KADI SARVA VISHWAVIDHYALAYA

B.E. Semester VI EXAMINATION (DECEMBER - 2023)

Subject Code: CT601-N
Date: 14/12/2023

Time: 12.00pm to 3.00 pm

Subject Name: Artificial Intelligence
Total Marks: 70 Marks

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Use of scientific calculator is permitted.
4. Indicate clearly, the options you attempt along with its respective question number.
5. Use the last page of main supplementary for rough work.

Section-I

Q:1 Attempt Following.

(A) List and Explain any five application of AI. [5]

(B) How AND-OR graph differ from the OR graph? Explain with suitable examples [5]

(C) Explain Types of Agents in detail [5]

OR

Q:1 (C) Explain PEAS Representation for an Agent. [5]

Q:2 Answer the following question.

(A) Compare Breadth First Search and Depth First Search. [5]

(B) Explain A* algorithm with example. [5]

OR

Q:2 (A) Explain Hill Climbing and Steepest Ascent Hill Climbing. [5]

(B) Discuss Following things: i) Constraint Satisfaction ii) Mean-End Analysis [5]

Q:3 Answer the following question.

(A) Explain Minimax Algorithm with suitable examples. [5]

(B) What is a list in PROLOG? Explain with examples. [5]

OR

Q:3 (A) Write a note on state space representation with example. [5]

(B) How can alpha-beta cuts be used to reduce the search space of two-player games? Explain with suitable example [5]

Section II

Q:4 (All Compulsory)

(A) What is the reasoning? Explain the Forward and Backward chaining.

(B) Explain in brief different approaches for knowledge representation.

(C) What is ontology? Explain it with an example.

OR

Q:4 (C) Explain Semantic Nets with Example.

Q:5 Answer the following question.

(A) What is First-Order Logic? explain in detail Syntax and Semantics of First- Order Logic.

(B) Define following terms. 1) facts 2) objects 3) predicates 4) variables 5) Rules

OR

Q:5 (A) What is resolution? Explain Unification Algorithm in detail?

(B) What is backtracking? Describe the process by which PROLOG goes backwards to find the solution.

Q:6 Answer the following question.

(A) Write a program to implement arithmetic operators, simple input/output and compound goals in PROLOG.

(B) Write a note on Belief Networks.

OR

Q:6 (A) Write a program to implement recursion in PROLOG.

(B) Define fuzzy logic. List and explain operation on Fuzzy. ,

Enrol. No. / ID | | | | | | | | | | | | |

KADI SARVA VISHWAVIDYALAYA

GANDHINAGAR

B.E. CE/IT KSV EXAMINATION APRIL 2023

Date : 3/4/23	Branch : CE/IT
Subject Name & Code: ARTIFICIAL INTELLIGENCE (CT601-N)	Semester : 6
Time : 10:00 AM to 1:00 PM	Max. Marks : 70

Instructions:
1) All questions are **compulsory.**
2) Figures to the **right** indicate full marks.
3) Use of scientific calculator is permitted.
4) Indicate **clearly,** the options you attempt along with its respective question number.
5) Use the last page of main supplementary for **rough work.**

SECTION - 1

Q.1 (A) Explain the State Space with the use of Water Jug Problem. [5]

(B) What is production system? Explain it with an example. Discuss the characteristics of a production system. [5]

(C) Explain depth first search (DFS) and breadth first search (BFS) with suitable examples. Why is 'depth limited search' necessary in DFS? [5]

OR

(C) Discuss the AI Problem Characteristics in detail [5]

Q.2 (A) Explain AO* algorithm in detail with example. [5]

(B) Solve the following Crypt arithmetic Problem. [5]

```
  KANSAS
+    OHIO
----------
 OREGON
```

OR

Q.2 (A) Discuss simulated annealing search method. Which types of problems are suitable to solve using this method? [5]

(B) Solve the following Crypt arithmetic Problem. [5]

```
  BANANA
+  GUAVA
--------
 ORANGE
```

Q.3 (A) Define Intelligent Agent. List the types of agent and Explain any two. [5]

(B) Consider the game tree of Fig. 1(given below) in which the static scores are from first player's point of view. Suppose the first player is maximizing player. Applying mini-max search, show the backed-up values in the tree. What move will the MAX choose? If the nodes are expanded from left to right, what nodes would not be visited using alpha-beta pruning? [5]

OR

Q.3 (A) Answer following questions: [5]
1. What do you mean by the problem of plateau occurring in hill climbing? How can it be solved?
2. Differentiate between declarative and procedural representation of knowledge.
3. What do you mean by admissibility of an algorithm? Is A* algorithm an admissible one? When?

