# GANPAT UNIVERSITY
## M. Tech Sem I (Computer Engineering) Examination Dec 2013
## 3CE 102: Computational Intelligence

**TIME: 3 HOURS**  **MARKS: 70**

**Instructions:** 1. Figures to the right indicate full marks of the question.
2. All questions are compulsory.

## SECTION: I

Q:1  Discuss following problems with respect to the seven problem [12] characteristics.
1. Chess
2. 8-puzzle
3. Travelling Salesman
4. Tower of Hanoi

OR

Q:1  For following types problems, describe a good heuristic function. [12]
1. Blocks world
2. Missionaries and cannibals

Q.2  (a)  With an example of a problem for which breadth-first search would [06] work better than depth first search.

(b)  What is constraint satisfaction? Solve following problem using [05] constraint satisfaction.

```
  C R O S S
+ R O A D S
-----------
D A N G E R
```

OR

Q.2  (a)  With an example of a problem for which depth first search would work [06] better than breadth first search.

(b)  What is constraint satisfaction? Solve following problem using [05] constraint satisfaction.

```
  D O N A L D
+ G E R A L D
-----------
  R O B E R T
```

Q:3  (a)  Discuss Resolution in Propositional Logic with an example with at least [06] six clauses.

(b)  Write a program to rotate the list on the Left direction. [05]

## SECTION: II

Q.4 (a) Consider the following sentences: [06]
1. John likes all kind of food.
2. Apple are food.
3. Chicken is food.
4. Anything anyone eats and isn't killed by is food.
5. Bill eats peanuts and is still alive.
6. Sue eats everything Bill eats.

(i). Translate these sentences into formulas in predicate logic.
(ii). Prove that John likes peanuts using backward chaining.
(iii). Convert the formulas of part a into clause form.
(iv). Prove that John likes peanuts using resolution.

(b) Discuss A* Algorithm with an example [06]

OR

Q.4 (a) Convert the following statements in predicate form [06]
1. All Romans were either Loyal to caesar or hated him.
2. People only try to assassinate rulers they are not loyal to.
3. Everyone loyal to someone.
4. Marcus was a man
5. Caesar was a ruler
6. Marcus was a roman.
(i). Translate these sentences into formulas in predicate logic.
(ii). Prove that Marcus is loyal to Caesar or Marcus is not loyal to Caesar.
(iii). Convert the formulas of part a into clause form.
(iv). Prove that Marcus is loyal to Caesar or Marcus is not loyal to Caesar using resolution.

(b) Write a program to find a greatest number from given list. [06]

Q.5 (a) Prove Fuzzy Demorgan's Law: $(A \cup B)= (A^C \cap B^C)^C$ [06]
(b) Write an output of the following programs. [05]

| 1. predicates | 2. Predicates |
|---|---|
| info(string, string) | done |
| start | loc(string, string) |
| start:- | clauses |
| info(Name, City), | done:- |
| writef ("%- | loc(City, State) |
| 10%2\n",Name,City), | writef("%-10%2\n",City,State), |
| fail.start. | fail, |
| info("abc"," ahm"). | done. |
| info("def","mhsn"). | loc("Jackson","ms"), |
| | loc("Washington","ds"). |

OR

Q.5 (a) When will Hill climbing searches fail? Do Steepest ascent hill climbing always find solutions? How might some problems be overcome in the search? [06]

(b) What is Artificial Neural Network. With an example discuss it. [05]

Q.6 (a) Write an algorithm of Stpest-Ascent Hill Climbing [06]

(b) What is an Expert System? Discuss it with an example [05]

=========End=========