BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – MCA-2022/MCA-2023
Course Name – Artificial Intelligence and Machine Learning
Course Code - MCA301
(Semester III)

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) Compare between syntax and semantics in natural language processing.

a) Syntax deals with the grammatical structure of sentences, while semantics focuses on word meanings.

b) Syntax is concerned with analyzing sentiment, while semantics focuses on part-of-speech tagging.

c) Syntax involves resolving coreferences, while semantics deals with dependency parsing

d) Syntax and semantics are interchangeable terms in NLP.

(ii) Select the NLP task involves recognizing the roles of words within a sentence, such as subject, object, or modifier.

a) Named entity recognition

b) Part-of-speech tagging

c) Sentiment analysis

d) Semantic role labeling

(iii) In a sentence, if the word "it" refers to a previously mentioned "book," Select NLP task to be performed.

a) Sentiment analysis

b) Anaphora resolution

c) Dependency parsing

d) Part-of-speech tagging

(iv) Select the importance of speech act recognition in NLP.

a) To determine the frequency of words in a text

b) To identify the intention behind a statement in a conversation

c) To analyze the syntactic structure of a sentence

d) To classify words based on their meanings

(v) In a dependency parsing tree, an arc between two words explains

a) A semantic role

b) A part of speech

c) A grammatical relationship

d) A synonym relationship

(vi) Choose that What term describes the problem of AI systems exhibiting biased behavior or unfair decisions based on data they were trained on.

a) Ethical AI

b) Machine Perception

c) . Machine Learning
d) Reinforcement Learning

(vii) Choose that Which AI problem focuses on the challenge of enabling machines to reason and make logical deductions.

a) Machine Learning
b) Knowledge Representation
c) Machine Reasoning
d) Natural Language Processing

(viii) Choose that What problem in AI deals with the challenge of enabling machines to recognize and identify objects or patterns in images and videos.

a) Machine Learning
b) Object Recognition
c) Machine Reasoning
d) Knowledge Representation

(ix) Choose that AI problem is concerned with the ability of machines to understand and interpret human emotions and sentiment.

a) Natural Language Processing
b) Machine Perception
c) Ethical AI
d) Reinforcement Learning

(x) Select what is the key advantage of multi-agent systems.

a) Reduced computational complexity
b) Improved decision-making
c) Decreased communication overhead
d) Limited scalability

(xi) Identify in a multi-agent system, what does "coordination" refer to.

a) Agents competing against each other
b) Agents working together towards common goals
c) Agents ignoring each other's actions
d) Agents sharing sensitive information

(xii) Select what is the primary purpose of a rational agent's utility function.

a) To measure the agent's intelligence.
b) To assess the agent's learning capabilities.
c) To quantify the agent's satisfaction with different outcomes.
d) To determine the agent's accuracy in predicting future events.

(xiii) Choose in predicate logic, what does a predicate symbol represent.

a) An object or entity
b) A logical operator
c) A property or relationship
d) A quantifier

(xiv) Choose what is the purpose of a knowledge inference engine in an expert system.

a) To acquire knowledge
b) To represent knowledge
c) To reason with knowledge
d) To store knowledge

(xv) Select which of the following is not a fundamental element of a problem-solving agent.

a) Goal
b) Knowledge
c) nvironment
d) Actuators

Group-B
(Short Answer Type Questions)   3 x 5=15

2. State that How does a reflex agent differ from a goal-based agent. (3)
3. Define a heuristic function in the context of search algorithms. (3)
4. Explain the primary goal of problem-solving in AI. (3)
5. Compare depth-first search and breadth-first search. (3)
6. Explain some challenges in NLP. (3)

OR

Explain some popular NLP libraries and frameworks. (3)

Group-C
(Long Answer Type Questions)   5 x 6=30

7. Write the purpose of part-of-speech tagging in NLP, and how is it beneficial in text analysis? (5)
8. Give an example of how AI is used in everyday life. (5)
9. Explain the concept of "Neural Net Learning" in the context of machine learning. (5)
10. Distinguish between supervised and unsupervised learning. (5)

11. Distinguish Machine Learning from traditional programming. (5)

12. Write the concept of checking semantic errors in case of natural language. (5)

OR

Write the concept of a decision tree in machine learning. How is it used for classification tasks? (5)

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