

2919CS079

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USN: 6th C.S. / common Q.P/Rs. 25/-

Course Code : 18CS61

Sixth Semester B.E MAKEUP Examination, AUGUST-OCTOBER 2021**ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING**

Time: 3 hrs

Max. Marks :100

Instructions :1. Answer any five full questions.

	L	CO	PO	M
1a. What Is Artificial Intelligence? Explain in brief its importance.	[2]	[1]	[1]	[5]
1b. Compare Strong AI and Weak AI methods.	[3]	[1]	[1]	[7]
1c. Demonstrate the Semantic Net with an example.	[3]	[1]	[2]	[8]
2a. For a problem of Missionaries and Cannibals in AI write the Operators and draw the Search tree without cycles having solution for the same.	[3]	[2]	[2]	[10]
2b. Write a note on Combinatorial Explosion and Problem reduction.	[2]	[1]	[1]	[10]
3a. Explain how searching helps in problem solving emphasizing on types of searches in AI.	[2]	[1]	[1]	[10]
3b. Demonstrate the working of Depth first search and Breadth first search algorithms by the use of either algorithm or pseudo-code for the same.	[3]	[2]	[2]	[10]
4a. List and Explain the properties of Search Methods.	[2]	[1]	[1]	[10]
4b. Explain with figure the three problems that could be faced by a HILL climbing algorithmic techniques.	[2]	[2]	[2]	[10]
5a. Demonstrate the use of Game trees in solving the tic-tac-toe problem. Draw the partial game tree for the same.	[3]	[2]	[2]	[10]
5b. Write a note on Alpha-beta Pruning emphasizing on its effectiveness and its implementation.	[2]	[1]	[1]	[10]
6a. State the deduction theorem and apply the same to prove the following. $\{A \rightarrow B\} \vdash A \rightarrow (C \rightarrow B)$	[3]	[2]	[2]	[10]
6b. Write a note on Soundness, Completeness, Decidability, Monotonicity.	[2]	[1]	[1]	[10]
7a. What is need of training in Machine Learning? Using a simple learning method derive a final hypothesis which is consistent for following training data: <slow, wind, 30ft, 0, evening, cold> <slow, rain, 20ft, 0, evening, warm> <slow, snow, 30ft, 0, afternoon, cold>	[3]	[3]	[2]	[10]

7b. Explain the candidate elimination technique and Meaning of Inductive bias.

[2] [3] [1] [10]

8a. Explain in brief the three types of learning methodologies in Artificial Neural Networks.

[2] [3] [1] [10]

8b. Demonstrate the working of simple perceptron to represent the learning of logical OR function for maximum 3 epochs.

[3] [3] [2] [10]

9a. Explain with an example the working of Probabilistic Reasoning and Joint Probability Distributions.

[2] [3] [1] [10]

9b. In the city of Cambridge, there are two taxi companies. One taxi company uses yellow taxis, and the other uses white taxis. The yellow taxi company has 90 cars, and the white taxi company has just 10 cars. A hit-and-run incident has been reported, and an eye witness has stated that she is certain that the car was a white taxi. Further suppose that experts have asserted that given the foggy weather at the time of the incident, the witness had a 75% chance of correctly identifying the taxi.

Given that the lady has said that the taxi was white, what is the likelihood that she is right?

[4] [3] [2] [10]

10a. Explain how learning happens in Simple Bayesian Concept Learning?

[2] [3] [1] [10]

10b. Write a note on Bayesian Belief Networks and The Noisy-V Function.

