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**Presidency University**

**Bengaluru**

**School Of Computer Science and Engineering & Information Science**

**Summer Term End-Term Examinations, August 2024**

**Date**: 06-08-2024

**Time**: 9:30am to 12:30pm

**Max Marks**: 100

**Weightage**: 50%

**Odd Semester**: 2023 - 24

**Course Code**: CSE3005

**Course Name**: Applied Artificial Intelligence

**Department:** Computer Science and Engineering

**Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any matter on the question paper other than roll number.*

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| **Q.No** | **Questions** | **Marks** | **CO** | **RBT** |
| 1 | 1. Differentiate between uninformed and informed search. | 4 | CO1 | L1 |
| 1. What is well defined problem? List 5 components of well-defined problem with an example. | 6 | CO1 | L2 |
| 1. Apply alpha beta pruning to the below tree and mention which branches are pruned. | 10 | CO1 | L3 |
| OR | | | | |
| 2 | 1. Differentiate between BFS and DFS | 4 | CO1 | L1 |
| 1. Consider that we have a set of **2 empty water jugs** which have capacity of 3 liters and 5 liters respectively, but no other markings on them. We need to fill out **4 liters** using those jugs. Take this as a search problem, and define:  * The initial state and final state * The set of actions * The transition model   Consider a state to be represented as the tuple (x, y), where x is the amount of water filled in the 3 liter jug and y is the amount of water filled in the 5 liter jug. Initial state = (0,0). | 6 | CO1 | L2 |
| 1. Find the most cost-effective path to reach from start state A to final state J using A\* Algorithm. | 10 | CO1 | L3 |

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| 3 | 1. Identify if the below statements are propositions are not. 2. Delhi is the capital of India. 3. Read this carefully 4. 5 + 2 = 7 5. X + 5 = 9 6. What color is it? 7. It is Sunday. 8. The Sun sets in the West 9. 3 + 8 = 9 | 4 | CO2 | L1 |
| 1. Explain properties of Well-formed formulae. | 6 | CO2 | L2 |
| 1. Translate below English sentence to propositional logic  * It is sunny this afternoon and it is not colder than yesterday * If we go swimming it is sunny * If we do not go swimming then we will make a Dallas trip * If we take a Dallas trip then we will be home by sunset. * We will be home by sunset. | 10 | CO2 | L3 |

OR

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| 4 | 1. Construct and prove De Morgan’s law with truth table. | 4 | CO2 | L1 |
| 1. Explain terms: implication, converse, contrapositive and inverse. | 6 | CO2 | L2 |
| 1. List common rules of inference and explain any 2 in detail. | 10 | CO2 | L3 |

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| 5 | 1. Describe CSP definition of Sudoku game. | 4 | CO3 | L1 |
| 1. What is backtracking and explain below ways of optimizing backtracking  * Degree heuristics * Minimum remaining value | 6 | CO3 | L2 |
| 1. Solve 4 queens problem using backtracking method. | 10 | CO3 | L3 |

OR

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| 6 | 1. Describe CSP definition of cryptarithmatic puzzle | 4 | CO3 | L1 |
| 1. What is backtracking and explain below ways of optimizing backtracking  * Least constraining value heuristics * Forward checking | 6 | CO3 | L2 |
| 1. Solve 5 queens problem using backtracking method | 10 | CO3 | L3 |

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| 7 | 1. Define prior probability and joint probability | 4 | CO4 | L1 |
| 1. Any patient with a stiff neck (S) may or may not have meningitis (M). The probability of a patient having a stiff neck, if they have meningitis, is **0.8**. However, meningitis is not widespread in the population – having a probability of only **0.0001**. On the other hand, stiff necks are more common, with a probability of **0.1**. A patient goes to the doctor and reports that they have a stiff neck. What is the probability that it is because they have meningitis? | 6 | CO4 | L2 |
| 1. Consider below paragraph and produce the named entity tagging output.   Citing high fuel prices, United Airlines said Friday it has increased fares by $6 per round trip on flights to some cities also served by lower-cost carriers. American Airlines, a unit of AMR Corp., immediately matched the move, spokesman Tim Wagner said. United, a unit of UAL Corp., said the increase took effect Thursday and applies to most routes where it competes against discount carriers, such as Chicago to Dallas and Denver to San Francisco. | 10 | CO4 | L3 |

OR

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| 8 | 1. Explain conditional probability | 4 | CO4 | L1 |
| 1. Explain with an example part of speech tagging with 6 tags. | 6 | CO4 | L2 |
| 1. Explain named entity tagging with an example. | 10 | CO4 | L3 |

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| 9 | 1. Describe CSP definition of Map coloring. | 4 | CO1 | L1 |
| 1. Explain any 2 ways of optimizing backtracking | 6 | CO1 | L2 |
| 1. Using backtracking method, Solve and produce at least two solutions for 5 queen’s problem. | 10 | CO1 | L3 |

OR

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| 10 | 1. What are the challenges in POS tagging | 4 | CO2 | L1 |
| 1. Explain the metrics used in evaluating POS tagging | 6 | CO2 | L2 |
| 1. Explain the metrics used in evaluation of part of speech tagging. | 10 | CO2 | L3 |