Reg. No.															

B.Tech. DEGREE EXAMINATION, DECEMBER 2023

Sixth Semester

18CSC305J – 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

PART – A (20 × 1 = 20 Marks)

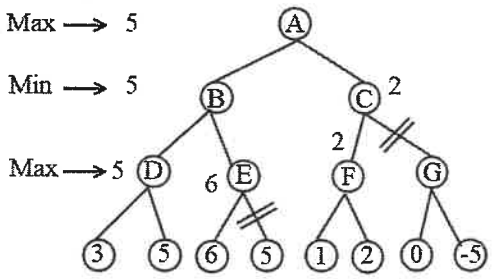
Answer **ALL** Questions

	Marks	BL	CO	PO
1. A state space forms a graph in which the nodes are _____ and the arcs between nodes are _____. (A) Actions, states (B) Path, solution (C) States, actions (D) Path, states	1	1	1	2
2. Web search is an example of _____. (A) Intelligent agent (B) Problem solving agent (C) Simple reflex agent (D) Model based agent	1	1	1	2
3. _____ are mathematical problems defined as a set of objects whose states must satisfy a number of constraints. (A) Uninformed search problems (B) Local search problems (C) Backtracking problems (D) Constraint satisfaction problems	1	1	1	2
4. PEAS in agent represents (A) Percept, efficiency, action, simplification (B) Performance, environment, actuators, sensors (C) Performance, environment, action, sensors (D) Percept, environment, actuators, sensors	1	2	1	2
5. If the training set error is high with high bias and high variance. This indicates (A) Over fitting (B) Bad fitting (C) Under fitting (D) Best fitting	1	2	4	2
6. _____ is an approximation algorithm (A) A^* algorithm (B) Ao^* algorithm (C) Hill climbing algorithm (D) Best first search algorithm	1	1	2	2
7. Robotics based applications are well handled by _____. (A) Machine learning (B) Rule based learning (C) Adaptive learning (D) Reinforcement learning	1	2	5	2

8. How Ao^* is different from A^* algorithm? 1 1 2 2

(A) Optimal, single solution
(B) Combination of AND-OR, NOT optimal
(C) Best solution with heuristics
(D) Searches and finds all solutions

9. Pruning at the node C and node E is called as _____. 1 1 2 2



(A) Alpha, alpha pruning
(B) Alpha, beta pruning
(C) Beta, alpha pruning
(D) Beta, beta pruning

10. Best first search is a search algorithm that depends on _____. 1 1 2 2

(A) Greedy approach
(B) Only distance
(C) Only heuristics
(D) Greedy approach and only heuristics

11. Consider the representation in predicate logic 1 2 3 2

(i) Brother of (Ram) and (ii) is eligible (18)

What type of statements are these?

(A) First-variable, second-function
(B) First-function, second-predicate
(C) First-predicate, second-function
(D) First-recursive function, second-function

12. _____ is used for standardizing the sentences during resolution by introducing a new constant 1 1 3 2

(A) String constant
(B) Plank's constant
(C) Skolem constant
(D) Avogadro constant

13. Prepositions which can't be further divided are called as _____. 1 1 3 2

(A) Sentences
(B) Atomic units
(C) Clauses
(D) Conjunctive normal form

14. Consider the statements and states for which value of X and Y the inference rule angle will be true? 1 2 3 2

Loves (Rahul, Riya)	Angry (X, Y);
Loves (Rohit, Riya)	Loves (X, Z);
Loves (Riya, Rohit)	Loves (Y, Z)

(A) X = Rohit; Y = Riya
(B) X = Rohit; Y = Rohit
(C) X = Rahul; Y = Rohit
(D) X = Riya; Y = Rahul

15. _____ is a process of converting the crisp set of values into fuzzy set of values. 1 1 4 2

(A) Fuzzierication
(B) Fuzzification
(C) Defuzzification
(D) Imprecise conversion

16. _____ is a type of planning that comes under uncertainty which is able to handle unknown situations — 1 1 4 2

(A) Conditional planning (B) Classical planning
(C) Reactive planning (D) Non linear planning

17. Age is _____ variable, age group is _____ variable. — 1 2 4 2

(A) Continuous, categorical (B) Categorical, categorical
(C) Discrete, continuous (D) Continuous, continuous

18. In machine and deep learning _____ is a parameter whose learning process. — 1 2 5 2

(A) Model parameters (B) Hyper parameters
(C) Input parameters (D) Parameters

19. Max pooling is used for _____. — 1 2 5 2

(A) Adding local variance (B) Finding maximum weights
(C) Passing weights (D) Reducing dimensionality