[2] [3] [1] [10]

Seventh Semester B.E. Semester End Examination, Dec./Jan. 2019-20

ARTIFICIAL INTELLIGENCE

Time: 3 Hours

Max. Marks: 100

Instructions: 1. Answer one full question each from the Units

UNIT - I

L CO PO M

- 1 a. Explain Turing test and Chinese room argument experiment. Compare and contrast. (2) (3) (2) (10)
- b. Convert the following information into semantic nets and frames:
 Tom is a cat. Tom caught a bird. Tom is owned by John. Tom is ginger in color. Cats like cream. The cat sat on the mat. A cat is a mammal. A bird is an animal. All mammals are animals. Mammals have fur. (3) (2) (2) (10)

OR

- 2 a. Explain the relationship between graphs, semantic nets, semantic trees, search spaces, and search trees. (2) (3) (2) (10)
- b. Design a suitable representation and draw the complete search tree for the following problem.
 A farmer is on one side of a river and wishes to cross the river with a wolf, a chicken, and a bag of grain. He can take only one item at a time in his boat with him. He can't leave the chicken alone with the grain, or it will eat the grain, and he can't leave the wolf alone with the chicken, or the wolf will eat the chicken. How does he get all three safely across to the other side? (5) (3) (2) (10)

UNIT - II

L CO PO M

- 3 a. Explain how you implement Depth First Search and Breadth First Search with example code. Compare both search techniques. (2) (3) (2) (10)
- b. Explain with example how you use heuristics for search. Explain the criteria for selecting a good heuristic. (2) (3) (2) (10)

OR

- 4 a. Explain different techniques to identify optimal paths. (2) (3) (2) (10)
- b. Implement a greedy-search algorithm. How well does it perform compared with the other methods you have implemented? Invent a 0-1 knapsack problem, and use your search tree implementation to model this problem. Can you model the fractional knapsack problem using a search tree? (5) (2) (1) (10)

UNIT - III

L CO PO M

- 5 a. Explain the following terms (i) Game Trees (ii) Minimax (iii) Alpha beta pruning. (2) (2) (3) (12)
- b. What is Logic? Explain Why Logic is used in Artificial Intelligence and explain Logical Operators. (2) (2) (3) (08)

OR

- 6 a. Explain the concepts of Translating between English and Logic Notation and explain the following Truth Tables of Not, And, Or, Implies, if, Complex Truth Tables. (2) (3) (2) (12)
- b. Explain deduction Theorem with an example. (2) (4) (4) (08)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

UNIT - IV

L CO PO

7 a. Consider the following axioms and convert them to clausal form

- a) Every coyote chases some roadrunner.
- b) Every roadrunner who says "beep-beep" is smart.
- c) No coyote catches any smart roadrunner.
- d) Any coyote who chases some roadrunner but does not catch it is frustrated.
- e) (Conclusion) If all roadrunners say "beep-beep", then all coyotes are frustrated.

Prove the conclusion If all roadrunners say "beep-beep", then all coyotes are frustrated

b. Explain with examples resolution in propositional logic.

(3) (3) (2)

(2) (3) (2)

OR

8 a. Explain with examples resolution in predicate logic.

(2) (3) (2)

b. Explain with example backward chaining.

(2) (3) (2)

UNIT - V

L CO PO

9 a. Explain black board architecture with its implementation.

(2) (3) (2)

b. Explain with example Dempster-Shafer theory of evidence.

(2) (3) (2)

OR

10 a. List and explain properties of agents.

(2) (1) (2)

b. List and explain types of agents.

(2) (1) (2)

