

Reg. No.														
----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--

B.Tech. DEGREE EXAMINATION, NOVEMBER 2023
Fourth Semester

18AIC201J – FOUNDATION OF ARTIFICIAL INTELLIGENCE
(For the candidates admitted during the academic year 2020-2021 & 2021-2022)

Note:

- (i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
- (ii) **Part - B & Part - C** should be answered in answer booklet.

Time: 3 hours

Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Marks BL CO

Answer **ALL** Questions

- | | | | |
|--|---|---|---|
| 1. Which of the following is an application of Artificial intelligence? | 1 | 1 | 1 |
| (A) It helps to exploit vulnerabilities to secure the firm | | | |
| (B) Language understanding and problem-solving (Text analytics and NLP) | | | |
| (C) Easy to create a website | | | |
| (D) It helps to deploy application on the cloud | | | |
| 2. Agents behavior can be best described by _____. | 1 | 1 | 1 |
| (A) Perception sequence | | | |
| (B) Agent function | | | |
| (C) Sensors and actuators | | | |
| (D) Environment in which agent is performing | | | |
| 3. Consider a problem of preparing a schedule for a class of student. What types of problem is this? | 1 | 1 | 1 |
| (A) Search problem | | | |
| (B) Backtrack problem | | | |
| (C) CSP | | | |
| (D) Planning problem | | | |
| 4. What is state space? | 1 | 2 | 1 |
| (A) The whole problem | | | |
| (B) Your definition to a problem | | | |
| (C) Problem you design | | | |
| (D) Representing your problem with variable and parameter | | | |
| 5. Inference algorithm is complete only if _____. | 1 | 2 | 2 |
| (A) It can derive any sentence | | | |
| (B) It can derive any sentence that is an entailed version | | | |
| (C) It is truth preserving | | | |
| (D) It can derive any sentence that is an entailed version and It is truth preserving | | | |
| 6. Translate the following statement into FOL | 1 | 2 | 2 |
| “For every a, if a is a philosopher, then a is a scholar”. | | | |
| (A) $\forall a$ philosopher(a) scholar(a) | | | |
| (B) $\exists a$ philosopher(a) scholar(a) | | | |
| (C) Γ philosopher(a) scholar(a) | | | |
| (D) \wedge philosopher(a) scholar(a) | | | |

7. Forward chaining systems are _____ whereas backward chaining systems are _____.
 (A) Goal-driven, goal-driven (B) Goal-drive, data-driven
 (C) Data-driven, goal-driven (D) Data-driven, data-driven
8. How can the goal be thought of in a backward chaining algorithm?
 (A) Stack (B) Queue
 (C) List (D) Vector
9. _____ are the compositions for Artificial Intelligence Agents.
 (A) Only program (B) Only architecture
 (C) Only sensors (D) Both Program and Architecture
10. In linguistic morphology _____ is the process for reducing inflected words to their root form.
 (A) Rooting (B) Stemming
 (C) Text-proofing (D) Fuzzy logic
11. An algorithms is complete if _____.
 (A) It terminates with a solution when one exists (B) It starts with a solution
 (C) It does not terminate with a solution (D) It has a loop
12. SOAR stands for _____.
 (A) State-Object-And-Result (B) System-Object-And-Resource
 (C) State-Operator-And-Result (D) State-Operator-Agent-Result
13. The process by which the brain incrementally orders actions needed to complete a specific task is referred to as _____.
 (A) Planning problem (B) Partial order planning
 (C) Total order planning (D) Both planning problem and partial order planning
14. A _____ is used to demonstrate, on a purely syntactic basis, that one formula is a logical consequence of another formula.
 (A) Deductive systems (B) Inductive systems
 (C) Reasoning with Knowledge-based systems (D) Search-based systems
15. Knowledge and reasoning also play a crucial role in dealing with _____ environment.
 (A) Completely observable (B) Partially observable
 (C) Neither completely nor partially observable (D) Only completely and partially observable
16. What is the frame?
 (A) A way of representing knowledge (B) Data structure
 (C) Data type (D) Knowledge

- | | | | |
|--|---|---|---|
| 17. _____ simulate the process of natural selection. | 1 | 1 | 5 |
| (A) Genetic algorithm | | | |
| (B) Mutation | | | |
| (C) Population | | | |
| (D) Knowledge | | | |
| | | | |
| 18. What is a perceptron? | 1 | 1 | 5 |
| (A) An auto-associative neural network | | | |
| (B) A single-layer feed-forward neural network with pre-processing | | | |
| (C) A double-layer auto-associative neural network | | | |
| (D) A neural network that contains feedback | | | |
| | | | |
| 19. What is an auto-associative network? | 1 | 1 | 5 |
| (A) A neural network that contains no loops | | | |
| (B) A neural network that has only one loop | | | |
| (C) A neural network that contains feedback | | | |
| (D) A single-layer feed-forward neural network with pre-processing | | | |
| | | | |
| 20. Though local search algorithms are not systematic, key advantages would include _____. | 1 | 1 | 5 |
| (A) Less memory | | | |
| (B) More time | | | |
| (C) Finds a solution in a large infinite space | | | |
| (D) Less memory and finds a solution in large infinite space | | | |

