

MCA (Revised)

Term-End Examination

June, 2011

01202

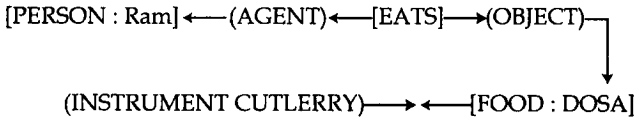
MCSE-003 : ARTIFICIAL INTELLIGENCE AND KNOWLEDGE MANAGEMENT

Time : 3 hours

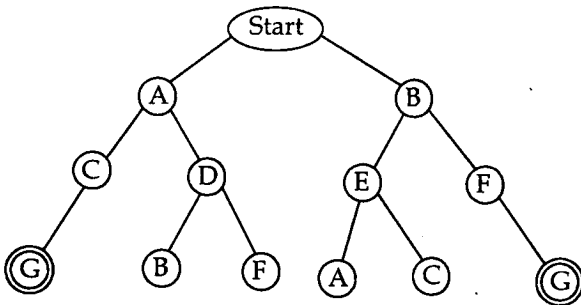
Maximum Marks : 100

Note : Question number 1 is compulsory. Attempt any 3 questions from the rest.

1. (a) Write FOPL statement for the conceptual graph given below 5



- (b) Use BFS to search for Goal node (G) in the following tree, also write algorithm's progression systematically. 5



- (c) How does informed search differs from uninformed search ? Classify the algorithm which lies in these two categories and give appropriate examples. 5
- (d) Prove  $(p \rightarrow q) \wedge (\sim r \rightarrow \sim q) \wedge \sim r \rightarrow \sim p$  is a tautology, without using truth table. 5
- (e) Write a LISP program to find GCD of two numbers. 5
- (f) Write well form formula (wff) for the following. 5
- (i) God loves every one who loves someone
- (ii) Every person has mother
- (g) Find standard form of the following formulas. 5
- (i)  $\exists_x \forall_y \forall_z \exists_u \forall_v \exists_w p(x, y, z, u, v, w)$
- (ii)  $\sim ((\forall_x) P(x) \rightarrow \exists_y \forall_z Q(y, z))$
- (h) What do you mean by Non-monotonic reasoning systems ? What are the constituent components of such system ? Describe the inter relation between the components of such system. 5
2. (a) Obtain CNF and DNF for the following given formula  $\sim (A \rightarrow (\sim B \wedge C))$ . 5
- (b) Trace the execution of following LISP code and determine the answer when  $n=y$   
`(defun my func (n)  
 (If (= n 1) 1  
 (+ n (mufunc (- n 1))))))` 5
- (c) Compare and contrast following pair of terms : 5
- (i) Hill climbing and BFS
- (ii) Conceptual graph and conceptual dependency
- (d) Write a prolog program to find factorial of a number and trace 'it' for Fact (5). 5

3. (a) Write Demorgan's laws for both predicate and propositional logic? The laws in these two domains are identical or inter-related? Prove the Demorgan is law of propositional logic. 5
- (b) Apply the principle of resolution to prove the theorem "Some who are intelligent can not read", the given knowledge to the system is as follows : 7
- (i) Who ever can read is literate
- (ii) Dolphins are not literate
- (iii) Some Dolphins are intelligent
- (c) What are Agents in AI? How Agents work to impart intelligence to a system? Classify the different type of agents and briefly discuss their properties. 8
4. (a) Write A\* Algorithm? How A\* algorithm is different from AO\*? Out of the two which one is better and why? 8
- (b) In the arena of A.I., how the concept of uncertainty is managed? What are the structures, used to manage knowledge uncertainty. 3
- (c) Differentiate between following pairs : 9
- (i) Monotonic and Non-Monotonic reasoning.
- (ii) Associative Networks and Conceptual graphs
- (iii) Forward and Backward chaining

5. (a) Write short notes on any two of the followings. 5
- (i) S-expressions in LISP
  - (ii) Lambda functions
  - (iii) Mapping functions
- (b) Write well form formula (wff) for the following. 5
- (i) Nothing beautiful is evil
  - (ii) For every natural number there is a number greater than it
- (c) What are closed world assumption systems ?  
What is the requirement of such systems ? 5
- (d) Write propositional syntax of the following inference rules. 5
- (i) Simplification
  - (ii) Syllogism
  - (iii) Dilemma
  - (iv) Modus Ponens
  - (v) Hypothetical syllogism
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