Goal state is defined as

1	2	3
4	5	6
7	8	

30. a.i. State various knowledge representation methods. (5 Marks)

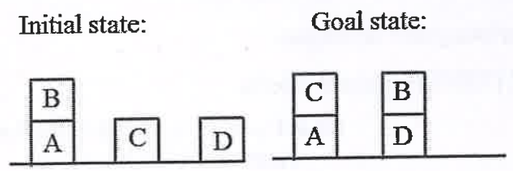
ii. Represent wumbus word problem in FOL. (7 Marks)

(OR)

b.i. What is semantic network? Explain it with an example.

ii. "Virat Kohli is the captain of the Indian cricket team". Construct a frame for the above scenario.

31. a. Solve the following problem by goal stack planning and find the action plan



(OR)

b.i. State various levels of natural language processing.

ii. Explain augmented transition networks (ATN).

32. a.i. Explain alpha-beta pruning. (5 Marks)

ii. State minmax algorithm. Illustrate it with a suitable example. (7 Marks)

(OR)

b. Draw the diagram of an expert system. Explain all the components.

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Reg. No.														

B.Tech. DEGREE EXAMINATION, DECEMBER 2019

First to Eighth Semester

15CS401 – ARTIFICIAL INTELLIGENCE

(For the candidates admitted during the academic year 2015-2016 to 2017-2018)

Note:

(i) **Part - A** should be answered in OMR sheet within first 45 minutes and OMR sheet should be handed over to hall invigilator at the end of 45th minute.

(ii) **Part - B** and **Part - C** should be answered in answer booklet.

Time: Three Hours Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Answer **ALL** Questions

1. In a problem reduction, the state space is given by
   (A) AND graph (B) AND/OR graph
   (C) OR graph (D) Tree

2. A problem is reduced to 5 sub problems (non overlapping) how many and arc will be there?
   (A) 5 (B) 10
   (C) 15 (D) 2

3. In 8 puzzle problem how many operators are there?
   (A) 3 (B) 2
   (C) 4 (D) 1

4. Turing test is used to check
   (A) The intelligence of humans (B) The intelligence of machines
   (C) Both (D) It can't check intelligence but check the speed

5. In A* algorithm $f(n)=g(n)+h(n)$, *if* $g(n)=0$ then it is called
   (A) Breadth first search (B) Depth first search
   (C) Best first search (D) A0* algorithm

6. The time complexity of breadth first search over a tree of depth 'd' and 'b' children at each level is
   (A) $O(b^d)$ (B) $O(n^2)$
   (C) $O(b^2)$ (D) O(bd)

7. Which of the following uses a priority queue?
   (A) Best first search (B) Depth limited search
   (C) Iterative deepening (D) Un informed search

8. In depth first search,_____ is used
   (A) Queue (B) Tree
   (C) Graph (D) Stack

9. Resolution is based on
   (A) Contradiction method (B) Mathematical induction
   (C) Constructive method (D) Default reasoning

10. Modus ponens is one in which rules are of the form
   (A) $p \rightarrow q$, p conclude q (B) $p \rightarrow q$, p conclude p
   (C) $p \rightarrow q$, N_p conclude N_q (D) $p \rightarrow q$, $q \rightarrow r$ conclude $p \rightarrow r$

11. 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

12. Given a fact and an AXIOM/premise, the reasoning falls under
   (A) Induction (B) Deduction
   (C) Abduction (D) Contradiction

13. Morphology is one which analyses
   (A) Analysis of smallest grammatical unit (B) Checking the meaning
   (C) Checking the syntax (D) Checks different sounds of the word

14. Pickup (in strips) has following in it's add list
   (A) On table(x), clear(x), hand empty (B) On table(x), clear(x)
   (C) Holding(x) (D) No add list

15. Stack (x,y) has the precondition
   (A) Holding(x), clear(y) (B) Holding(x), on table(y)
   (C) Holding(y), clear(x) (D) Hand empty, on(x,y)

16. 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

17. In symmetric game the gains for playing a specific strategy is
   (A) Not depend on other strategies (B) Not depend on gain
   (C) Depend on other strategies (D) Depend on gain

18. Alpha-beta search essentially performs
   (A) Reduction in number of moves (B) Reduction in the max-min values for the nodes
   (C) Reduction in the gains for opponent (D) Increase the gains for self

19. The core part of decision making for the expert system lies in the
   (A) Knowledge base (B) Explanations
   (C) Facts (D) Inference mechanisms

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

PART – B (5 × 4 = 20 Marks)

Answer **ANY FIVE** Questions

Define the following

21. (i) AI
   (ii) State space search problem

When do you say an algorithm is

22. (i) An optimal algorithm
   (ii) Complete algorithm

23. Write syntax for the first order logic.

24. What is forward chaining? Explain it with an example.

25. What is learning? Give some examples.

26. Explain various game strategies.

27. What is MYCIN? Explain it briefly.

PART – C (5 × 12 = 60 Marks)

Answer **ALL** Questions

28. a. 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 outnumbered by cannibals which is fatal. Make a plan to safely take all to the right bank. Represent the above problem by state space search problem
   (i) Represent initial state
   (ii) Goal state
   (iii) Operators
   (iv) Action plan
   (v) Fund the entire solution

(OR)

b.i. State problem characteristics in detail. (8 Marks)

ii. To multiply 4 matrices A_1, A_2, A_3, A_4 (of compatible orders) construct an AND/OR graph. (4 Marks)

29. a.i. State A* algorithm and explain it with an example. (8 Marks)

ii. State hill climbing algorithm. (4 Marks)

(OR)

b.i. What is simulated annealing? State the algorithm. Explain how it is used in optimization problems.

ii. What is best first search? Find the solution to the following 8 puzzle problem using best first search with initial state.

1	2	3
4		6
7	5	8