

**Nirma University**  
**Institute of Technology**

Semester End Examination (IR), November 2011

B.Tech. Semester VII (Institute Elective)

2CE007: Artificial Intelligence

Roll/Exam No

Supervisor's initial  
with date

Time: 3 Hrs

Max. Marks: 100

- Instructions: 1. Attempt all questions.  
2. Figures to the right indicate full marks.  
3. Section wise separate answer book to be used.  
4. Draw neat sketches wherever necessary.

**SECTION - I**

**Q-1 [A]** Explain the consequences of the following: **08**

1. Depth First Search is used for the problem of finding shortest path.
2. Agenda driven search is used for a problem requiring user interaction.
3. No predefined search techniques are applicable on the problem at hand.
4.  $g()$  i.e. cost value is considered to be constant 1 in A-Star algorithm.

**[B]** Explain the following terms: **10**

1. Dilemma in AI
2. Physical symbol System
3. Artificial Intelligence
4. State Space
5. OR graph

**Q-2 [A]** List major applications of Artificial Intelligence, with brief description. **04**

**[B]** Define the state space and suggest a heuristic for the following problems. **06**

1. Water Jug problem
2. mutilated checkerboard problem

**[C]** Explain the AI technique which is the most suitable for solving travelling salesman problem. Justify your choice. **06**

**OR**

**[C]** Explain Simulated Annealing with example.

**Q-3 [A]** Describe any two types of production system with example. **04**

**[B]** Explain A\* Algorithm with example. **06**

**[C]** Solve the given crypt-arithmetic problem using constraint satisfaction algorithm. **06**

LOGIC + LOGIC = PROLOG

**OR**

**[C]** Solve the given crypt-arithmetic problem using constraint satisfaction algorithm. **06**

DONALD + GERALD = ROBERT

## Section II

- Q-4 [A]** Explain the following terms: **10**
1. procedural knowledge
  2. non-monotonic reasoning
  3. Script
  4. Frame
  5. Backward reasoning
- [B]** Why is knowledge representation a critical issue in AI? List the steps to follow for an efficient knowledge representation. **04**
- [C]** List the types of knowledge and explain inheritable knowledge. **04**
- Q-5 [A]** Which one is better, propositional logic or predicate logic representation? Justify your answer. **04**
- [B]** Explain the concept of statistical reasoning with example. **06**
- OR**
- [B]** What is Bayesian network? Explain with example.
- [C]** Analyze the following problems with reference to problem characteristics. **06**
- (i) chess
  - (ii) missionaries and cannibals
- Q-6 [A]** What is plateau in reference to hill climbing algorithm? How can we solve a plateau instance? **04**
- [B]** Describe the steps involved in natural language processing. **06**
- [C]** Convert the following facts to conjunctive normal form. And resolve the answer to the question: Is Singham alive? **06**
- Facts:
- i. Singham was an animal.
  - ii. Singham was a dinosaur.
  - iii. Singham was born in 40 A.D.
  - iv. All dinosaurs died when volcano erupted in 70 A.D.
  - v. No mortal lives longer than 150 years.
  - vi. It is now 2011.
  - vii. Alive means not dead.
  - viii. If some species dies it is dead at all later times.
- OR**
- [C]** Draw a semantic nets representing the following facts: **06**
- (i) Every batter hits a ball.
  - (ii) Jimmy gave an English book to jinny.