SASTRA	School of Computing
DEEMED TO BE UNIVERSITY	First CIA Exam – Feb 2025
THINK MERIT	THINK TRANSPARENCY	THINK SASTRA	Course Code: INT314

School of Computing
First CIA Exam – Feb 2025
Course Code: INT314
Course Name: Artificial Intelligence and Logical Reasoning
Duration: 90 minutes   Max Marks: 50

**Answer all questions**   **PART A**   **8 x 5 = 40 Marks**

1. You are building food delivery agent within SASTRA. Discuss the type of its environments. (5)
2. You have to develop an agent to work in a blind environment, Develop the steps of Breadth First Search algorithm to give instruction to the agent to do a task. (5)
3. Assume that you are planning to build Learning agent. Discuss the components which are to be present. (5)
4. Discuss the type of environments you mentioned in question 1. (5)
5. Compare the performance metrics of all uninformed search strategies. (5)

6. Anand developed a part-picking robot to identify defective part. Identify PEAS of that agent. (5)

7. Draw the block diagram of Goal based Agent. (5)

8. Discuss how bidirectional search is better than BFS and DFS. (5)

Answer all questions   **PART B**   **1x 10 = 10 Marks**

9. The courier delivery bot has to travel in the given state space. The possible states and costs are given in the graph. M-Start, G-Goal. How UCS can be applied and least cost path be found? (10)
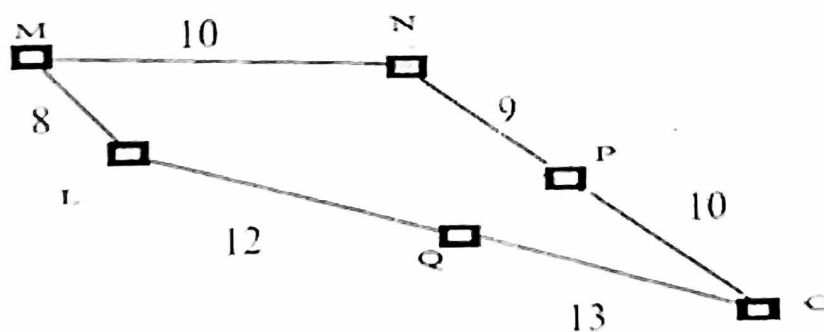
SASTRA

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| School of Computing |
| Second CIA Exam – Mar 2025 |
| Course Code: INT314 |
| Course Name: Artificial Intelligence and Logical Reasoning |
| Duration: 90 minutes   Max Marks: 50 |

Answer ANY FOUR questions   **PART A**   **4 x 10 = 40 Marks**

1. Bot wants to reach railway station in a city from your college (X). The SLD values are given in circle. Path costs are given in edges. First find the goal from these values. Then apply A* search to get minimal cost. Step by step process along with formula and tree are required. (10)
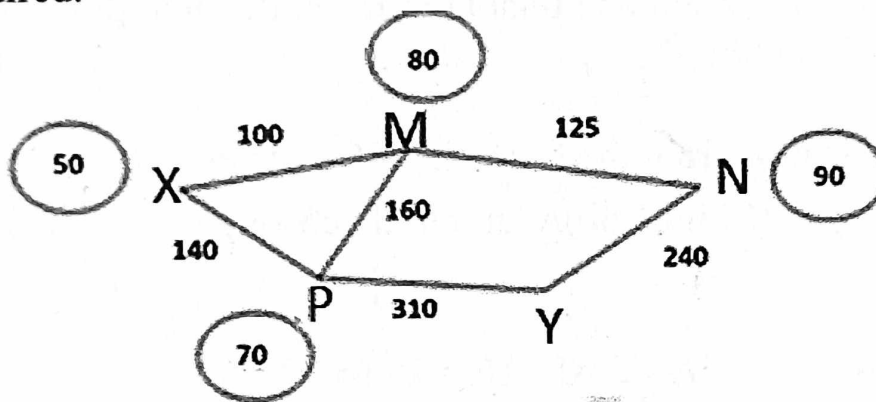
2. Consider the following tree is a part of Tic-Tac-Toe game played by two players. Apply alpha-beta pruning process to reduce the number of branches or nodes to be searched by. (α, β values are to mentioned) (10)
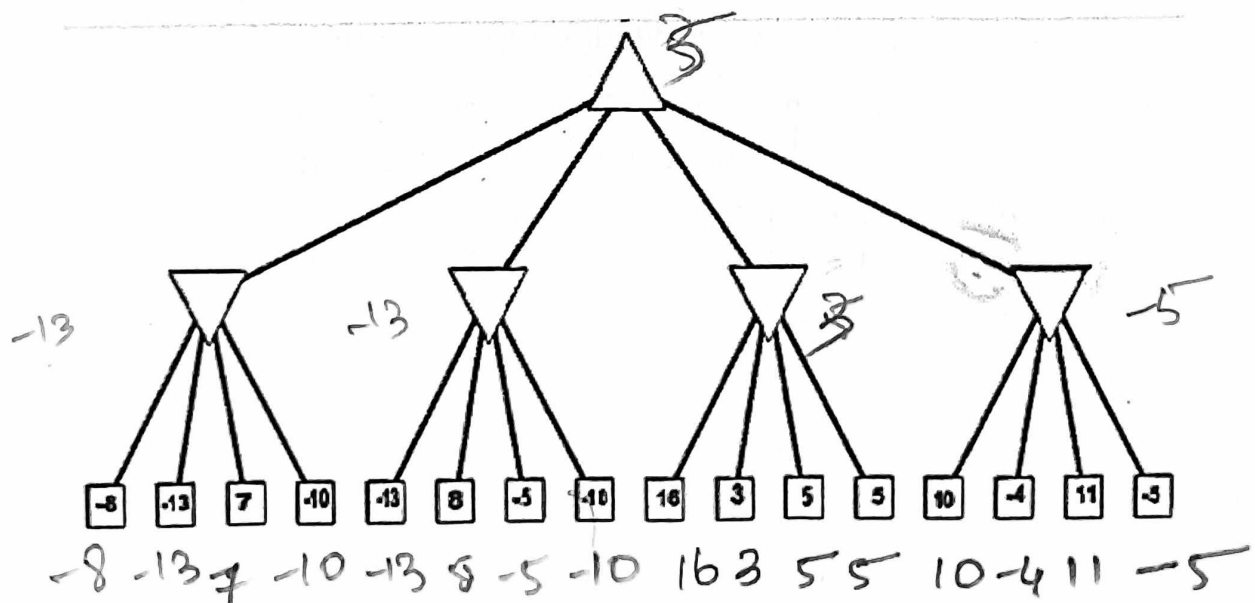
3. Illustrate 'for all' and 'there exists' Quantifiers of FOL statements. (10)

