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MCSE-003

09189

MCA (Revised)

Term-End Examination

June, 2014

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.*

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1. (a) Transform the following into Conjunctive Normal Form (CNF) : **5**

$$\sim (C \rightarrow D) \vee (C \wedge D)$$

(b) Determine the output on execution of the function given below, when n = 5. Write the intermediate results of each step while calculating the result also. **5**

```
(defun func (n)
    (cond ((zerop n) -1)
        (t
            (*(-0 n)
                func (-n 1)))
        )))
```

(c) Give conceptual dependency representation of the sentence given as follows : **5**

"Mohan will eat Dosa from the plate with fork and knife"

(d) With the help of a suitable example, describe the "member" function of PROLOG. How the same can be used to perform recursive search of a data in a list ? **5**

(e) Transform the following formula into Prenex Normal form. 5

$$(\forall_x)(\forall_y)((\exists_z) Q(x, y, z) \wedge ((\exists_u) R(x, u)$$

$$\rightarrow (\exists_v) R(y, v)))$$

(f) Briefly discuss, the "Turing Test" along with its significance. 5

(g) Transform the following conceptual graph into FOPL statement : 5

[PERSON : Anita]←(AGENT)←[DRINK]

→(OBJECT)→ [FOOD : MILK]

↓

↑

(Instrument Glass)

(h) What are Agents ? Briefly discuss the properties of agents. 5

2. (a) Discuss Truth Maintainence System (TMS), with the help of a suitable diagram. 4

(b) Under what conditions would it make sense to use both forward and backward chaining ? Give an example where both of these are used. 6

(c) Explain the term "Knowledge" with respect to a Knowledge Base System. How "Knowledge" differs from "Intelligence" ? Distinguish between procedural and declarative knowledge, while citing an example for each. 10

3. (a) Write short notes on the following : **10**
   (i) AO* Algorithm
   (ii) Reasoning techniques and its types

   (b) Explain any two of the following logic concepts, using suitable examples : **5**
   (i) Modus Tollens
   (ii) Satisfiable statement
   (iii) Resolution principle in proposition logic

   (c) Machines can be made intelligent artificially but ultimately persons make the machines. So, who is more intelligent - the artificial machine or the person ? Justify your answer. **5**

4. (a) Briefly discuss Data Structures and Data Values in LISP. **5**

   (b) Briefly discuss "Default Reasoning Systems" as a mechanism of handling incompleteness of a Knowledge Base. **5**

   (c) What is an Expert System ? Explain the architecture of Expert System. Create an Expert System to infer whether a student has secured excellent, good, average or poor marks in his/her exams. **10**

5. (a) Compare and contrast precisely the following pair of terms : **10**
   (i) BFS and Heuristic Search
   (ii) Conceptual graph and Conceptual Dependency
   (iii) Associative Network and Semantic Network
   (iv) Abductive inference and Analogical inference
   (v) Knowledge and information

(b) Write DFS algorithm and use it, to search the Goal node (G) in the tree given as follows : **10**