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Paper Code : CS-703C

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.

Answer all groups.

Group – A

(Multiple Choice Type Questions)

1×10=10

1. Choose the correct alternative of the following:

(i) Frame is a collection of

(a) Slots (b) Fillers

(c) Resolutions (d) Knowledges

(ii) A Baysian network is a

(a) tree (b) directed graph

(c) undirected graph (d) None of these

(iii) Horn clause is a clause with _____ positive literals.

(a) at most one (b) at most two

(c) at least one (d) at most four

(iv) An algorithm that gives optimal solution is

(a) Hill climbing (b) BFS

(c) Blind search (d) A*

(v) Uniformed search is also known as:

(a) Brute force search (b) Hill climbing search

(c) Worst case search (d) Blind search

(vi) The process of eliminating existential quantifiers is known as

(a) Resolution (b) Skolemisation

(c) Unification (d) None of these

(vii) The rule used to change weight in Neural Network (NN) is

(a) Kirchoff's rule (b) Hebb's rule

(c) Boehm's rule (d) None of these

(viii) Inheritable knowledge is best represented by:

(a) Semantic net (b) FOPL

(c) Database (d) None of these

(ix) Minimax algorithm search process obeys

(a) breadth first search fashion. (b) depth first search fashion.

(c) best first search fashion. (d) blind search fashion.

(x) Depth first search procedure uses

(a) AND graph (b) OR graph

(c) AND-OR graph (d) None of these

Group – B

(Short Answer Type Questions)

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

2. Compare and contrast Best First and Hill climbing search. 5

3. What is an agent in AI? What are the types of agent? Discuss about environment for agent. 1+2+2=5

4. What is bling search technique? Explain with examples. 5

5. What is tautology? Prove that $(((P \rightarrow Q) \rightarrow P) \rightarrow P)$ is a tautology. What are Modus Ponens and Modus Tollens? 1+2+2=5

6. Write iterative deepening algorithm with example. 5

Group – C
(Long Answer Type Questions)
Answer *any three* of the following. 15×3=45

7. Suppose you have the following search space:

State	Next	Cost
A	B	4
A	C	1
B	D	3
B	E	8
C	C	0
C	D	2
C	F	6
D	C	2
D	E	4
E	G	2
F	G	8

Assume that the initial state is A and the goal state is G. Show how each of the following search strategies would create a search tree to find a path from the initial state to the goal state and the cost of the solution:

(i) Breadth-first search

(ii) Depth-first search

(iii) Iterative deepening search 5+5+5=15

8. (a) What do you mean by constraint satisfaction problem? Solve the following cryptography problem using constraint satisfaction search:

```
  SEND
  MORE
 =====
 MONEY
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(b) Write a program in PROLOG to compute the GCD of two numbers. 10+5=15

9. (a) What is 'Horn Clause'?

(b) What is Skolemisation?

(c) Given the following text 'Everyone who enters in a theatre has to buy a ticket. Person who doesn't have money can't buy a ticket. Vinod enters a theatre'. Prove by resolution that 'Vinod has money'.

(d) With the help of semantic net, prove that Sourav is 6 feet tall and he is taller than Sachin. 2+3+5+5=15

10. (a) Briefly explain the steps of Natural Language Processing
    (b) Generate the parse tree for the sentence 'The boy went to School'.
    (c) Explain AO* algorithm with a suitable example. 3+5+7=15

11. Write short notes on *any three* of the following: 5×3=15
    (a) Conceptual graph
    (b) Alpha-Beta pruning in min-max search
    (c) A* search
    (d) The steps for transforming into Clause Form
    (e) Expert Systems