MCA (Revised)

Term-End Examination

June, 2012

MCSE-003 : ARTIFICIAL INTELLIGENCE AND KNOWLEDGE MANAGEMENT

Time : 3 hours *Maximum Marks : 100*

Note : *Question number 1 is compulsory.*
Attempt any three questions from the rest.

1. Transform the following into disjunctive Normal forms.

   (a) $\sim (A \vee \sim B) \wedge (S \rightarrow T)$ 5

   (b) Discuss some application areas of Expert 5 system, in brief.

   (c) Explain the following rules of Inference of 5 propositional logic :

   (i) Modus pones

   (ii) Chain rule

   (d) Write Prolog statement to establish following 5 relations. You can use suitable predicates to Express the relations.

   (i) X is Brother of Y

   (ii) X is Grand Father of Y

   (e) Show the conceptual dependency representation 5 of the following sentence.

   John wanted Mary to go to the store.

(f) Write short Note of DFS   5

(g) Assume the following Facts :   5
   If it is not humid then it will rain
   If it is humid, then it is hot
   It is humid now.
   Using the propositional logic Inference,
   answer the Question, will it rain ?

(h) Suppose A new operator exor denoted as   5
   ⊕ has been defined in the following manner :

P	Q	P exor Q
T	T	F
T	F	T
F	T	T
F	F	F

   Create a propositional Calculus Statement
   Using ∨ , ∧ and ⊕ (exor) that is equivalent
   to P exor Q.

2. (a) Transform the following into the conjunctive   5
      Normal forms :
      $(\sim A \wedge B) \vee (A \wedge \sim B)$

   (b) Differentiate between Proposition and   5
      Predicate logic.

   (c) Write a LISP program expo to compute i   5
      raise to power j where i and j are natural
      numbers.

   (d) Differentiate between the Non-Monotonic   5
      Reasoning System and Monotonic
      Reasoning System.

3. (a) Using Truth Table, Prove the $P \leftrightarrow Q$ is **5** equivalent to $(P \rightarrow Q) \wedge (Q \leftarrow p)$.

(b) Write interactive and recursive Prolog **5** Programs to find the sum of a list containing integer elements.

(c) What is a supervised learning ? How is it **5** different from Unsupervised learning ?

(d) Discuss briefly the component of the generic **5** Expert System.

4. (a) Explain a test which can identify whether **8** a machine given to you is intelligent. Is there any machine which has qualified this " Intelligence Test". Discuss.

(b) The game *nim* is played as follows : **8**

Two players alternate in removing one, two or three pennies from a stack initially containing five pennies. The player who picks up the last penny loses. Show by drawing the game graph that the player who has the second move can always win. Illustrate the steps clearly.

(c) What is the Role of agents in artificial **4** intelligence ? Briefly discuss properties of agents.

5. (a) What do you mean by forward chaining ? 8
Explain with the help of examples taken
from real world. Can you use forward
chaining in ancestor - tree classification.
Why/ why not ?

(b) Create a Semantic Net for the following 6
data :

Tom is a cat.

Tom caught a bird.

Tom is owned by John

Tom is ginger in colour.

Cats like cream.

The cat sat on the mat.

A cat is a mammal.

A bird is an animal.

All mammals are animals.

Mammals have fun.

(c) For the following fuzzysets : 6

A = {a|0.5, b|.6, c|.3, d|0, e|.a} and

B = { a|.3, b| .7, c|.6, d|.3, e|.6}

Find the fuzzy set $A \cap B$,

$A \cup B$, and $(A \cap B)'$