



# COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)  
SHIVAJI NAGAR, PUNE - 411 005

## END Semester Examination

### (CT(DE)-14003) Artificial Intelligence

Course: B.Tech

Branch: Computer Engineering & Information Technology

Semester: Sem VII

Year: 2014-2015

Max.Marks:60

Duration: 3 Hours Time:- 2.00pm to 5.00pm

Date:28/11/2014

#### Instructions:

MIS No.

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1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of anything like stationery, calculator is not allowed.
5. Assume suitable data if necessary.
6. Write your MIS Number on Question Paper

- Q.1 A. Are reflex actions (such as flinching from a hot stove) rational? Are they intelligent? 5
- Q.1 B. For each of the following assertions, say whether it is true or false and support your answer with examples or counterexamples where appropriate. 5
1. Every agent function is implementable by some program/machine combination.
  2. Suppose an agent selects its action uniformly at random from the set of possible actions. There exists a deterministic task environment in which this agent is rational.
  3. It is possible for a given agent to be perfectly rational in two distinct task environments.
  4. Every agent is rational in an unobservable environment.
  5. A perfectly rational poker-playing agent never loses.
- Q.2. A. "Problem formulation must follow goal formulation". Justify this statement with help of two real time applications. 5
- Q.2. B. "Depth-first search always expands at least as many nodes as A\* search with an admissible heuristic". Justify your view on the given statement with help of two real time applications. 5
- Q.3. A. Compare performances of A\* and AO\* algorithms with respect to any two real time examples. 5
- Q.3. B. Explain the Mean-End Analysis and Constraint Satisfaction algorithm with help of one example each. 5

Q.4. A. A problem-solving search can proceed either forward (from a known start state to a desired goal state) or backward (from a goal state to a start state). What factors determine the choice of direction for a particular problem ? Justify the factors mentioned with help of one real time application for each approach.

Q.4. B. If a problem-solving search program were to be written to solve each of the following types of problems, determine whether the search should proceed forward or backward :

1. Water jug Problem

We have a Four Gallon Jug of Water and a Three Gallon Jug of Water and a Water Pump. The challenge of the problem is to be able to put exactly two gallons of water in the Four Gallon Jug, even though there are no markings on the Jugs.

2. Natural Language Understanding

Q.5. A. Consider the problem of building a program to learn a grammar for a language such as English. Assume that such a program would be provided, as input, with a set of pairs, each consisting of a sentence and a representation of the meaning of the sentence. This is analogous to the experience of a child who hears a sentence and sees something at the same time. How could such program be built using the techniques of Learning?

Q.5. B. You have a number of trucks with which to deliver a set of packages. Each package starts at some location on a grid map, and has a destination somewhere else. Each truck is directly controlled by moving forward and turning. How this problem can be approached with help of Planning Techniques? What knowledge about the solution does your planning techniques need ?

Q.6. A. Why does the search in game playing programs always proceed forward from the current position rather than backward from a goal state ? Explain your answer with help of two real time applications.

Q.6. B. Write Short notes on : **(any TWO)**

1. Natural Language Processing

2. Truth Maintenance System

3. Semantic Nets and Frames