b.i. Find the solution for the following 8-puzzle problem using best first search — 6 | 3 | 2 | 4

Initial state		
1	2	3
4		6
7	5	8

Goal state		
1	2	3
4	5	6
7	8	

ii. State the simulated annealing algorithm. Explain how it is used in optimization problems. — 6 | 2 | 2 | 2

30. a. Explain the knowledge representation using predicate and propositional logic with a unification algorithm. — 12 | 2 | 3 | 4

(OR)

b.i. What is semantic network? Explain it with an example. — 6 | 2 | 3 | 2

ii. Represent WUMBUS word problem in FOL. — 6 | 2 | 3 | 2

31. a. Write short notes on the following concepts with an example. — 12 | 3 | 4 | 1
(i) Reinforcement learning
(ii) Adaptive learning
(iii) Multi agent based learning
(iv) Ensemble learning

(OR)

b. Describe the components of planning in detail. — 12 | 2 | 4 | 1

32. a. Describe the frame-based expert systems functioning principles in detail. — 12 | 2 | 5 | 1

(OR)

b. Write about alpha-beta pruning procedure with an example. — 12 | 4 | 5 | 2

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Reg. No.															

B.Tech. DEGREE EXAMINATION, MAY 2023
Sixth Semester

18CSC305J – ARTIFICIAL INTELLIGENCE
(For the candidates admitted during the academic year 2018-2019 to 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 | PO
Answer **ALL** Questions

1. Which tool is used for describing the judgment or common sense part of problem solving? — 1 | 1 | 1 | 1
(A) Heuristic (B) Critical
(C) Value based (D) Analytical

2. Artificial intelligence is defined as _____. — 1 | 1 | 1 | 1
(A) Making machine intelligent (B) Putting more memory to computer
(C) Programming with your intelligence (D) Transferring your intelligence into computers

3. A problem solving approach works well for _____. — 1 | 1 | 1 | 2
(A) 8-puzzle problem (B) 8-queen problem
(C) Finding a optimal path from a given source to a destination (D) Robot navigation

4. Turing test is used to check _____. — 1 | 2 | 1 | 1
(A) The intelligent of humans (B) Intelligent of machines
(C) Both intelligent of humans and machines (D) It can't check intelligence but check the speed

5. A problem is a search space defined by one of these _____. — 1 | 1 | 2 | 1
(A) Initial state (B) Last state
(C) Intermediate state (D) Final state

6. Which of the following uses a priority queue? — 1 | 2 | 2 | 2
(A) Uniformed search (B) Depth first search
(C) Best first search (D) Iterative deepening

7. Heuristic is used in _____. — 1 | 2 | 2 | 1
(A) Informed search (B) Uninformed search
(C) Brute force (D) Blind search

8. The time complexity for breadth first search is _____. — 1 | 2 | 2 | 2
(A) O (b^d) (B) O (bd)
(C) O (d) (D) O (n)

9.	Contradiction in propositional logic represents the truth value of compound sentence? (A) Always true (B) Always false (C) Some are true, some are false (D) Can't be inferred	1	1	3	1
10.	A production rule consist of _____. (A) Set of rules (B) Sequence of steps (C) Set of rules and sequence of steps (D) Arbitrary representation to problem	1	1	3	1
11.	What will happen if two literals are identical? (A) Remains the same (B) Added as three (C) Reduced to one (D) One variable less	1	1	3	1
12.	Which is not a property of representation of knowledge? (A) Representation verification (B) Representation adequacy (C) Inferential adequacy (D) Inferential efficiency	1	1	3	1
13.	What are the major aspects which combines AI planning problem? (A) Search dLogic (B) Logic dKnowledge based system (C) FOL dLogic (D) Knowledge based system	1	1	4	1
14.	Unsupervised learning is one in which _____. (A) Input output pairs given (B) Learning is done automatically (C) Learning is done in semi supervised manner (D) Only inputs are given	1	2	4	12
15.	One of the main challenges of NLP is _____. (A) Handling ambiguity of sentences (B) Handling tokenization (C) Handling POS-tagging (D) Linguistics	1	2	4	1
16.	How many types of quantifiers are available in AI? (A) 6 (B) 2 (C) 3 (D) 4	1	1	4	1
17.	Pruning is used for _____. (A) Traverse the tree from left to right (B) Top down search (C) Reduce the search space (D) Bottom up search	1	1	5	12
18.	The main component of the expert systems are _____. (A) Inference engine (B) Knowledge base (C) Inference engine and knowledge base (D) Meta data	1	1	5	12
19.	General games involve _____. (A) Single agent (B) Multi agent (C) Neither single-agent nor multi-agent (D) Only single-agent and multi-agent	1	1	5	12

20.	In fuzzy expert system conversion to crisp value is done by (A) Inference mechanism (B) Composition (C) Fuzzification (D) Defuzzification	1	1	5	12

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

		Marks	BL	CO	PO
21.	Define the following (i) AI (ii) State space search problem	4	1	1	2
22.	What is turing test?	4	1	1	1
23.	What is forward chaining? Explain it with an example.	4	2	3	1
24.	Discuss about the learning. Give some examples.	4	2	4	1
25.	State the differences between BFS and DFS.	4	2	2	2
26.	Illustrate how knowledge is represented in fuzzy based expert system.	4	3	5	2
27.	How is predicate logic helpful in knowledge representation and state the syntax of first order predicate logic?	4	2	3	3

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

		Marks	BL	CO	PO
28. a.	Construct production rules for the situation where there are two jugs, one with capacity of 4 liters and the other with capacity of 3 liters, both without measurements. Imagine there is a pump that can be used to draw water in any quantity find 2 liters of water in a 4 liters jug.	12	3	1	2
	(OR)				
b.	There are three missionaries and 3 cannibals stand on the left bank of a river. A boat is available which can take maximum 2. At any point of time number of missionaries should not be out numbered by cannibals which is fatal. Make a planto safely take all to the right bank. Represent the above problem by state space search problem. (i) Represent initial state (ii) Goal state operators (iii) Action plan (iv) Find the entire solution	12	3	1	2
29. a.i.	State A^* algorithm and explain it with appropriate example.	8	2	2	4
ii.	Discuss about hill climbing problem.	4	2	2	2
	(OR)				