

MCA (Revised)
Term-End Examination
December, 2013

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) Transform the following into Disjunctive Normal Form (DNF) : 5

(P -> (~ (Q -> R)))

(b) What will be the output of the function given below, when a list L is passed as an argument say, L= (a b c d ). Write the intermediate results of each step, while calculating the result. 5

(defun TRY (L)

(cond

((null L) O)

(t (+1(TRY(cdr L) ) ) )

)

)

)

)

- (c) Represent the following sentence as a conceptual graph “cow has four legs and eats grass”. 5
- (d) Write a recursive program in PROLOG, to find factorial of a number. 5
- (e) Transform the following formula to Prenex Normal form : 5  

$$(\exists_x) (\sim(\exists_y) Q(x, y) \rightarrow (\exists_z) R(z) \rightarrow S(x))$$
- (f) Briefly Discuss, the Chinese Room Test along with its significance 5
- (g) Convert the following WFF in to a set of clauses : 5  

$$\forall_x (\exists_y \text{Man}(y) \wedge \text{bite}(x, y) \rightarrow \text{dog}(x))$$
- (h) How Agents are different from Intelligent Agents ? Briefly discuss the role and utility of Agents in Artificial Intelligence. 5
2. (a) How is inferencing used in deriving conclusions from the facts ? Differentiate between forward chaining and Backward chaining. On what factors does the decision to choose forward or backward chaining depend ? 10
- (b) Enumerate the Various Knowledge representation schemes. Give brief description of each scheme. Identify advantages of representation scheme over the other. 10

3. (a) Write short notes on the following : 10
- (i) Mean-End Analysis
  - (ii) A\* Algorithm
- (b) Briefly describe the And-OR graph. How does it contribute to search and control strategy of an expert system ? 5
- (c) Explain any two of the following logic concepts, using suitable examples : 5
- (i) Modus ponens
  - (ii) Valid statement
  - (iii) Unification principle in proposition logic
4. (a) Briefly discuss Data types and structures in Prolog. 5
- (b) Briefly discuss "Closed World Assumption systems" as a mechanism of handling in completeness of a knowledge base. 5
- (c) What is the Turing Test ? If the machine passes the Turing Test, does it mean that the system is intelligent ? What are the associated problems with Turing Test ? What are required improvement / advances to over come these problems ? 10

5. (a) Compare and Contrast the following fair of terms : 10
- (i) Monotonic and Non-Monotonic Reasoning
  - (ii) Predicate and Propositional logic
  - (iii) Frames and Scripts
  - (iv) DFS and Heuristic Search
  - (v) BFS and D-Search
- (b) Write BFS algorithm and use it, to search the Goal node  $\textcircled{\textcircled{G}}$  in the tree given below : 10

