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MCSE-003

MCA (Revised)

Term-End Examination

04051

June, 2017

MCSE-003 : ARTIFICIAL INTELLIGENCE AND KNOWLEDGE MANAGEMENT

Time : 3 hours *Maximum Marks : 100*

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

1. (a) What is the purpose of Chinese Room test ? Give a brief outline of Chinese Room test. 5

(b) If the propositions are described as follows

A : Hard work

B : Success

C : Knowledge

D : Money

then, represent the following formulae in English : 5

(i) $A \wedge C \rightarrow B \wedge D$

(ii) $\sim A \rightarrow \sim B$

(iii) $A \wedge \sim C \rightarrow \sim B$

(iv) $\sim A \wedge C \rightarrow \sim D$

(v) $A \rightarrow C$

(c) Transform the following into PCNF : 5

(i) $\sim (X \rightarrow Y) \rightarrow Z$

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

(d) Write well-formed formulae (WFF) for the following : 5

(i) Person respected by every other person is a king

(ii) Some, who are intelligent, can't read

(e) Draw a conceptual graph for the sentence, "Car has four wheels and consumes fuel." 5

(f) Evaluate the LISP code given below, for n = 5. Write each step while calculating the result. 5

```
(defun mycode (n)
   (cond ((zerop n) – 1)
      (t
        ( * ( – 0 n )
             mycode (– n 1 )))
      )))
```

(g) Given the fuzzy set to describe the term Tall :

Tall = {5′/0·0, 5′5″/ 0·2, 5′8″/0·5, 6′/0·7
6′5″/0·8, 7′/1·0}

Discuss and describe the membership function for the fuzzy sets for each of the following terms : 5

(i) Very tall

(ii) Not tall

(h) What is an Expert System ? Briefly discuss the architecture of an Expert System. 5

2. Compare and contrast the following : *20*

   (a) Monotonic and Non-monotonic reasoning

   (b) DFS and BFS

   (c) Conceptual Graph and Conceptual Dependency

   (d) Predicate and Prepositional Logic

3. (a) Write a LISP program to find the maximum of three numbers. *5*

   (b) Write a prolog program to identify the grandfather relation. You can create a knowledge base of your choice. *5*

   (c) Write short notes on any ***two*** of the following : *10*

   (i) Associative Networks

   (ii) Task Environments of Agents

   (iii) S-Expressions

4. (a) Briefly discuss the term 'Truth Maintenance System (TMS)'. *5*

   (b) What do you mean by the term Backtracking ? Describe this concept of Backtracking with the help of a suitable program in prolog. *8*

   (c) Express the following knowledge as a semantic network structure with interconnected nodes and labelled arcs : *7*

   "Anu is the Principal of XYZ School. She is married to Raj and has a female child, Anita. Anita goes to school. Raj plays golf and owns a silver coloured German made car, Benz."

5. (a) What do you mean by the term 'Agents' in Artificial Intelligence ? Classify the various types of Agents. *5*

(b) What do you understand by a rule of inference ? Discuss any four rules of inference. *5*

(c) How is the concept of matching used in Artificial Intelligence, for problem solving ? Explain the Indexing Technique used for rule matching. *10*