(B) Define "Heuristic Search". Explain the steps in "Best First Search" and illustrate it using a suitable example. [5]

SECTION-2

Q.4 (A) Differentiate between propositional and first order predicate logic? [10]

(B) Explain the different issues in Knowledge representation [5]

(C) 1. 'Minimax is not good for game playing when the opponent is not playing optimally.' Justify using suitable example. [5]
2. Explain AND-OR graphs.

OR

(C) Compare Forward versus Backward Reasoning. Explain how Prolog uses backward reasoning to reach a solution. [5]

Q.5 (A) Define Logical Agent. Explain Wumpus world problem [5]

(B) Explain how list is used in Prolog. Discuss how following list-functions can be implemented in Prolog: (a) Checking membership of an element in a given list, (b) concatenating two lists, and (c) deleting an element from a given list. [5]

OR

Q.5 (A) What is Ontology? Discuss RDF with example. [5]

(B) Write a Prolog program that verifies whether an input list is a palindrome. [5]

Q.6 (A) Discuss following: [5]
i. Bayesian network
ii. Fuzzy logic

(B) Consider the following sentences:
- Prince is a mega star.
- Mega stars are rich.
- Rich people have fast cars.
- Fast cars consume a lot of petrol.

(1) Translate these sentences into formulas in predicate logic.
(2) Prove that Prince's car consumes a lot of petrol. [5]

OR

Q.6 (A) Consider the following axioms:
1. Anyone whom Mary loves is a football star.
2. Any student who does not pass does not play.
3. John is a student.
4. Any student who does not study does not pass.
5. Anyone who does not play is not a football star. [5]

Prove using Resolution - "If John doesn't study, Mary doesn't love John."

(B) What is Semantic Nets? Consider the following statements and draw the semantic net: [5]
Tom is a cat.
Tom caught a bird.
Tom is owned by John.
Tom is ginger in colour.
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.