PART – B (5 × 4 = 20 Marks)
Answer ANY FIVE Questions

- | | Marks | BL | CO |
|---|-------|----|----|
| 21. Differentiate an agent function and an agent program. | 4 | 2 | 1 |
| 22. Describe any one of the following problems. What types of control strategy is used in the following problem.
I. The Tower of Hanoi
II. 8-queens problem | 4 | 2 | 2 |
| 23. Consider the following sentences:
<ul style="list-style-type: none"> • Ram like all kinds of fruits • Fish are food • Chicken is food • Everyone loves everyone • Bill eats peanuts and still alive Translate these sentences into formulae in predicate logic. | 4 | 2 | 3 |
| 24. Elaborate and Compare Bargaining, Argumentation. | 4 | 2 | 3 |
| 25. Write about knowledge-based reasoning and agents. | 4 | 2 | 4 |
| 26. Illustrate Conceptual graphs and hierarchies in the domain. | 4 | 2 | 4 |
| 27. Compose the process of Hill climbing with an example. | 4 | 2 | 4 |

PART – C (5 × 12 = 60 Marks)

Answer ALL Questions

Marks BL CO

28. a. Explain the following algorithms in detail with real time scenario

12 2 1

- (i) A* algorithm
- (ii) Best first search

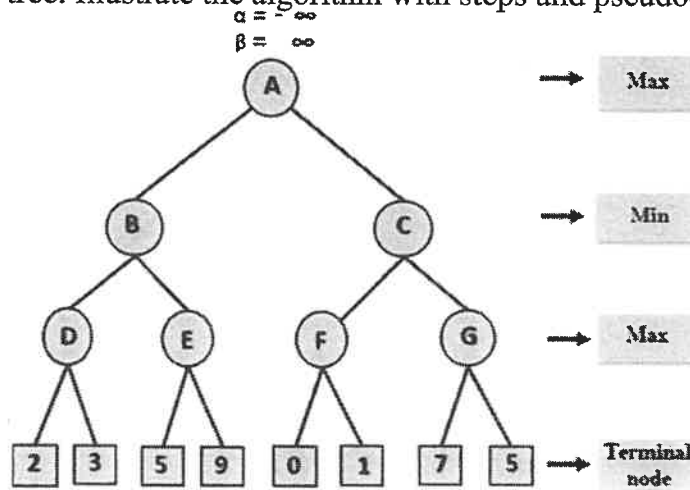
(OR)

b. Define constraint satisfaction problem (CSP). How CSP is formulated as a search problem? Explain with an example.

12 2 1

29. a. Given the following search tree, apply the alpha beta pruning algorithm to it and show that the search tree that would be built by this algorithm. Make sure that you show where the Alpha Beta cuts are applied and display the final pruned tree. Illustrate the algorithm with steps and pseudocode.

12 3 2



(OR)

b. Consider the following sentences:

12 3 2

- John likes all kinds of food
- Apples are food
- Chicken is food
- Anything anyone eats and isn't killed is food
- Bill eats peanuts and is still alive
- Sue eats everything Bill eats

- (i) Translate these sentences into formulae in predicate logic.
- (ii) Convert the above FOL into clause form.

30. a. Explain with an example the use of the Unification algorithm to prove the concept of resolution.

12 3 3

(OR)

b. Describe the trust and reputation in multi-agent systems.

12 3 3

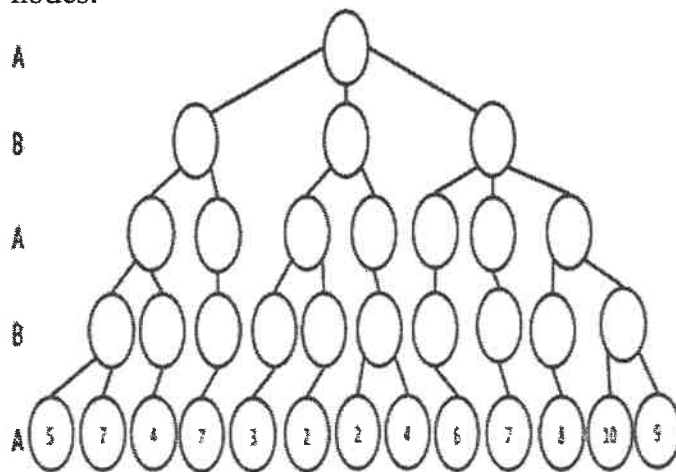
31. a. Define Script. Construct a script for going to the bank and withdrawing money.

12 3 4

(OR)

- b. We shall look at game trees, and we assume that the root node of the tree in the figure below is representing the current situation of a game (that we do not describe further), and that it is player A's turn to move. The other player is B, and A and B alternately make moves. Player A wants to maximize the values of the nodes while B wants to minimize them. Player A shall make considerations for deciding which move to make from the root situation, and the tree in the figure below shows all situations it is possible to reach with at most four moves from the current situation. A has a heuristic function (that is, a function that for a given situation gives an integer) that he uses to evaluate how good the situation is for him. A uses this function for situations where he terminates the search towards deeper nodes. For each terminal node in the tree below this function is evaluated and the value appears in the nodes.

12 3 4



32. a. Construct a graph with six nodes and demonstrate the Traveling salesman problem.

12 3 5

(OR)

- b. Discuss Game-theoretic approaches for multi-issue negotiation.

12 3 5

* * * * *