Seventh Semester B.E. Makeup Examination, January 2019
ARTIFICIAL INTELLIGENCE

Time: 3 Hours

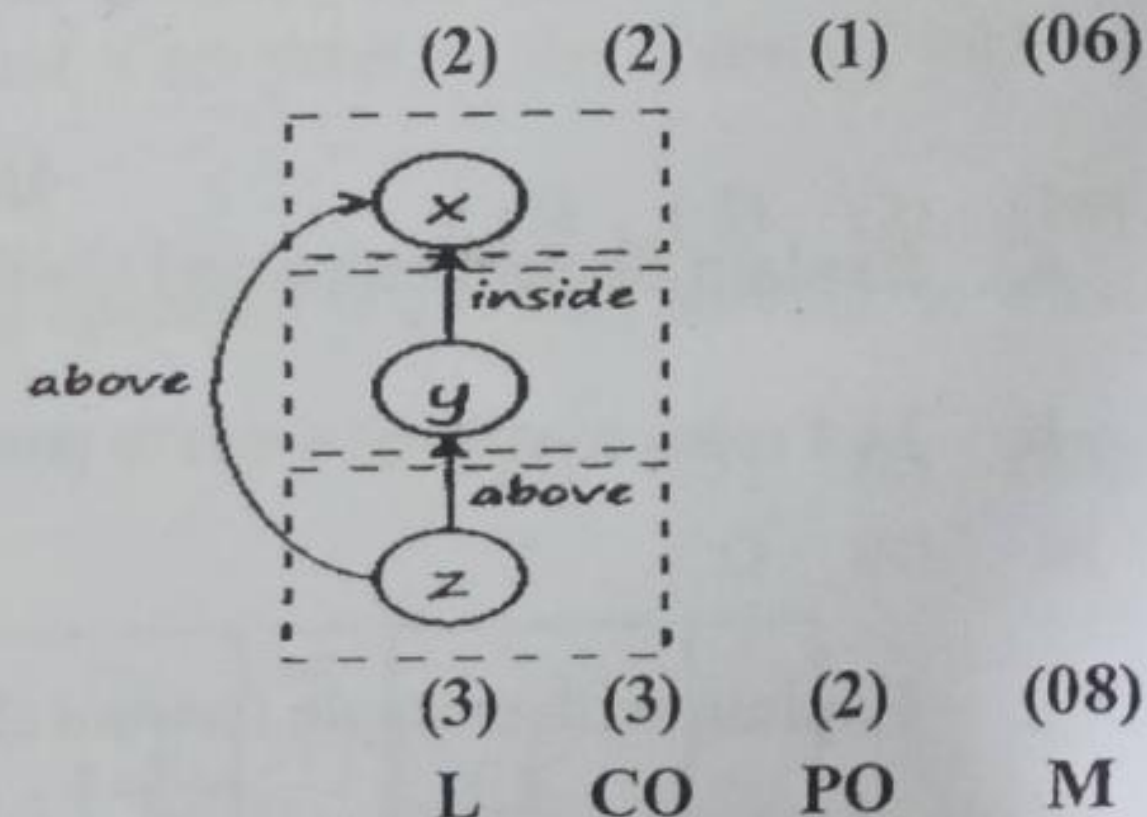
Max. Marks: 100

- Instructions:** 1. Unit-I and Unit-II are compulsory
 2. Answer any one full question from each of the remaining units.

