Seat No: _____ **Enrollment No: _____**

PARUL UNIVERSITY

FACULTY OF ENGINEERING & TECHNOLOGY

B.Tech. Winter 2021-22 Examination

Semester: 7 **Date: 08/10/2021**
Subject Code: 03105431 **Time: 10:30am to 01:00pm**
Subject Name: Artificial Intelligence **Total Marks: 60**

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 **Objective Type Questions -** (Fill in the blanks, one word answer, MCQ-not more than Five in case of MCQ) (All are compulsory) (Each of one mark) **(15)**

1. Is Hill-Climbing algorithm optimal?
2. A* is not optimal if h(n) is an admissible heuristic-that is, provided that h(n) never underestimates the cost to reach the goal.
   a) True b) False
3. A heuristic is a way of trying
   a) To discover something or an idea embedded in a program
   b) To search and measure how far a node in a search tree seems to be from a goal
   c) To compare two nodes in a search tree to see if one is better than the other is
   d) All of the mentioned
4. Which search method does not take less memory?
   a) Depth-First Search b) Breadth-First search c) Optimal search d) Both (a) and (b)
5. A game can be formally define as a kind of search problem with the following components:
   a) Initial State b) Follower Function
   c) Terminal Test d) Both (a) and (c)
6. Translate the following statement into FOL. "For every a, if a is a philosopher, then a is a scholar"
   a) ∀ a philosopher(a) scholar(a) b) ∃ a philosopher(a) scholar(a)
   c) All of the mentioned d) None of the mentioned
7. Where does the values of alpha-beta search get updated?
   a) Initial state itself b) Along the path of search
   c) At the end d) None of the mentioned
8. Which form is called as conjunction of disjunction of literals?
   a) Context normal form b) Disjunctive normal form
   c) Conjunctive normal form d) All of the mentioned
9. Which form is called as conjunction of disjunction of literals?
   a) Context normal form
   b) Disjunctive normal form
   c) Conjunctive normal form
   d) All of the mentioned

10. What is the equivalence of A -> B in logic theory?

(a) ~A ^ ~B (b) ~A v ~B

(c) ~A v B (d) A v ~B

11. What is the given predicate logic for "∀x man(x) → drink (x, coffee)"?

12. What is the given predicate logic for "∃x: boys(x) ∧ intelligent(x)"?

13. What is the given predicate logic for "∀x man(x) → respects (x, parent)"?

14. What is the given predicate logic for "∃x boys(x) → play (x, cricket)"?

15. What is the given predicate logic for "∀x bird(x) →fly(x)"?

Q.2 Answer the following questions. (Attempt any three) **(15)**

A) Convert this to CNF (A v B) -----> (C ------> D) ?

B) List five industries where expert system is used.

C) List five Applications of AI.

D) List various fields of AI which are data driven.

Q.3 A) Explain Greedy Best First search with example. **(07)**

B) Write Predicates for the following sentences: **(08)**

(a) Every student who walks talks.

(b) Everyone walks or talks.

OR

B) In which domain or particular problem neural network is used. Write mathematical equation of three activation functions. **(08)**

Q.4 A) Explain AO* algorithm with suitable example. **(07)**

OR

A) Explain why Hill climbing searching technique is not optimal? Justify your answer. **(07)**

B) Consider the game tree given in Fig. 1, in which the evaluation function values are shown below each leaf node for the max player. Assume that the root node corresponds to the minimizing player. Assume that the search always visits children left-to-right. **(08)**

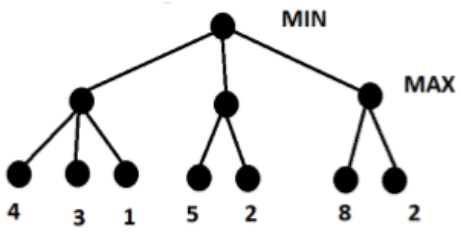

Fig : 1

which nodes will not be examined by the alpha-beta pruning algorithm? Show the process of alpha-beta pruning to justify your answer.