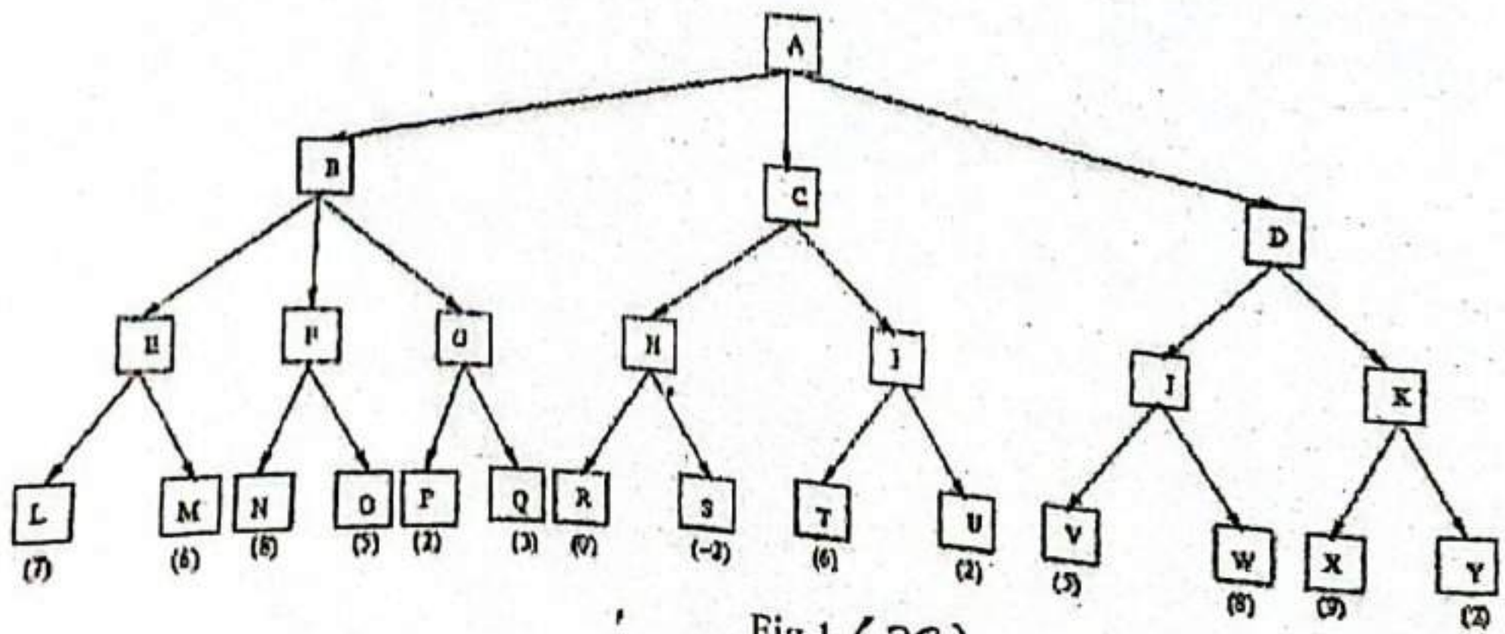

Fig 1 (3B)

----------BEST OF LUCK----------

Exam Number: _____

KADI SARVA VISHWAVIDYALAYA
B.E. 6th (REG/ATKT) EXAMINATION DECEMBER 2022

Subject Name: Artificial Intelligence(AI) **Subject Code: CT601-N**

Date: 12/12/2022 (Monday) **Time: 10:00 AM to 01:00 PM** **Total marks: 70**

Instructions:

1. **Answer each section in separate Answer sheet.**
2. **All questions are compulsory.**
3. **Indicate clearly, the options you attempt along with its respective question number.**
4. **Use the last page of main supplementary for rough work.**

Section-I

Q.1 (A)	Is Artificial Intelligence a Job Killer or Job Creator? Justify your statements	(5)
Q.1 (B)	Explain PEAS representation with example.	(5)
Q.1 (C)	Explain Inform and Uninform search techniques in brief.	(5)
	OR	
Q.1 (C)	Write a program to implement Lists in PROLOG.	(5)
Q.2 (A)	Solve given crypt arithmetic problems using constraint satisfaction. T W O + T W O --- F O U R	(5)
Q.2 (B)	What is Hill Climbing? Explain simple hill climbing.	(5)
	OR	
Q.2 (A)	Solve given crypt arithmetic problems using constraint satisfaction. I N D I A + P A K --- P E A C E	(5)
Q.2 (B)	Explain AO* algorithm with example.	(5)
Q.3 (A)	What is resolution? Explain the Forward and Backward Reasoning.	(5)
Q.3 (B)	What are the limitation of Propositional Logic and How they are overcome using predicate Logic?	(5)
	OR	
Q.3 (A)	Solve Tic-Tac-Toe game using Mini-Max algorithm.	(5)
Q.3 (B)	What is Semantic Web and RDF? Explain with example.	(5)

Section-II

Q.4 (A)	Write a note on state space representation and explain the terms goal state, path, Initial state and successor.	(5)
Q.4 (B)	Explain Travelling Salesperson Problem in AI	(5)
Q.4 (C)	Explain CUT and FAIL predicate in Prolog.	(5)
	OR	
Q.4 (C)	Write a program to implement arithmetic operators, simple input/output in PROLOG.	(5)
Q.5 (A)	Explain Belief network with example.	(5)
Q.5 (B)	Compare Breadth First Search and Depth First Search.	(5)
	OR	
Q.5 (A)	Explain Fuzzy logic with example	(5)
Q.5 (B)	Explain Best First Search with suitable example. How it differs from Hill Climbing and Steepest Ascent Hill Climbing?	(5)
Q.6 (A)	Define: Local maximum, Plateau, Ridge,	(5)
Q.6 (B)	Define the logical Agent and explain Wumpus problem.	(5)
	OR	
Q.6 (A)	Explain different approach of knowledge representation.	(5)
Q.6 (B)	What is Semantic Nets? Consider the following statements and draw the semantic net: □ Tom is a cat. □ Tom caught a bird. Tom is owned by John.Tom is ginger in colour □ The cat sat on the mat. A cat is a mammal. □ A bird is an animal. □ All mammals are animals. Mammals have fur.	(5)

KADI SARVA VISHWAVIDYALAYA

B.E SEMESTER VI EXAMINATION (April-2022)