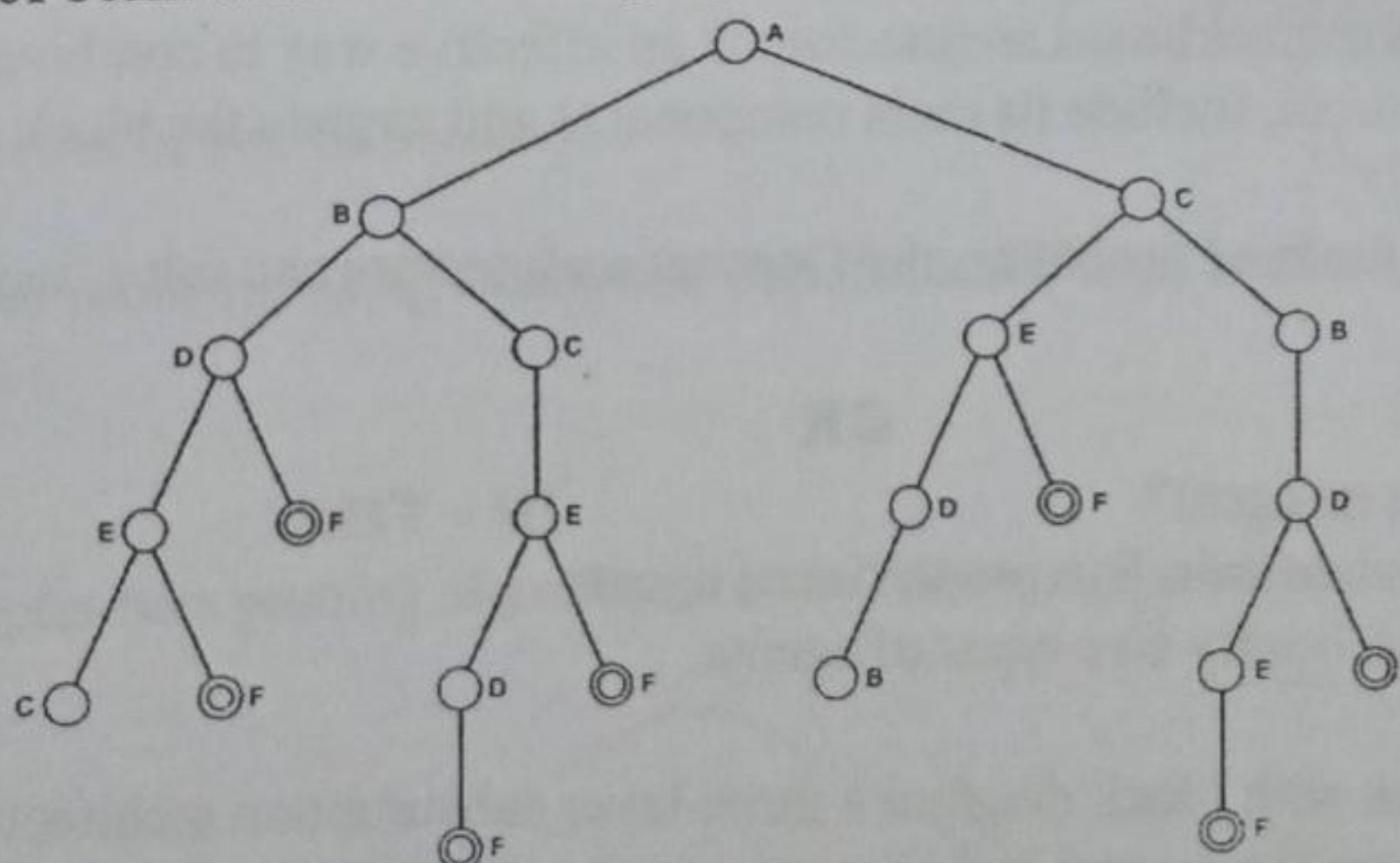
- (1) **UNIT - I** L CO PO M
- (1) a. Define (1) (1) (1) (06)
- (1) a. Intelligence
- (1) b. Artificial intelligence
- (1) c. Strong Methods and Weak Methods
- (1) b. Explain the Chinese Room argument, and (2) (2) (1) (06)
- (1) a. present some of the arguments against it, and
- (1) b. the counter-arguments.
- (1) c. Which do you find most convincing? How does this affect your view on the overall worth of the study of Artificial Intelligence?

- (1) c. Design Semantic net with appropriate frames for the following objects having relations each other:

● z

**UNIT - II**

- a. Explain the differences and similarities between depth-first search and breadth-first search. Give examples of the kinds of problems where each would be appropriate. Mention the time and space complexity of depth-first search and breadth-first search. (2) (3) (2) (10)
- b. Write implementation of beam search in 'C' language. Analyze beam search for the following tree.

