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BRAINWARE UNIVERSITY

Term End Examination 2025-2026
Programme – BCA-Hons-2023
Course Name – Artificial Intelligence
Course Code - BCA57203 (T)
(Semester V)

Full Marks : 40 **Time : 2:0 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 10=10

1. *Choose the correct alternative from the following :*

(i) Select the term for all possible sequences of actions and resulting states in a problem.
a) Knowledge base b) Production system
c) State space d) Transition model

(ii) Identify the component name in a production system that contains rules.
a) Working memory b) Conflict resolver
c) Rule base d) Environment

(iii) Identify the type of agent that evaluates its success using a utility function.
a) Utility-based agent b) Reflex agent
c) Model-based agent d) Learning agent

(iv) Interpret the output of a POS tagging algorithm on the sentence "She can fish."
a) PRONOUN–MODAL–VERB b) NOUN–VERB–NOUN
c) PRONOUN–VERB–NOUN d) VERB–NOUN–VERB

(v) Classify the following sentence type: "Although it was raining, they went out."
a) Simple b) Compound
c) Complex d) Imperative

(vi) Compare the focus of discourse analysis and pragmatic analysis.
a) Both discourse analysis and pragmatic analysis focus on individual sentence meaning b) Discourse focuses on context between sentences; pragmatics focuses on speaker intent
c) Pragmatic is lexical-level only d) Discourse is limited to word-level analysis

(vii) Solve the dependency of "yesterday" in the sentence "She arrived yesterday."
a) Root b) Temporal Modifier
c) Direct Object d) Subject

(viii) Apply semantic analysis to determine the sentiment of: "This film was surprisingly good."
a) Positive b) Negative
c) Neutral d) Ambiguous

(ix) Apply fuzzy membership: If temperature = 35°C, with fuzzy sets: Cold: $\mu = 0.2$ Hot: $\mu = 0.8$ Which category does it mostly belong to?
a) Cold b) Hot
c) Moderate d) Uncertain

(x) Apply fuzzy rules: Rule 1: If dirty and full → wash Rule 2: If not full → wait State: dirty = true, full = false. Action?
a) wait b) wash
c) ignore d) clean

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

2. **Name the different types of intelligent agents in AI.** (3)
3. **Show the state space representation for a simple problem (e.g., 8-puzzle).** (3)

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4. Relate the concept of pragmatics to chatbot communication. (3)

5. In a medical Bayesian network: (3)

Disease (D) → Fever (F)

Given probabilities:

$P(D = T) = 0.01$

$P(F = T \mid D = T) = 0.9$

$P(F = T \mid D = F) = 0.05$

Question: If a patient has a fever, calculate the probability that the patient has the disease using Bayes' theorem:
$P(D = T \mid F = T)$

6. Distinguish between minimax search and alpha-beta pruning. (3)

OR

(3)

Fuzzy Set Problem

A fuzzy set B represents the concept of 'Hot Day' with the following temperatures in °C: 25, 30, 35, 40, 45

The membership function for the fuzzy set B is defined as:
$\mu B(T) = (T-25)/20$, for $25 \leq T \leq 45$

Questions:

1. Calculate the membership value for each temperature in the fuzzy set B.
2. Represent the fuzzy set B in roster form with the membership values.

Group-C

(Long Answer Type Questions) 5 x 3=15

7. Define Artificial Intelligence and list its main branches and applications. (5)
8. Explain the use of state space representation in problem-solving and interpret its advantages. (5)
9. Develop a time-efficient search strategy for game-playing agents in constrained environments by incorporating iterative deepening. Explain how your design balances depth of search with available time and compose a rationale for choosing iterative deepening over fixed-depth or breadth-first approaches. (5)

OR

Formulate a comprehensive gameplay strategy tailored for two-player adversarial environments by synthesizing appropriate search algorithms and evaluation techniques. Prepare a reasoned explanation to support your selection, focusing on its effectiveness in dynamic, competitive conditions. (5)

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