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MCA (Revised)

Term-End Examination

December, 2010

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) How does Predicate logic differs from the Propositional logic ? Establish the relation between quantifiers & operators. 5
- (b) Verify that the given Proposition is valid or not $q \wedge (p \rightarrow q) \vdash p$? 5
- (c) Derive DNF for the expression given below $p \wedge (q \vee \sim r)$ 5
- (d) Write the well form formula (wff) for the statement "Every person has a mother" ? Skolomize the wff given by you. 5
- (e) Prove Modus Tollens using Modus Ponens. 5

- (f) How programming languages used to design expert systems are different from the general purpose programming language? Name the components which they have and programming language don't. Give two example of each language type. 5
- (g) Write a Lisp program to find maximum of three numbers. 5
- (h) In artificial intelligence what do you mean by Agents ? What is the role of Agents in artificial intelligence ? Briefly discuss properties of agents. 5
2. (a) Obtain the conjunctive normal form (CNF) for the expression $D \rightarrow (A \rightarrow (B \wedge C))$ 4
- (b) Transform the FOPL statement $\forall_x(\text{HasEars}(x) \wedge \text{LaysBabies}(x) \rightarrow \text{Mammal}(x))$ into equivalent conceptual graph. 5
- (c) Explain the difference between forward and Backward chaining and under what conditions each would be best to use for a given set of problems ? 5
- (d) Briefly describe the two knowledge representation schemes. Also mention how one representation scheme has an edge over other. 6

3. (a) What is Turing Test ? Discuss how the Chinese Room Test stood as an objection to the Turing Test. 5
- (b) Write short note on 5
- (i) DFS
- (ii) Reasoning techniques & its types
- (c) Represent the following statement as an Associative network. 5
- “IGNOU is an open University established by an act of parliament. It has many divisions & schools of studies to support academic activities. Each school & Division is headed by a Direction”.
- (d) Briefly describe AND-OR Graph & its utility in artificial intelligence. 5
4. (a) What is resolution principle ? What is the resolution of $(\sim P \vee Q)$ and $(\sim Q \vee R)$. 5
- (b) Differentiate between following pair of terms : 5
- (i) Frames vs Scripts
- (ii) Unification vs resolution
- (c) Write Prolog statements to establish following relations, you can use suitable predicates to express the relations 5
- (i) X is Brother of Y
- (ii) X is Grandfather of Y

- (d) What are Fuzzy sets ? How Fuzzy sets are different from Crisp sets ? Why Fuzzy logic is frequently desired in the stream of A.I. ? Briefly describe the term "Normalization of Fuzzy Set". 5
5. (a) Write the steps involved in solving problem through resolution method and use the same to come to a conclusion for the statement given below. 7
- " If interest rates goes up stockmarket goes down and if stockmarket goes down, most people become unhappy. Prove that if interest rates goes up then most people become unhappy".
- (b) Write short notes on following : 8
- (i) Mean - end Analysis
- (ii) A* Algorithm
- (c) How is conceptual graph is transformed into FOPL ? Can we transform FOPL into a conceptual graph, if yes give the procedure to do so. 5
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