**UNIT - III**

- a. Prove the following: $\vdash (\forall \rightarrow B) \rightarrow ((B \rightarrow C) \rightarrow ((C \rightarrow D) \rightarrow (\forall \rightarrow D)))$ (3) (2) (1) (06)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

- b. Explain the Deduction Theorem, with the rule: if $A \cup \{B\} \vdash C$ then $A \vdash (B \rightarrow C)$ (2) (1) (1)
- c. Explain briefly
- Soundness
 - Completeness
 - Decidability
 - Monotonicity
- (2) (1) (2)

OR

- 4 a. i. What is Logic? (1)
 ii. Why Logic is used in Artificial Intelligence? (1)
 iii. List five Logical Operators. (2)
- b. Translate from English to Logic notations, making use of symbols R=raining, T=Tuesday, N=New York, S=sick, T=tired:
- "It is raining and it is Tuesday" (2)
 - "It is raining in New York" (2)
 - "It is raining in New York, and I'm getting sick or just very tired" (1)
- c. Identify the meaning of Deduction, for the logical expressions: a. $\frac{A \quad B}{A \wedge B}$ b. $\frac{A \wedge B}{A}$ c. $\frac{A \quad A \rightarrow B}{B}$ (2) (2) (1)
- (3) (2) (2)

UNIT - IV

- 5 a. Explain Skolemization and Unification with examples (2) (3) (2) (10)
- b. List rules to convert a wff to prenex normal form. Also list the rules to move quantifiers to the front. (1) (3) (2) (10)
- OR
- 6 a. Explain with example forward chaining and backward chaining. (2) (3) (2) (10)
- b. Write a short note on
- CLIPS
 - CYC
- (2) (3) (2) (10)

UNIT - V

- 7 a. Explain why the blackboard architecture is an effective way to combine information from a number of knowledge sources, include its main components and explain the block schematic. (2) (1) (1) (10)
- b. Explain what kinds of problems, the Copycat architecture can solve, using block schematic. (2) (1) (1) (10)
- OR
- 8 a. i. Define an agent? (2) (1) (1) (10)
- ii. List and explain five properties of agents.
- iii. Explain briefly five types of agents.
- b. i. Explain with block diagram a three-layer subsumption architecture for an agent. (2) (1) (1) (10)
- ii. Compare Horizontal and Vertical agent architectures. (2) (1) (1) (10)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

Seventh Semester B.E. Semester End Examination, Dec/Jan 2018-19
ARTIFICIAL INTELLIGENCE

Time: 3 Hours

Max. Marks: 100

- Instructions:**
1. Unit I and II are compulsory.
 2. Readable question's numbers must be in allocated space.
 3. Data, if necessary, may be assumed.
 4. Sketches, when required, may be drawn.

UNIT - I

L CO PO M

- a. Differentiate between
 i) Strong methods and weak methods
 ii) Strong AI and weak AI

(3) (3) (2) (05)

- b. Convert the following information into:
 a) a semantic net
 b) a frame based representation

A Ford is a type of car. Bob owns two cars. Bob parks his car at home. His house is in California, which is a state. Sacramento is the state capital of California. Cars drive on the freeway, such as Route 101 and Highway 81.

(3) (3) (2) (10)

