| Reg. No. | R | A | 1 | 9 | 1 | 1 | 0 | 0 | 3 | 0 | 1 | 0 | 6 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

# B.Tech. DEGREE EXAMINATION, MAY 2022

Sixth Semester

## 18CSC305J – ARTIFICIAL INTELLIGENCE

*(For the candidates admitted from the academic year 2018-2019 to 2019-2020)*

**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** should be answered in answer booklet.

Time: 2½ Hours

Max. Marks: 75

**PART – A (25 × 1 = 25 Marks)**

Answer **ALL** Questions

| | Marks | BL | CO | PO |
|---|---|---|---|---|

1. The performance measure, the agents prior knowledge, the agents actions and the agents percept sequence are all referred to as — 1 | 1 | 1 | 1

   (A) Semi-dynamic (B) Rationality
   (C) Agent (D) Autonomy

2. Which could be best way to deal with game playing problem? — 1 | 1 | 1 | 1

   (A) Linear approach (B) Heuristic approach
   (C) Random approach (D) An optimal approach

3. Solve the given crypt arithmetic puzzle and find the value of A, B and C respectively. — 1 | 2 | 1 | 1

$$\begin{array}{r} A\ \ A \\ +B\ \ B \\ \hline CBC \end{array}$$

   (A) 9, 1, 0 (B) 8, 1, 0
   (C) 9, 2, 1 (D) 8, 9, 1

4. In 8-queen problem, all 8 queens should be placed in a 8×8 grid where no two queens should be in the same row, the same column, or in diagonal to one another. Find out what type of constraint it is — 1 | 2 | 1 | 1

   (A) Higher – order (B) Unary
   (C) No order (D) Binary

5. A searching algorithm that searches for the shortest path between the initial and the final state — 1 | 1 | 2 | 2

   (A) Breadth first search (B) Depth first search
   (C) A* algorithm (D) Linear search

6. Your friend is in a building that has 9 floors and you want to locate him. Which search technique would you use? — 1 | 2 | 2 | 2

   (A) Depth first search (B) Depth limited search
   (C) Iterative deepening (D) Breadth first search

7. Backtracking helps to 1 1 2 1

(A) Make the order of values (B) Eliminate invalid search space
(C) Contains one or more constraint symbols (D) Restrict the value of a single variable

8. For a perfect binary tree of BFS resists the nodes in following order: A, B, C, D, E, F, G then what will be order for DFS? 1 2 2 2

(A) A, B, C, D, E, F, G (B) A, B, D, C, F, G, F
(C) A, B, D, E, E, G, F (D) A, B, D, E, C, F, G

9. The main condition required for alpha-beta pruning is 1 1 3 1

(A) alpha = beta (B) alpha <= beta
(C) alpha >= beta (D) Alpha 1 = beta

10. The correct formula for the sentence "not all rainy days are cold" is 1 2 3 2

(A) $\exists d\left(Rainy(d)\wedge\sim cold\left(d\right)\right)$ (B) $\forall d\left(Rainy(d)\wedge\sim cold\left(d\right)\right)$
(C) $\forall d\left(\sim Rainy(d)\rightarrow cold\left(d\right)\right)$ (D) $\exists d\left(Rainy(d)\rightarrow cold\left(d\right)\right)$

11. In this planning system, the problem solver makes use of a single stack that contains both goals and operators that have been proposed to satisfy those goals 1 1 3 1

(A) Meta planning (B) Goal stack planning
(C) Case base planning (D) Inductive planning

12. Consider two solutions $S_1 = 101100$ and $S_2 = 101111$ and a random choice of 4 and 5 is chosen a cross over points then the solution $S_1, S_2$ after crossover will be 1 2 3 2

(A) $S_1 = 111101$ and $S_2 = 100111$ (B) $S_1 = 111101$ and $S_2 = 101011$
(C) $S_1 = 101101$ and $S_2 = 100111$ (D) $S_1 = 101101$ and $S_2 = 101011$

13. The Artificial Intelligence techniques imposed in Tesla, Wagno cars are the applications of _____ learning. 1 2 4 2

(A) Supervised (B) Unsupervised
(C) Semi-supervised (D) Reinforcement

14. The blocks world problem in AI is used to give the details about _____. 1 1 4 2

(A) Search (B) Constraint satisfaction problem
(C) Knowledge bone system (D) Planning system

15. Which technique uses predictions of other models as input to improve the performance of a new model? 1 2 4 2

(A) Learning (B) Stacking
(C) Sampling (D) Boosting

16. Identify the planning agent based on explicit, logical representation of the current state 1 2 4 2

(A) Planning agents (B) Basic agents
(C) Problem sovling agents (D) Knowledge-based agents

17. The general method of inferencing in MYCIN expert system is _____ 1 2 5 2

(A) Goal driven (B) Fact driven
(C) Cause driven (D) Data driven

18. The popular voice assistants like google assistant, Alexa, Seri implement the concept of _____. 1 2 6 2

(A) Machine learning (B) Deep learning
(C) Data learning (D) Human learning

19. Two subfields of natural language processing 1 1 5 1

(A) Generation and understanding (B) Semantics and pragmatics
(C) Context and expectations (D) Recognition and synthesis

