Name : .....

Roll No. : .....

Invigilator's Signature : .....

CS/BCA/SEM-6/BCAE-601B/2010

2010

INTELLIGENT SYSTEMS

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 : $10 \times 1 = 10$

i) AI is applied for

a) Game playing

b) Speech & language processing

c) Planning & scheduling

d) All of these.

ii) Time complexity of DFS where d(depth) and b(branch) is

a) O(bd) b) O(b\s\up4(d) \)

c) O(d b)d) none of these.

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iii) In genetic algorithm the new generation is formed by
   a) Chromosome crossover
   b) Mutation
   c) Both (a) & (b)
   d) Neither (a) nor (b).

iv) In heuristic search we do not have problem of
   a) Ridge b) Local maxima
   c) Local minima d) Plateau.

v) In a natural neuron the input signal is received from
   a) Axon b) Dendrites
   c) Nucleus d) None of these.

vi) Local search such as hill-climbing
   a) operates using many current states
   b) uses more memory than depth first search
   c) is not situated for pure optimization problem
   d) does not retain the paths followed by a search.

vii) Which one of the following is invalid atom ?
   a) Bill b) 12345
   c) (a b) d) A1234.

viii) Assignment statement is
   a) X = 10 b) (Setq ∞ 10)
   c) X – > 10 d) None of these.

ix) (car '(*a b c*)) will return
   a) *a* b) *b*
   c) *c* d) *a b c*.

x) (cdr '(*a b c*)) will return
   a) *ab* b) *bc*
   c) *ac* d) none of these.

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GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. 3 × 5 = 15

2. a) Explain AND-OR graph.
   b) Define the travelling selesman problem. 3 + 2
3. a) What is an Expert System ?
   b) What are the characteristic features of an Expert System ? 3 + 2
4. a) How an informed search is different from an uninformed search ?
   b) Give an example for each of the searching methods. 3 + 2
5. Differentiate between any *two* of the following : 5
   a) Procedural Knowledge and Declarative Knowledge.
   b) Forward reasoning and backward reasoning.
   c) BFS and DFS.
6. What is Artificial Intelligence ? Write down the different applications of AI. 2 + 3

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. 3 × 15 = 45

7. a) Explain Abductive, Inductive and Analogical Inference with an example.
   b) What is Clausal Form ? Change the following expression in Clausal Form :

   $\exists x \forall y \, (\forall z \, P \, (f \, (x), y, z) \varnothing \, (\exists u \, Q \, (x, u) \, \& \, \exists v \, R \, (y, v)))$

   (2 + 2 + 2) + (2 + 7)
8. a) What are the different knowledge representation schemes ? Explain in brief.
   b) Write down the algorithm of BFS.
   c) What are the components of a Knowledge Based System ? 6 + 5 + 4

9. a) Represent the following expressions in F.O.P.L. (First Order Predicate Logic) :
   i) Everyone is loyal to someone.
   ii) No employee earns more than the President.
   iii) All employees earning Rs. 20,000 Or more per month pay tax.
   b) Differentiate data, knowledge, belief and hypothesis.

(3 + 3 + 3) + 6

10. a) Derive the parse tree for the sentence "Jim stood on the chair" where the following rewrite rules are used :

S ∅ NP VP
NP ∅ N
NP ∅ DET N
VP ∅ V PP
PP ∅ PREP NP
N ∅ Jim | chair
V ∅ stood
DET ∅ the
PREP ∅ on.

   b) Represent the given facts about a professor with the help of a Frame Structure. Bob is a Professor, his age is 42, his wife's name is Sandy and he is having two children Sue and Joe. 9 + 6

11. Write short notes on any *three* of the following : 3 × 5
   a) Genetic algorithms
   b) 8 puzzle problem
   c) Polymorphism
   d) Hill Climbing
   e) Expert System.

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