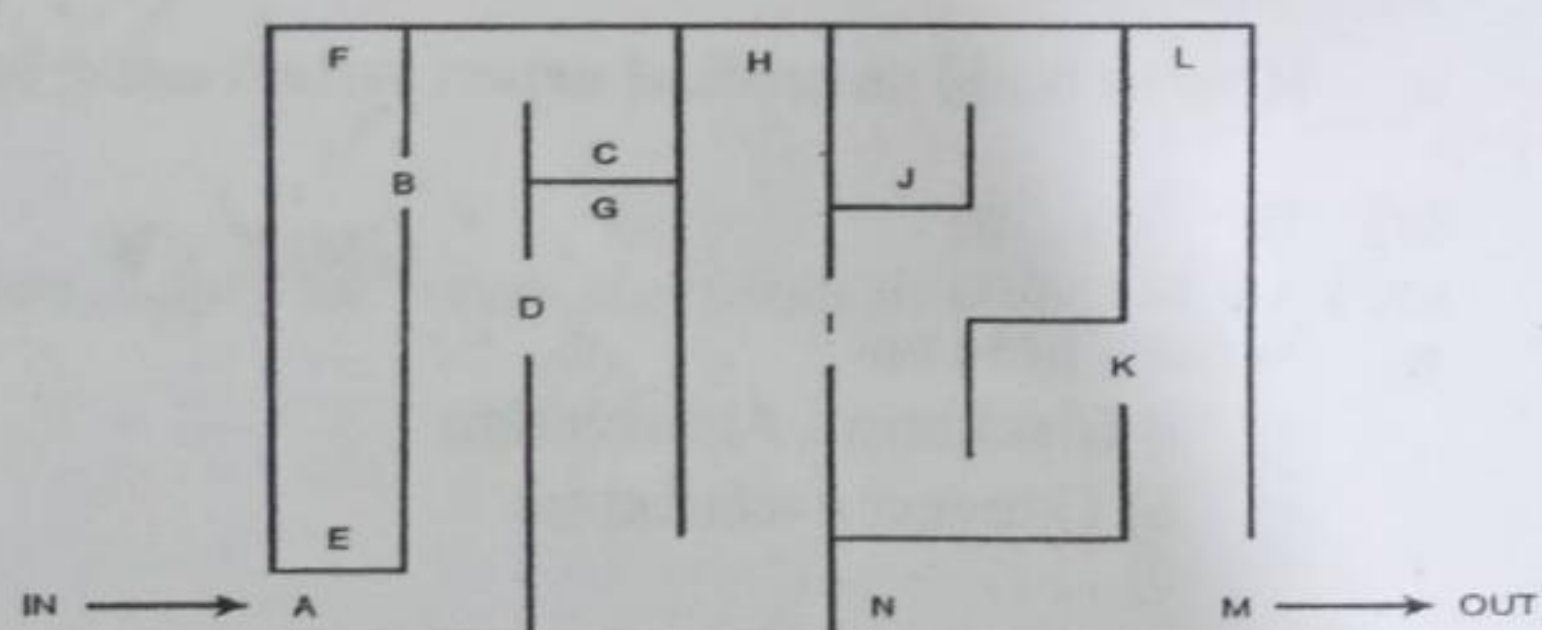
- c. Differentiate between a top-down approach and a bottom-up approach to problem solving. In what kind of situations might each be appropriate

(3) (3) (2) (05)

UNIT - II

L CO PO M

- a. Refer to maze, for entry, exit, dead nodes, decision nodes – identify path from entry to exit, and build an appropriate search tree.



(3) (2) (2) (08)

- b. Summarize the Properties of Search Methods.

(1) (1) (1) (04)