4. a) Convert the following sentences into FOL statements
   "There is a course that is hard and interesting "
   "A number x is even if and only if x is divisible by 2" (5)

   b) Differentiate Greedy best first search, A star search and Memory bounded A star search. (5)

5. a) If agent struck at a point and unable to reach the goal, how can you help as per hill climbing. (7)

   b)Remove implication from the following FOL statement.
   Mother(Alice)$\leftrightarrow$(Child(Bob)$\land$Parent(Alice,Bob)) (3)

Answer the question   PART B1x 10 = 10 Marks

6.Answer the following questions

a) Illustrate Manhattan distance as heuristic value. (2)

b) Define Crossover of genetic algorithm using 8-queen problem.(2)

c) Recall any two properties of knowledge representation. (2)

d) Convert the following sentence into equivalent existential quantifier sentence: Convert the following sentence into equivalent existential quantifier sentence: $\exists x(Bird(x)\land\neg CanFly(x)$ (4)

Answer ANY FOUR questions   **PART A**   **4 x 10 = 40 Marks**

1. You're analyzing customer behavior to understand who is likely to buy organic food. You observe three things: Whether a person is health conscious, Whether a person buys organic food, Whether the person uses reusable bags. From the full joint probability distribution table find

   a. What is the probability that a customer is health conscious?   (2)

   b. What is the probability of reusable bags?   (2)

   c. What is the probability that a customer buys organic given they are health conscious?   (3)

   d. What is the probability that a customer is health conscious given they use a reusable bag?   (3)

Health Conscious	Organic	Reusable Bag	Probability
Yes	Yes	Yes	0.20
Yes	Yes	No	0.05
Yes	No	Yes	0.10
Yes	No	No	0.05
No	Yes	Yes	0.05
No	Yes	No	0.05
No	No	Yes	0.15
No	No	No	0.35

2. Illustrate Instance and ISA Relationships of FOL.   (10)

3. A bot is searching a spare part in the available rooms. The part is available in the bold-rounded room. Apply Depth First Search and analyze the searching process in a table using the order of fringe queue.   (10)
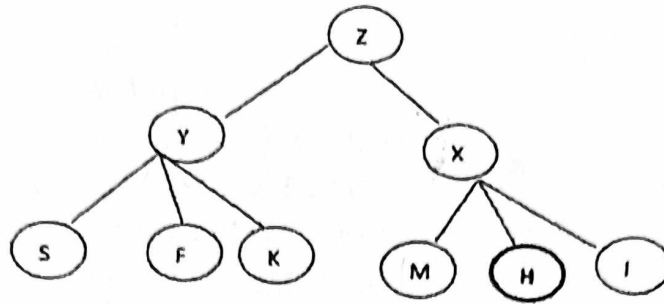
4. a) Construct goal stack planning for the given block world example. (10)

Initial State   Goal State
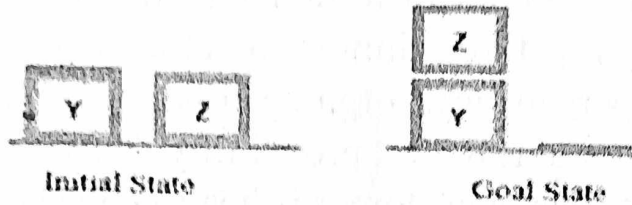
5. a) Recall Minimax algorithm. (7)

b) Recall hill climbing algorithm. (3)

Answer the question   PART B   1x 10 = 10 Marks

6. a) Recall the steps of resolution refutation proof of FOL. (5)
b) Define Modus Ponens. (3)
c) Apply Alpha beta pruning to the given tree, find alpha, beta values, root value and pruned branches. (2)