Reg. No.															

B.Tech. DEGREE EXAMINATION, NOVEMBER 2023

Sixth Semester

18CSC365J – ARTIFICIAL INTELLIGENCE

(For the candidates admitted from 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

	Marks	BL	CO	PO

PART – A (20 × 1 = 20 Marks)

Answer **ALL** Questions

1. Which artificial intelligence approach enables computers to recognize and graphs the linkages and interactions that exist between things and events? (A) Heuristic processing (B) Cognitive science (C) Relative symbolism (D) Pattern matching	1	1	1	1
2. When it comes to exploration, the question is where? (A) Agent contains the knowledge of state and actions (B) Agent does not contains the knowledge of state and actions (C) Only actions are known to the agent (D) Only state action knowledge is present	1	1	2	1
3. The reason for the ambiguity in the wompus world problem is because the agent's sensor only provides _____ information. (A) Full and global (B) Partial and global (C) Full and local (D) Partial and local	1	1	2	2
4. Decide on the most appropriate circumstances in which a blind search may be carried out is _____. (A) Real-life situation (B) Small search space (C) Complex game (D) Simple game	1	2	1	2
5. Select the appropriate technique that can be used for map coloring problem. (A) Means-end analyze (B) Constraint satisfaction (C) Ao^* search (D) Breadth first search	1	2	2	2
6. DFS always expands the _____ node in the current fringe of the search tree. (A) Shallowest (B) Child node (C) Deepest (D) Minimum cost	1	2	2	2
7. _____ combines the small memory foot print of DFS and has the completeness guarantee of BFS. (A) Iterative deepening search (B) Depth limited search (C) Uniform cost search (D) Depth first search	1	2	2	2

8. The time and space complexity of BFS is (for time and space complexity problems consider B as branching factor and D as depth of the search tree). 1 2 2 1

(A) $O(b^d + 1)$ *and* $O(b^d + 1)$ (B) $O(b \wedge 2)$ *and* $O(b \wedge 2)$

(C) $O(d \wedge 2)$ *and* $O(b \wedge 2)$ (D) $O(d \wedge 2)$ *and* $O(d \wedge 2)$

9. How the effectiveness of the alpha-beta running gets increased? 1 2 2 2

(A) Goal impedance (B) Subgoal impedance

(C) Both goal and sub goal impedance (D) Main goal impedance.

10. How the effectiveness of the alpha-beta pruning gets increased? 1 1 2 1

(A) Depends on the nodes (B) Depends on the order in which they are executed

(C) Depends on goal impedance (D) Depends on subgoal impedance

11. The initial state and the legal moves for each side define the _____ for the game. 1 1 2 2

(A) Search tree (B) Game tree

(C) State space search (D) Forest

12. Propositional logic sentences use grammar _____. 1 1 3 1

(A) Chomsky normal form (B) Backus-Naur form

(C) Griebach normal form (D) Second normal form

13. In correct information results in unsatisfied preconditions for actions and plans _____ detects violations of the pre-conditions for successful completion of the plan. 1 2 5 1

(A) Conditional plan (B) Conformant planning

(C) Execution monitoring (D) Both conditional plan and execution monitoring

14. How the Bayesian network can be used to answer any query? 1 2 3 2

(A) Full distribution (B) Joint distribution

(C) Partial distribution (D) All of the mentioned

15. Which condition is used to influence a variable directly by all the others? 1 3 3 2

(A) Partially connected (B) Fully connected

(C) Local connected (D) Globally connected

16. What is the form of fuzzy logic? 1 2 4 1

(A) Two valued logic (B) Crisp set logic

(C) Many-valued logic (D) Binary set logic

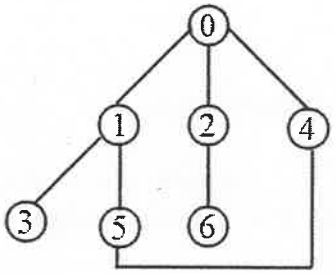
17. Knowledge and reasoning also play a crucial role in dealing with _____ environment. 1 2 5 1

(A) Completely observable (B) Partially observable

(C) Neither completely nor partially observable (D) Only completely and partially observable

18.	Treatment chosen by doctor for a patient for a diseases is based on _____. (A) Only current symptoms (B) Current symptoms plus some knowledge form the text books (C) Current symptoms plus some knowledge from the text books plus experience (D) Current symptoms plus partial knowledge	1	2	5	2
19.	The process by which the brain incrementally orders actions needed to complete a specific task is referred as _____. (A) Planning problem (B) Partial order planning (C) Total order planning (D) Both planning problem and partial order planning	1	2	5	1
20.	To eliminate the inaccuracy problem in planning problem or partial order planning problem we can use _____ data structure/s (A) Stacks (B) Queue (C) BST (Binary Search Tree) (D) Planning graphs	1	1	5	1

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

		Marks	BL	CO	PO
21.	Write the detailed steps of problem solving with problem reduction algorithm and explain with an example.	4	3	2	2
22.	Discuss the role of production system.	4	3	2	2
23.	Derive a solution for the following graph using iterative deepening DFS algorithm.  	4	1	2	2
24.	Define fuzzy logic, fuzzy sets and basic operations in fuzzy logic.	4	3	3	3
25.	Discuss the basic concepts and heuristics involved in A^* search algorithm.	4	1	2	2
26.	Differentiate forward and backward reasoning.	4	2	4	1
27.	Discuss goal-driven problem solving with an example?	4	3	5	2

PART – C (5 × 12 = 60 Marks)
Answer **ALL** Questions

		Marks	BL	CO	PO
28. a.	Enumerate classical "Water Jug Problem". Describe the state space for this problem and also give the solution.	12	3	2	2

(OR)

b.	What is production system? Explain it with an example. Discuss the characteristics of a production system.	12	3	2	2
29. a.	Discuss the following heuristic search techniques. Explain the algorithm with the help of an example. (i) Hill climbing gradient descent (ii) Best first search: the A^* algorithms	12	3	2	4
	(OR)				
b.	Discuss constraint satisfaction problem with an algorithm for solving a cryptarithmetic problem, for number 0-9 If point + zero = energy Then E + N + E + R + G + Y = 1?	12	4	2	2
30. a.	Illustrate the use of predicate logic to represent the knowledge with suitable example.	12	4	3	4
	(OR)				
b.	Convert the following well formed formula into clause from with sequence of steps. $\forall x$: [Roman (x)$\wedge$ know (x, Marcus)] $\rightarrow$ [Hate (x, Caesar) $\vee$ ($\forall y : \exists z$: Hate (y, z) $\rightarrow$ Think Oray (x, y))]	12	4	3	4
31. a.	Construct a Bayesian network and define the necessary CPT's for the given scenario. We have a bag of three biased coins A, B and C with probabilities of coming up heads of 20%, 60% and 80% respectively. One coin is drawn randomly from the bag (with equal likelihood of drawing each of the three coins) and then the coin is flipped three times to generate the outcomes X1, X2, X3.	12	4	3	4
	(OR)				
b.	Briefly discuss about reasoning done using fuzzy logic.	12	4	4	2
32. a.	Explain in detail about strips and write the components of strips for the given scenario: "Consider a flight journey in a luxurious flight from India to us".	12	3	5	4
	(OR)				
b.	With neat sketch explain the architecture, characteristic features and roles of expert system.	12	3	5	2

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