MCA-303

INTELLIGENT SYSTEM

Time Allotted: 3 Hours | Full Marks: 70

The questions are of equal value.
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. Answer any *ten* questions. $10 \times 1 = 10$

(i) Skolem functions is used in

(A) unification algorithms
(B) natural deduction
(C) conversion to clause form
(D) none of these

(ii) Order of complexity of DFS is

(A) 2^n
(B) log n
(C) $\log n^2$
(D) none of these

(iii) Inheritable knowledge is best represented by

(A) semantic net
(B) FOL
(C) database
(D) none of these

(iv) What is the heuristic search?

(A) DFS
(B) BFS
(C) breast first search
(D) none of these

(v) Which is not a pure AI game?

(A) Ludo
(B) Snakes and Ladders
(C) Tic-Tac-Toe
(D) Chess

(vi) Heuristic search has

(A) minimization of function value (B) maximization of function value
(C) both (A) and (B) (D) none of these

(vii) Which of the following is a declarative knowledge?

(A) a set of production rules.
(B) using LISP code to define a value.
(C) describing the objects using a set of attributes and associated values.
(D) a knowledge about the order in which to pursue the sub goals.

(viii) Resolution can be used for

(A) question answering (B) theorem proving
(C) both (A) and (B) (D) none of these

(ix) Which of the following is there in Prolog?

(A) existential quantifier (B) universal quantifier
(C) conjunction (D) disjunction

(x) Which is not heuristic search?

(A) constraint satisfaction search (B) depth first search
(C) simulated annealing (D) steepest ascent Hill-Climbing

(xi) "John is very tall" –this statement can be completely expressed in

(A) FOPL (B) propositional logic
(C) fuzzy logic (D) default logic

GROUP B
(Short Answer Type Questions)

Answer any *three* questions. 3×5 = 15

2. Write a prolog program to find the greatest common divisor of two integers. 5

3. (a) What are heuristic search and heuristic function? 2

(b) What is plateau? How is it overcome? 2

(c) What is script? 1

4. Draw a semantic network and write atomic formulae for the English sentence given below 5
"Manju is playing with a red ball."

5. Differentiate between the following 2.5+2.5

(a) Inheritable Knowledge and Inferential Knowledge.

(b) Monotonic Reasoning and Non-Monotonic Reasoning.

6. State = (x, y), where x is the number of gallons of water in the 5-gallon jug and y is the number of gallons in the 2-gallon jug. 5
Initial state = (5, 0) Goal State = (*, 1), where * means any amount.
Create the search tree.

GROUP C
(Long Answer Type Questions)

Answer any *three* questions. 3×15 = 45

7. (a) State three different inference rules. 3

(b) Discuss the resolution-refutation method. Why it is used? 3+2

(c) Convert the following structure into a semantic net by mentioning the conventions. 7
A. Students love books
B. Students have pets
C. Pets harm books
D. Prakash is a student.
E. Tomy is pet of Prakash

8. (a) State different application areas of AI. 4

(b) What is Horn Clause? 1

(c) State the rules for clausal conversion procedure. 5

(d) What is the need of unification? Explain with example. 3

(e) What is context free grammar? 2

9. (a) What do you mean by generalization and specialization? Explain with an example. 2+2

(b) Explain the A* search algorithm by clearly specifying the data structures associated with it. 7

(c) What are the different problems associated with Hill climbing search? 4

10.(a) Consider the following axioms : 8

1. All hounds howl at night.
2. Anyone who has any cats will not have any mice.
3. Light sleepers do not have anything which howls at night.
4. John has either a cat or a hound.
5. (Conclusion) If John is light sleeper, then John does not have any mice.

Prove the above conclusion from the set of facts using resolution refutation technique.

(b) There are three identical boxes, each provided with two drawers. In the first box each drawer contains a gold coin; in the third, each drawer contains a silver coin; and in the second, one drawer contains a gold and the other a silver coin. A box is selected at random, and one of the drawers is opened. If a gold coin is found, what is the probability that the box chosen is the second one? 7

11.(a) What is conceptual dependency? Illustrate in the light of Slot and Filler structure. 6

(b) Briefly describe Bayesian Network. 3

(c) Explain different parsing techniques. 6