20. _____ combines the goodness of algorithms to achieve better results. — 1 2 5 2

(A) Gradient learning (B) Ensemble learning
(C) Metric learning (D) Vote based learning

PART – B (5 × 4 = 20 Marks) — Marks BL CO PO

Answer **ANY FIVE** Questions

21. Explain the difference between goal based agent and learning agent with an example. — 4 4 1 2

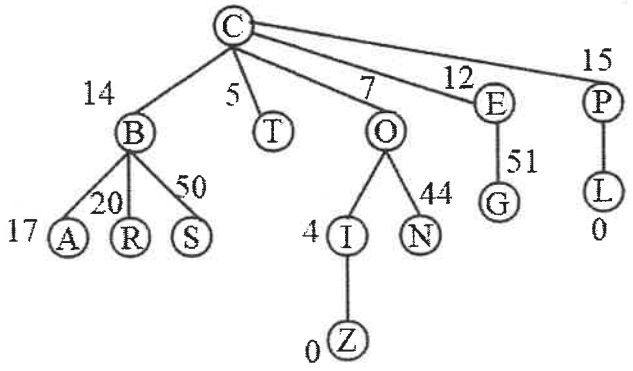
22. Explain the significance of heuristics in Informed search algorithms. — 4 3 2 2

23. Prove that the below statement can satisfy the query happy using resolution — 4 4 3 2

(i) Ignore negativity and be cool headed
(ii) If you ignore negativity you can be happy
(iii) If you are cool you can be happy

24. List the types of machine learning algorithms with suitable example. — 4 3 4 2

25. Solve the given problem using local beam search with beam width as 2. — 4 4 2 4



Identify the path to the goal node and explain its algorithmic properties.

26. State the various tasks involved in natural language processing. — 4 4 5 2

27. Explain the importance of business intelligence and analytics. 4 4 5 2

PART – C (5 × 12 = 60 Marks) Marks BL CO PO

Answer **ALL** Questions

28. a.i. Identify a way to empty 2 gallon jug and fill 5 gallon jug with 1 gallon of water. Explain how to formulate this problem and represent. Also give the state space diagram for the above mentioned problem. 6 2 1 2

ii. List the problem characteristics in detail. 6 3 1 2

(OR)

b.i. Solve the crypt arithmetic puzzle 6 3 1 2

CROSS
ROADS
DANGER

ii. Compare and contrast forward checking and constraint propagation with an example. 6 3 1 2

29. a. Explain any two local search techniques with an example form the below mentioned 12 4 2 2

(i) Genetic algorithm
(ii) Hill climbing
(iii) Stimulated annealing

(OR)

b.i. Identify the shortest path using A^* algorithm, also mention its algorithmic properties. 6 3 2 2

Actions: Horizontal, Vertical, Diagonal
Starting point: Dog
Goal point: Bone

Pole G = 3.5 H = 6	Rope G = 3.8 H = 5	Bone H = 0 G = 3
Stend G = 6 H = 5	Pebbles G = 4 H = 8	Horn G = 3 H = 5.5
Stick G = 2 H = 6	Restricted lane G = 1 H = 6	Hurdles G = 1 H = 6.5
Dog		Garden G= 5 H = 9

ii. Explain the working of min-max algorithm. 6 3 2 2

30. a. Facts: 12 4 3 4

(i) John likes all kind of food
(ii) Apple and vegetable are food
(iii) Anything anyone eats and not killed is food

(iv) Anil eats peanut and still alive

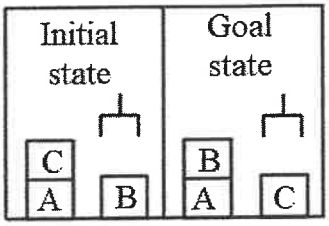
(v) Harry eats everything that Anil eats

Based on the above mentioned facts prove John likes peanuts.

(OR)

b. Explain how Bayesian belief networks exhibit uncertainty with an example. 12 3 3 4

31. a. The initial and goal states of a block world is given 12 4 4 4



Elaborate its action using goal stack planning.

(OR)

b. Explain the working of support vector machine in detail. 12 3 4 4

32. a. Explain in detail about the architecture of expert systems along with its advantages and disadvantages. 12 4 5 4

(OR)

b. Explain the architecture and working of Artificial Neural Networks. 12 4 5 4

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