

MCA (Revised)
Term-End Examination
June, 2007

**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. (a) Write a LISP program to perform depth first search. 10
- (b) Describe "means ends analysis" as a technique for AI problem solving. For what type of applications is it most suitable ? 10
- (c) Transform following FOPL statements into equivalent conceptual graph : 6
- (i) $\forall x \text{ NORMAL}(x) \ \& \ \text{GROWN}(x) \rightarrow \text{WALK}(x)$
- (ii) $\forall x,y \text{ MARRIED}(x,y) \rightarrow \text{MARRIED}(y,x)$
- (iii) $\forall x \text{ HASWINGS}(x) \ \text{and} \ \text{LAYSEGGS}(x) \rightarrow$
 $\text{ISBIRD}(x)$

(d) Differentiate between non monotonic and monotonic reasoning. 4

(e) Transform the following into Prenex Normal form
 $\forall xy (\exists z P(x, z) \& P(y, z)) \rightarrow \exists u Q(x, y, u)$ 10

2. (a) Find the meaning of the statement
 $(\neg P \vee Q) \& R \rightarrow S \vee (\neg R \& Q)$
for each of the interpretations given below : 7

(i) P is true, Q is true, R is false, S is true

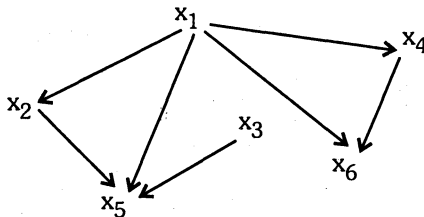
(ii) P is true, Q is false, R is true, S is true

(b) Write a LISP function that determines whether two sets are equal or not. 10

(c) Prove Modus Ponens by truth table. 3

3. (a) Explain the A* search algorithm. How is it modified in AO* search algorithm. 10

(b) Write the joint distribution of x_1, x_2, x_3, x_4, x_5 and x_6 as product of chain conditional probabilities for the following network : 10



4. (a) How does the use of heuristics reduce the search space ? Suggest a good heuristic function for travelling salesman problem. 10
- (b) Explain the concept of formalized symbolic logics. Define following properties of statements : 10
- (i) Satisfiable
 - (ii) Contradiction
 - (iii) Logical consequence
 - (iv) Valid
5. Write short notes on the following : 20
- (i) Knowledge manipulation
 - (ii) Associative networks
 - (iii) Fuzzy matching algorithms
 - (iv) Conceptual Dependency Graph