SUBJECT CODE: CT 601- N SUBJECT NAME: Artificial Intelligence

DATE: 09/04/2022 TIME: 12:30 pm to 3:30 pm TOTAL MARKS: 70

Instructions:

1. Answer each section in separate Answer sheet.
2. Use of scientific Calculator is permitted.
3. Al Indicate clearly, the options you attempted along with its respective question number

SECTION 1

Q:1 (A) What is artificial intelligence? Define the different task domains of artificial intelligence. 05

(B) Comparison between informed and uninformed search techniques. 05

(C) For the Water Jug problem, describe state space representation, actions, start and end state. 05

OR

(C) Describe the production system. 05

Q:2 (A) Solve the following Crypt arithmetic Problem. 05

```
  SEND
+MORE
-------
MONEY
```

(B) Discuss and Analyze Tower of Hanoi problem with respect to the seven problem characteristics 05

OR

(A) Describe Depth First Search algorithm with an example. 05

(B) What is heuristic function? Discuss with an example. 05

Q:3 (A) Describe Best First Search algorithm with anexample. 05

(B) Explain alpha-beta cut off search with an example. State a case when to do alpha pruning. 05

OR

(A) Explain Fuzzy logic. Also describe set operations on fuzzy. 05

(B) What is Hill Climbing? Explain Simple Hill Climbing and Steepest-Ascent Hill Climbing. 05

SECTION 2

Q:4 (A) Construct the partitioned semantic net representations for the following: 05

- Every batter hit a ball.
- All the batters like the pitcher.

(B) Explain Procedural versus declarative knowledge. 05

(C) Differentiate prepositional & predicate logic. 05

OR

(C) Compare Forward versus Backward Reasoning. Explain how Prolog uses backward reasoning to reach a solution 05

Q:5 (A) Explain the properties that a good knowledge representation system should possess. 05

(B) Write Prolog programs to Merge two sorted integer lists L1 and L2 to generate a final sorted list L3. (For example, if L1= [1,3] and L2=[2,5,8], then L3=[1,2,3,5,8]) 05

OR

(A) Consider the following facts: 05

1. Raghu likes all kinds of food.
2. Mangoes are fruit.
3. Cabbage is not fruit.
4. All fruits are food.

Represent the above facts using Predicate Logic and use Resolution to prove that "Raghu likes Mangoes"

(B) Explain the Bayesian Network. 05

Q:6 (A) Explain resolution in Propositional Logic and also explain its algorithm. 05

(B) Explain the following terms (i) Semantic Nets (ii) Frames 05

OR

(A) Explain Ontology and RDF in detail. 05

(B) Discuss the concept of LIST in prolog with suitable example. 05

20BECE30005

Enrollment No.

KADI SARVA VISHWAVIDYALAYA
LDRP INSTITUTE OF TECHNOLOGY & RESEARCH, GANDHINAGAR

B.E. MID-SEMESTER EXAMINATION FEB- 2023

Date: 21/2/23
Subject Name & Code: Artificial Intelligeace CT-601-N
Time : 9:20 am to 10:50 am

Branch : CE/IT
Semester : 6
Max. Marks : 30

Instructions:
1) All questions are **compulsory**.
2) Figures to the **right** indicate full marks.
3) Indicate **clearly**, the options you attempt along with its respective question number.
4) Use the last page of main supplementary for **rough work**.

			Marks
Q.1	(A)	Explain the Following terms: 1. Knowledge 2. Arity 3. State Space Search 4. Horn Clauses 5. Agent Function	[5]
	(B)	Solve the Water Jug problem by using production rule system	[5]
Q.2	(A)	Explain AO* Algorithm.	[5]
	(B)	Differentiate the DFS and BFS with merits and demerits	[5]
		OR	
Q.2	(A)	What is local maximum, Plateau and Ridge and how to deal with this problem? Explain the block world problem by using local and global heuristic function.	[5]
	(B)	Explain Steepest ascent Hill Climbing algorithm.	[5]
Q.3	(A)	Explain alpha beta cutoff procedure in game playing with example.	[5]
	(B)	Solve the following Crypt Arithmetic Problem. ZERO + POINT ENERGY	[5]
		OR	
Q.3	(A)	Explain Model based reflex agent and Utility based agent.	[5]
	(B)	Explain CUT, FAIL & REPEAT predicates in PROLOG and types of CUT.	[5]