the opponent\'s strategy in a game?

a) The opponent always plays optimally.
b) The opponent always plays randomly.
c) The opponent is trying to maximize the player\'s utility.
d) The opponent is not present in the game.

(xi) Choose What is the primary goal of resolution in logic?

a) To create knowledge bases
b) To infer new information from existing knowledge
c) To represent probabilistic relationships
d) To perform arithmetic operations

(xii) Choose Logic programming languages, such as Prolog, are based on which type of knowledge representation?

a) Procedural knowledge
b) Declarative knowledge
c) Control knowledge
d) Probabilistic knowledge

(xiii) Identify In which approach to knowledge representation, information is organized into frames or templates with slots and fillers?

a) Frame-based systems
b) Rule-based systems
c) Semantic networks
d) Conceptual clustering

(xiv) Identify What does the acronym \"OWL\" stand for in the context of knowledge representation?

a) Online Web Learning
b) Object-Weighted Language
c) Ontology Web Language
d) Organic World Link

(xv) Identify Which knowledge representation approach focuses on representing knowledge in terms of prototypes and exemplars?

a) Conceptual clustering
b) First-Order Logic
c) Frame-based systems
d) Bayesian networks

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Identify Problem Characteristics in context of AI (3)
3. Define Depth First Search. (3)
4. Define Two Person Zero-Sum Game. (3)
5. Estimate What is the difference between Propositional Logic and Predicate Logic when representing simple facts? (3)
6. Analyze What is the role of Neural Networks in Subsymbolic Knowledge Representation? (3)

OR

Analyze What is the primary advantage of the Semantic Network approach to Knowledge Representation? (3)

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Describe A* Search Algorithm with it's advantages and disadvantages. (5)

8. Explain Hill climbing search with it's advantages and disadvantages. (5)
9. Explain the concept of uncertainty in AI and how probabilistic reasoning addresses it. (5)
10. Illustrate Bayesian networks and their application in probabilistic reasoning. (5)
11. Discriminate the concept of modus ponens and modus tollens in logical inference. Provide examples to illustrate each. (5)
12. Evaluate the concept of ANOVA (Analysis of Variance). When is it appropriate to use, and how does it differ from t-tests? (5)

OR

Compare the fundamental concepts of Predicate Logic and Propositional Logic. (5)

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