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MCSE-003

**MASTER OF COMPUTER
APPLICATIONS (MCA) (REVISED)**

Term-End Examination

June, 2021

**MCSE-003 : ARTIFICIAL INTELLIGENCE AND
KNOWLEDGE MANAGEMENT**

Time : 3 Hours

Maximum Marks : 100

Note : *Question No. 1 is compulsory. Answer any
three questions from the rest.*

1. (a) Write Turing Test. What are the objections to the turing test ? 5
- (b) Obtain the Disjunctive Normal Form (DNF) for $\sim (A \rightarrow (\sim B \wedge C))$. 5
- (c) Let P (X) : X is a rational number; and Q (X) : X is a real number. Write Well-Form-Formula (WFF) for the following sentences : 5
 - (i) Every rational number is a real number.
 - (ii) Not every real number is a rational number.

- (d) Write Prenex Normal Form (PNF) for the following : 5

(i) $\forall_x (Q(x) \rightarrow \exists_x R(x, y))$

(ii) $\exists_x (\sim \exists_y Q(x, y) \rightarrow (\exists_z R(z) \rightarrow S(x)))$

- (e) Differentiate between “Modus Tollen” and “Modus Ponem”. 5

- (f) What are fuzzy systems ? Briefly discuss the utility of fuzzy systems in artificial intelligent systems. 5

- (g) Write a program in LISP to compute i raise to power j , where i and j are natural numbers. 5

- (h) What are agents in artificial intelligent systems ? Briefly discuss the role of Goal based Agents. 5

2. (a) Compare predicate logic and propositional logic. Write De Morgan’s law for both. How will you verify that a given formula is valid or invalid ? What do you understand by validity and consistency of any well form formula ? 10
- (b) Briefly discuss the method of resolution. What for this method of resolution is

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required in artificial intelligence ? Using Resolution method, solve the following logic problems : 10

- (i) Some patients like all doctors.
- (ii) No patient like any quake.
- (iii) Therefore, no doctor is a quake.

3. (a) Write formulas for the following Inference rules and explain their meaning : 10

- (i) Dilemma
- (ii) Hypothetical syllogism
- (iii) Simplification
- (iv) Addition

(b) How does monotonic reasoning differ from non-monotonic reasoning ? What are the advantages of non-monotonic reasoning over monotonic reasoning ? Draw block diagram of non-monotonic reasoning system, and discuss the role of each component, shown in the block diagram. 10

4. (a) Discuss the following functions in LISP with suitable example : 5

- (i) Lambda function
- (ii) Mapcar function

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(b) Write a program in Prolog to identify the relation, Grandfather (X, Y). Develop appropriate knowledge base and write the rules applicable to the knowledge base. 5

(c) Briefly discuss data types and structures in prolog. Give suitable example of each. 5

(d) Differentiate between forward chaining systems and backward chaining systems. Give suitable example of each. 5

5. Write short notes on the following : 5 each

- (a) Semantic Networks
- (b) Knowledge Acquisition Systems
- (c) Building Blocks of Expert System
- (d) Different forms of Learning in Agents

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