# RAMRAO ADIK INSTITUTE OF TECHNOLOGY, NERUL
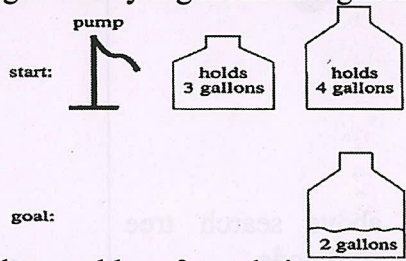
## (D Y Patil Deemed to be University)

**Program: B. Tech-Computer Engineering**
**End Semester Examination: B.Tech. Semester VI**
**Course Code: CECDLO6042 Course Name: Artificial Intelligence**
**Time: 2-hour**
**Max. Marks: 60**

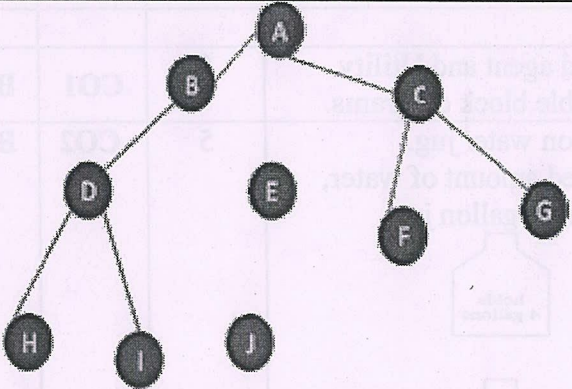**Instructions: 1. All three questions are compulsory**

| Que. No. | Question | Max. Marks | CO | BT |
|---|---|---|---|---|
| Q1 | Solve any **Four** | | | |
| i) | Differentiate between Model based agent and Utility based Agent with the help of suitable block diagrams. | 5 | CO1 | BT4 |
| ii) | You have a 4-gallon and a 3-gallon water jug. You have a faucet with an unlimited amount of water, You need to get exactly 2 gallons in 4-gallon jug  Give a complete problem formulation. | 5 | CO2 | BT6 |
| iii) | Simulated Annealing is a variation of Hill Climbing algorithm. Explain how Simulated Annealing algorithm overcomes the limitations of Hill Climbing algorithm. | 5 | CO3 | BT4 |
| iv) | Represent each of the following sentences in first-order logic. i) A whale is a mammal. ii) Jane likes John. iii) If it's raining, then the ground is wet. iv) If the switch is on and the light is off then the light-bulb is broken. v) All computers have a processor. | 5 | CO4 | BT6 |
| v) | Let us consider the following two fuzzy propositions along with their fuzzy truth values $p$ = Mr. Bakshi is handsome. $\tau(p) = 0.7$ $q$ = Mr. Bakshi is tall. $\tau(q) = 0.4$ Perform various fuzzy operations: Fuzzy AND, Fuzzy OR, Fuzzy NOT and Fuzzy implication | 5 | CO5 | BT5 |
| vi) | Explain in brief about STRIPS and BLOCK world problem in planning. | 5 | CO6 | BT2 |

| Que. No. | Question | Max. Marks | CO | BT |
|---|---|---|---|---|
| Q2 A | Solve any **Two** | | | |
| i) | The wumpus world is a cave consisting of rooms | | CO1 | BT4 |

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| | connected by passageways. Lurking somewhere in the cave is the wumpus, a beast that eats anyone who enters its room. The wumpus can be shot by an agent, but the agent has only one arrow. Some rooms contain bottomless pits that will trap anyone who wanders into these rooms (except for the wumpus, which is too big to fall in). The only mitigating feature of living in this environment is the possibility of finding a heap of gold. Although the wumpus world is rather tame by modern computer game standards, it makes an excellent test bed environment for intelligent agents. Give PEAS description for the above agent. | 5 | | |
| ii) | <br>Apply IDFS algorithm for the above search tree considering A as start node and G as goal node. | 5 | CO2 | BT3 |
| iii) | Suppose we want to maximize the number of ones in a string of $l$ binary digits (say L=5) to maximizing the number of correct answers, each encoded by 1. The fitness $f$ of a candidate solution to the MAXONE problem is the number of ones in its genetic code. Consider n=4. Apply Genetic Algorithm to solve the above problem. Initially, to solve consider the below four candidates<br>01101, 11000, 01000, 10011 | 5 | CO3 | BT6 |
| iv) | The law says that it is a crime for an American to sell weapons to hostile nations. The country Nono, an enemy of America, has some missiles, and all of its missiles were sold to it by Colonel West, who is American.Prove that West is a criminal.<br>Show how the forward-chaining algorithm solves the problem. | 5 | CO4 | BT6 |
| Q 2 B | Solve any **One** | | | |
| i) | Consider the below facts<br>Jimmy likes all kinds of food<br>Apples are food<br>Chicken is food<br>Anything anyone eats and is not killed by is food<br>Bill eats peanuts and is still alive<br>Susie eats anything bill eats.<br>Prove that Jimmy likes peanuts using backward | 10 | CO4 | BT4 |