MCSE-003

MCA (Revised)

Term-End Examination

00910

December, 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) Discuss the Turing test. What are the shortcomings of the Turing test ?   *5*

   (b) Transform any *two* of the following to CNF :   *5*

   (i) $\sim (X \rightarrow Y) \vee (X \wedge Y)$

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

   (iii) $P \rightarrow (\sim (Q \rightarrow R))$

   (c) Evaluate and elaborate the following LISP expressions :   *10*

   (i) (lessp 18 151 76)

   (ii) (car (a b c d))

   (iii) (cdr (x y z))

   (iv) (member 'a '(a b c d))

   (v) (list 'a '(b c))

(d) Convert the following WFF into a set of clauses
$\forall x \, (\exists y \, \text{Man} \, (y) \wedge \text{Bites} \, (x, y) \rightarrow \text{dog} \, (x))$.   5

(e) What is Means-Ends Analysis ? How is Means-Ends Analysis used as a problem solving technique ?   5

(f) What do you understand by the term Agents in Artificial Intelligence ? Discuss the properties of agents.   5

(g) What is the utility of conceptual dependency representation ? Generate the conceptual dependency representation of the sentence given below :   5
"Raj will eat dosa from the plate with fork and knife."

2. (a) Write BFS algorithm. Use the BFS to search the goal node Ⓖ. Show each step of the algorithm.   10
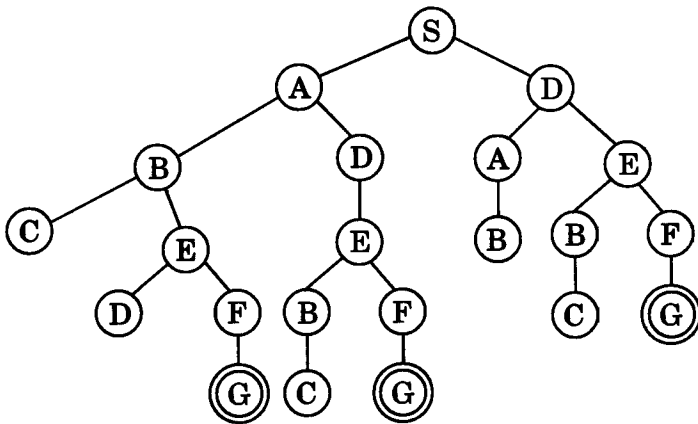
(b)   Given the following information :

A1 : If 'a' is on top of 'b', 'b' supports 'a'

A2 : If 'a' is above 'b', and they are touching each other, 'a' is on top of 'b'

A3 : A jug is above the table

A4 : A jug is touching the table

Perform the following tasks :   *10*

(i)   Translate the statements A1 to A4 (given) in clausal form.

(ii)   Show that the predicate support (table, jug) is true, using Resolution.

3. (a)   What is the difference between Knowledge and Intelligence ? Enumerate the various knowledge representation schemes, giving a brief description for each scheme.   *10*

(b)   Write the AO* algorithm. Briefly discuss any application area of the AO* algorithm.   *5*

(c)   What are the various methods to deal with the uncertainty in the knowledge system ? Discuss any one of them.   *5*

4. (a)   Differentiate   between   the   following (any *two*) :

(i)   Forward   chaining   and   Backward chaining

(ii)   Conceptual   graph   and   Conceptual dependency structure

(iii) A* and AO* algorithms

Give suitable examples and diagrams to explain the differences.   *10*

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

(i) Chinese Room Experiment

(ii) Scripts

(iii) Heuristic Search

5. (a) Write a program in Prolog to find and print
prime numbers between 1 to 100. 7

(b) Write a program in LISP to search for an
element (given by user) in a list. Give
comments in the program to explain your
logic. 7

(c) Discuss any *two* of the following : 6

(i) mapcar function

(ii) Property list

(iii) S-expression