Name : ....

Roll No. : ....

Invigilator's Signature : ....

CS/M.Sc(Info.Sc)/SEM-4/MI-405(b)/2013

2013
ARTIFICIAL INTELLIGENCE

Time Allotted : 3 Hours   *Full Marks :* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following : 10 × 1 = 10

    i) What is in "Modus Ponens" ?

        a) From *P* and *P* → *Q* infer *Q*. This is sometimes written as *P*

        b) From *P* and *P* → *Q* infer *Q*. This is sometimes written as *Q*

        c) Invalid term

        d) None of these.

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ii) What is Artificial Intelligence ?

    a) Non-existence intelligence

    b) Non-real intelligence

    c) The branch of computer science concerned with making computers behave like humans

    d) None of these.

iii) In conceptual dependency ATRAN means

    a) Actual Transfer   b) Abstract Translation

    c) Abstract Transfer   d) None of these.

iv) What is define the term heuristic ?

    a) Heuristic refers to risk analysis

    b) Heuristic refers to experience-based techniques for problem solving, learning, and discovery

    c) Heuristic refers to search without any knowledge base

    d) None of these.

v) What is define fuzzy logic ?

    a) It has two definite states

    b) It is deterministic

    c) Fuzzy logic is a form of many-valued logic; it deals with reasoning that is approximate rather than fixed and exact

    d) none of these.

vi) What is knowledge ?

    a) Knowledge can be defined as the body of facts and principles accumulated by human kind or the act, fact or state of knowing

    b) Knowledge is heuristic

    c) Knowledge is processed information

    d) None of these.

vii) What is knowledge-based system ?

    a) Knowledge-based systems get their power from the expert knowledge that has been coded into facts, rules, heuristics and procedures

    b) It is knowledge database

    c) Knowledge-base is same as database

    d) None of these.

viii) The full form of PROLOG and LISP is

    a) Programming Logic and List Processing

    b) Programming Logic and List Programming

    c) Process Logic and List Programming

    d) None of these.

ix) The term pruning in the context of game tree is

    a) It is a sorting technique

    b) Requires its application in game search tree to reduce complexity

    c) It increases the searching complexity in a game search tree

    d) none of these.

x) What is semantic net ?

    a) It is one of the form of knowledge representation

    b) It is one of the form of frame knowledge representation

    c) It is a searching technique

    d) none of these.

GROUP – B
(Short Answer Type Questions)
Answer any *three* of the following.   3 × 5 = 15

2. State different knowledge representation techniques inside the computers ?

3. Give the conceptual dependency structure for the following :

    a) Mohan ate the soup with spoon

    b) John give a flower to Sue.

4. Translate the following statements in FOPL :

    a) All staffs having salary more than Rs. 1,00,000 per year, pay income tax

    b) Nothing beautiful is evil.

5. Check whether the follow logical expressions are valid or not.

   a) (~ P and Q) V (Q → P)

   b) (CV~D) → (D → C)

6. "Al plays its role in Medical Diagnosis". Explain.

GROUP – C
(Long Answer Type Questions)
Answer any *three* of the following.   3 × 15 = 45
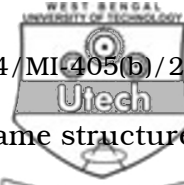
7. a) In a sample program in PROLOG, write the following facts

   ● parent(symbol, symbol)

   ● male(symbol)

   ● female(symbol)

   Also write the following rules depending upon defined facts

   ● grandfather (symbol, symbol)

   ● husband(symbol, symbol)

   ● brother(symbol, symbol).   3 + 3 + 3 + 3 + 3

b) Express the following description as a frame structure :

● Mohan has a red Maruti car of 1986 model. It has 4 doors, weighs 125 kgs. Its mileage at any time may be computed be a procedure 'find mileage'.

● Mohan is a lecturer of computer science at Delhi University. The names of his wife and two children are respectively Geeta, Monu and Sonu.

8. What is heuristic search technique ? Write A* algorithm.

9. What are clausal normal form and Prenex normal form ? Write steps for clausal conversion procedure for the following expression :

$$\exists_x \forall_y \ (\forall_z P \ (f(x), \ y, \ z) \rightarrow (\exists_u \ Q \ (x, \ u) \ \& \ \exists_v \ R \ (y, \ v) \ ) \ )$$

4 + 4 + 7

10. What is expert system ? With a diagram explain the basic architecture of expert system and its various components.

5 + 5 + 5

11. Explain the frame problem with a suitable example. Describe briefly "the frame problem" in context of knowledge organization and management. What is its significance in the context of effective memory organization ?   5 + 5 + 5