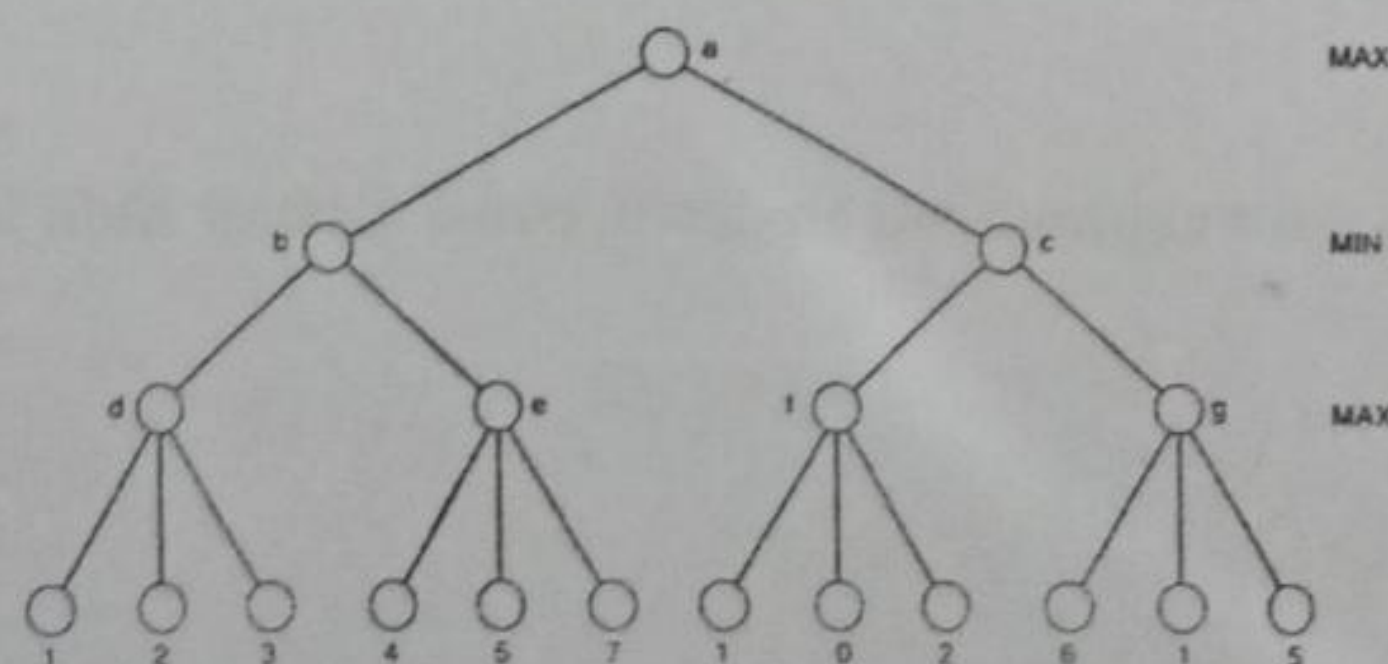
- c. Solve the eight-queens problem, using Constraint Satisfaction Search method, list out the steps and chess-board sketch, too.

(3) (2) (2) (08)

UNIT - III

L CO PO M

- a. Apply and analyze alpha-beta pruning algorithm for the following game tree.



(4) (2) (2) (10)

Note: L (Level), CO (Course Outcome), PO (Programme Outcome), M (Marks)

- b. Translate the following sentences in to predicate logic:
- Marcus was a man
 - All Pompeians were Romans
 - Everyone is loyal to someone
 - Marcus tried to assassinate Caesar
 - All men are people

(2) (2) (2) (10)

OR

- 4 a. Explain effectiveness of alpha-beta pruning algorithm. Explain how alpha-beta pruning algorithm is implemented with code.

(2) (3) (2) (10)

- b. Prove the following:

a) $(\neg A \rightarrow B) \rightarrow (\neg B \rightarrow A)$

b) $(A \rightarrow B) \rightarrow ((B \rightarrow C) \rightarrow ((C \rightarrow D) \rightarrow (A \rightarrow D)))$

(3) (3) (1) (10)

UNIT - IV

- 5 a. Solve the phrase to to get Conjunctive Normal Form (CNF): $(A \rightarrow B) \rightarrow C$

(3) (2) (2) (06)

- b. Explain the Resolution Rule and using the Resolution Rule resolve $\{A, B\}, (\neg B, C)$

(2) (1) (1) (06)

- c. Illustrate with block diagram and explain the architecture of an Expert System.

(2) (1) (1) (08)

OR

- 6 a. Solve the phrase to to get Conjunctive Normal Form (CNF): $A \leftrightarrow (B \wedge C)$

(3) (2) (1) (06)

- b. Explain the method of Proof by Reputation using an example.

(2) (2) (1) (06)

- c. How to build an medical expert system using backward chaining in Rule-Based Expert System.

(1) (2) (1) (08)

UNIT - V

- 7 a. Write a note on
- Blackboard Architecture
 - Copycat Architecture

(2) (3) (2) (10)

- b. Explain Dempster Shafer Theory of evidence with an example

(2) (3) (2) (10)

OR

- 8 a. Explain properties of agents

(2) (1) (2) (10)

- b. Explain with block diagram a three-layer subsumption architecture for an agent with suitable examples

(2) (1) (2) (10)