20. Meaning check is carried out in which of the following level of NLP 1 2 5 21

(A) Discourse integration (B) Pragmatic analysis
(C) Syntactic analysis (D) Semantic analysis

21. In Tic-Tac-Toe problem the path cost can be calculated by 1 1 1 1

(A) Storage space (B) Length of the path
(C) Number of possible moves (D) Number of positions

22. Find the informed search algorithm that does not backtrack and depends only on the current and the upcoming states. 1 1 2 1

(A) A* algorithm (B) AO* algorithm
(C) Hill climbing algorithm (D) Steepest ascent hill climbing

23. Which step blogs to unification algorithm? 1 2 3 1

(A) First order logic (B) Inference rule for quantifiers
(C) Declarative and procedural knowledge (D) Indexing

24. Relate if then state statements/ rules are with any one of the following options 1 2 4 2

(A) Inference engine (B) Knowledge base
(C) Explanation facility (D) Production rule

25. What is the main idea behind bag of word model? 1 2 6 2

(A) Frequency of words (B) Ordering of words
(C) Both frequency and ordering of words (D) Semantics of words

**PART – B (5 × 10 = 50 Marks)**

Answer **ALL** Questions

| | Marks | BL | CO | PO |
|---|---|---|---|---|
| 26. a.i. Illustrate the types of agents with its architecture. | 5 | 3 | 1 | 2 |
| ii. Solve the cryptarithmetic puzzle. | 5 | 4 | 1 | 2 |

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    E A T
+ T H A T
---------
A P P L E
```

**(OR)**

| | | | | |
|---|---|---|---|---|
| b.i. Illustrate problem solving technique and formulate a problem with an example. | 5 | 3 | 1 | 2 |

| | | | | | |
|---|---|---|---|---|---|
| ii. | Solve room colouring problem with an example using CSP. | 5 | 4 | 1 | 2 |
| 27. a. | Explain alpha beta pruning with example specifying the need for the same. Give the condition in which pruning can be done. | 10 | 3 | 2 | 2 |
| | **(OR)** | | | | |
| b. | Illustrate $A^*$ algorithm with initial state and final state as given below. | 10 | 4 | 2 | 2 |

| | | |
|---|---|---|
| 2 | 8 | 3 |
| 1 | 6 | 4 |
| 7 | | 5 |

Initial state

| | | |
|---|---|---|
| 1 | 2 | 3 |
| 8 | | 4 |
| 7 | 6 | 5 |

Final state

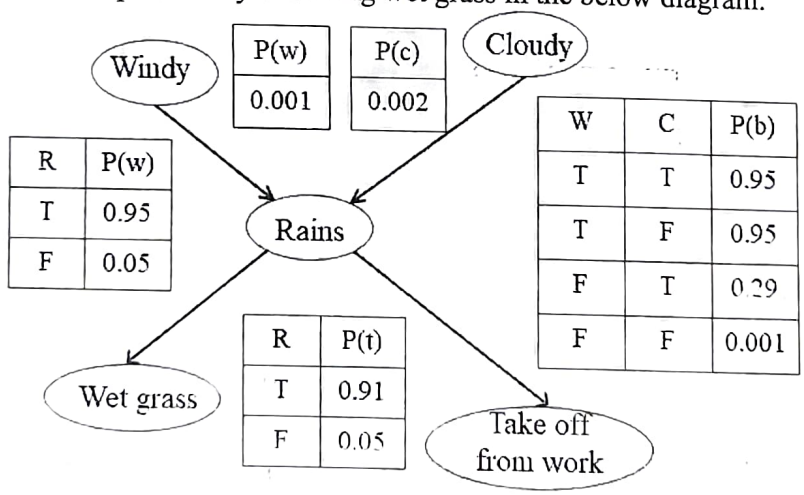
Explain the steps involved.

| | | | | | |
|---|---|---|---|---|---|
| 28. a.i. | Define resolution and its steps. | 3 | 2 | 3 | 2 |
| ii. | Prove by resolution that John likes peanuts from the given statements. | 7 | 3 | 3 | 2 |

(1) John likes all kind of food
(2) Apple and vegetable are food
(3) Anything anyone eats and not killed is food
(4) Anil eats peanuts and still alive
(5) Harry eats everything that Anil eats

**(OR)**

| | | | | | |
|---|---|---|---|---|---|
| b.i. | What is Baye's theorem and give its applications. | 3 | 2 | 3 | 2 |
| ii. | Find the probability of having wet grass in the below diagram. | 7 | 3 | 3 | 2 |




| | | | | | |
|---|---|---|---|---|---|
| 29. a. | Demonstrate Artificial Neural Network Algorithm with example. | 10 | 3 | 4 | 2 |
| | **(OR)** | | | | |
| b. | Demonstrate Support Vector Machine Algorithm with example. | 10 | 3 | 4 | 2 |
| 30. a. | Illustrate frame-based expert system with its components guidelines and its working principles. | 10 | 3 | 5 | 2 |
| | **(OR)** | | | | |
| b. | What is Natural Language Processing? Illustrate its functionalities in detail. | 10 | 3 | 5 | 2 |

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