GANPAT UNIVERSITY
M. Tech. (CE) SEMESTER – I EXAMINATION – JAN 2012
PGCE – 102: Computational Intelligence

[Time: 3 Hours] **Total Marks: 70]**

Instructions:

1. Figures to the right indicate full marks.
2. Each section should be written in a separate answer book.
3. Be precise and to the point in your answer.

SECTION – I

Q – 1 Answer Followings:

(A) Discuss Chess problem in terms of AI. [5]

(B) Discuss following terms. [6]

a) Knowledge
b) Horn clause
c) Operationalization
d) Combinatorial explosion
e) Backward Chaining
f) Heuristic function

Q – 2 Answer Followings:

(A) You are given two jugs of water. A 3–gallon jug and 5-gallon jug. Neither has any measuring marker on it. We can fill the water from outsource pump. How can we get exactly 4-gallons of water into the 5-gallon jug. Define a problem of Water Jug as a State Space Search. [8]

(B) Discuss ignorable and irrecoverable Class of Problem with an example. [4]

OR

Q – 2 Answer Followings:

(A) When steepest-ascent hill climbing may fail and what is the solution to overcome it? [6]

(B) Describe the different control strategies which apply on the problem to solve the next steps during the process of searching for a solution to a problem [6]

Q – 3 Answer Followings:

(A) Explain admissibility of A* algorithm. Justify it also. [4]

(B) Consider the following facts: [8]

- The members of the Elm St. Bridge club are Joe, sally, Bill, and Ellen.
- Joe is married to Sally.
- Bill is Ellen's brother.
- The spouse of every married person in the club is also in the club.
- The last meeting of the club was at Joe's house.

a) Represent these facts in predicate logic.

b) From the facts given above, most people would be able to decide on the truth of the following additional statements.

- The last meeting of the club was at Sally's house.

- Ellen is not married.

c) Can you construct resolution proofs to demonstrate the truth of each of these statements given the five facts listed above? Do so if possible. Otherwise, add the facts you need and then construct the proofs.

OR

Q – 3 Answer Followings:

(A) Answer the question, "What course would Steve like?" using resolution by considering following facts. **[4]**

- Steve only likes easy courses.
- Science courses are hard.
- All the courses in the basketweaving department are easy.
- BK301 is a basketweaving course.

(B) Describe the problem characteristics of the given problem. **[8]**

SECTION – II

Q – 4 Answer Followings:

(A) What is constraint satisfaction.Solve the following problem. **[7]**

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

(B) What is the difference between fuzzy logic and binary logic. Explain with suitable example. **[5]**

Q – 5 Answer Followings:

(A) Answer the question, "Was Rama loyal to Ravana?" using resolution by considering following facts. **[8]**

- Rama was a man.
- Rama was a saint.
- All saints were Hindus.
- Ravana was a Ruler.
- All Hindus were either loyal to Ravana or hated him.
- Everyone is loyal to someone.
- People only try to assassinate Rulers they are not loyal to.
- Rama tried to assassinate Caesar.

All men are people.

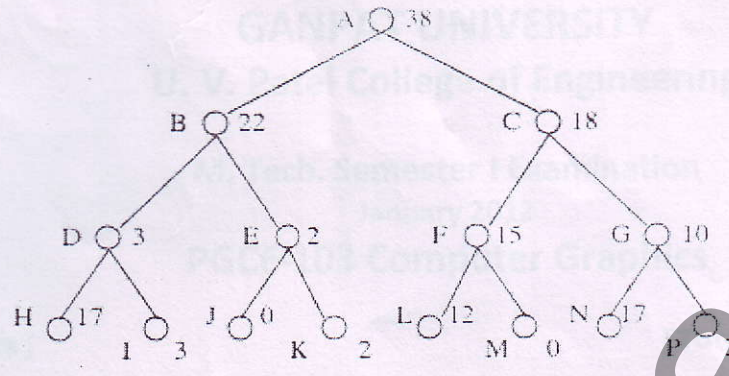
(B) Elaborate the role of AI in Expert System **[4]**

OR

Q – 5 Answer Followings:

(A) Consider a search problem where the state space is represented by the **[8]**

following tree:



Each node has an alphabetic label and an estimated distance to the goal. A is the initial state, J and M are goal states.

a) Perform a breadth-first, and then a depth-first, search on the above tree. List the nodes on open and closed for each iteration".

b) Now perform a Best-First search on the same tree and list the nodes on Open and Closed as before.

(B) Explain the difference between expert system and conventional system. **[4]**

Q – 6 Answer Followings:

(A) Consider trying to solve the 8-puzzle using hill climbing. Can you find a heuristic function that makes this work? Make sure it works on the following example **[6]**

1	2	3	
8	5	6	
4	7		

start

1	2	3
4	5	6
7	8	

goal

(B) Explain resolution in propositional logic. **[5]**

OR

Q – 6 Answer Followings:

(A) Explain General Graph Search procedure with an example. **[6]**

(B) Explain resolution in predicate logic. **[5]**

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