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

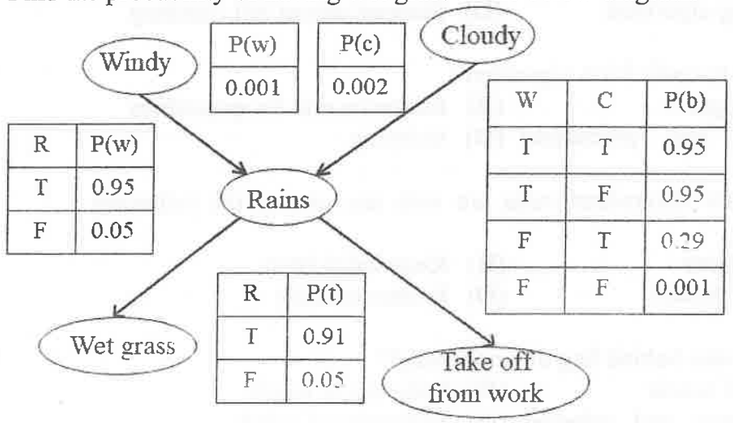
ii. Prove by resolution that John likes peanuts from the given statements. 7 3 3 2

(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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Reg. No.														

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) Marks BL CO PO
Answer **ALL** Questions

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

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 1 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
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A P P L E
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(OR)

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

b.i.	Describe about knowledge and reasoning.	5	3	3	8
ii.	Define about unification.	5	3	3	8
29. a.i.	Explain about formed reasoning with example.	5	4	4	11
ii.	Give notes on block world problem.	5	4	4	11
	(OR)				
b.i.	Write note on simple planning agent.	5	3	4	11
ii.	Define mean-end analysis.	5	3	4	8
30. a.i.	Explain about partial order planning.	5	3	5	8
ii.	Write short notes on knowledge based planning.	5	3	5	7
	(OR)				
b.i.	Explain about expert system architecture.	5	3	5	4
ii.	Define about expert system shells.	5	3	5	5

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Reg. No.														

B.Tech. DEGREE EXAMINATION, JUNE 2022

Sixth Semester

18CSC365J – 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

		Marks	BL	CO	PO
	PART – A (25 × 1 = 25 Marks)				
	Answer **ALL** Questions				
1.	How many types of informed search method are in artificial intelligence? (A) 1 (B) 2 (C) 3 (D) 4	1	4	1	5
2.	The task environment of an agent may consists of _____. (A) Sensors (B) Voice (C) Picture (D) Animation	1	2	1	5
3.	Which depends on the precepts and actions available to the agent? (A) Agent (B) Sensor (C) Design problem (D) Short term	1	4	1	5
4.	Which search agent operates by interleaving computation and action? (A) Offline search (B) Online search (C) Breadth-first search (D) Depth-first search	1	1	1	4
5.	Which search uses the problem specific knowledge beyond the definition of the problem? (A) Informed search (B) Depth-first search (C) Breadth-first search (D) Uniformed search	1	4	1	4
6.	In a depth-first traversal of a graph G with n vertices, k edges are marked as tree edges. The number of connected components in G is (A) k (B) k+1 (C) n–k–1 (D) n–k	1	1	2	4
7.	For an undirected graph G with n vertices and e edges, the sum of the degrees of each vertex is (A) ne (B) 2n (C) 2e (D) e^n	1	4	2	4
8.	When hill-climbing algorithm terminate? (A) Stopping criterion met (B) Global min/max is achieved (C) No neighbor has higher value (D) Bo backtracking	1	1	2	4

9. Hill climbing sometimes called _____ because it grabs a good neighbor state without thinking ahead about where to go next. 1 1 2 4
   (A) Needy local search (B) Heuristic local search
   (C) Greedy local search (D) Optimal local search

10. In KANSAS+OHIO = OREGON then find the value of G+R+O+S+S 1 1 2 4
   (A) 7 (B) 8
   (C) 9 (D) 10

11. General games involves _____. 1 1 3 4
   (A) Single-agent (B) Multi-agent
   (C) Neither single-agent nor multi-agent (D) Only-single agent and multi-agent

12. Which search is equal to minimax search but eliminates the branches that can't influence the final decision? 1 1 3 4
   (A) Depth-first search (B) Breadth-first search
   (C) Alpha-beta pruning (D) Genetic search

13. What is the total number of logical connectives in artificial intelligence? 1 1 3 4
   (A) 7 (B) 3
   (C) 6 (D) 5

14. Which is a refutation complete inference procedure for a propositional logic? 1 1 3 4
   (A) Clauses (B) Variables
   (C) Propositional resolution (D) Proposition

15. _____ is a theorem proving technique that proceeds by building refutation proofs. 1 1 3 4
   (A) Variable (B) Logic
   (C) Resolution (D) Theory

16. How can be the goal is thought of in backward chaining algorithm? 1 1 4 4
   (A) Queue (B) List
   (C) Vector (D) Stack

17. Which algorithm are in more similar to backward chaining algorithm? 1 1 4 4
   (A) Depth-first search algorithm (B) Breadth-first search algorithm
   (C) Hill-climbing search algorithm (D) A 0 star algorithm

18. The process by which the brain incrementally orders actions needed to complete a specific tasks is referred as _____. 1 1 4 4
   (A) Planning problem (B) Partial order planning
   (C) Total order planning (D) Both planning problem and partial order

19. _____ analysis is problem solving techniques used in artificial intelligence for limiting search in AI programs. 1 2 4 4
   (A) Mean-end (B) Mean-start
   (C) Mean-average (D) Mean-middle

20. Which is a mixture of backward and forward search technique? 1 1 4 4
   (A) Mean-end (B) A0 star
   (C) A * (D) Sub goal

21. What are not present in finish actions? 1 2 5 4
   (A) Preconditions (B) Effect
   (C) Finish (D) Cause

22. How many possible plans are available in partial-order solution? 1 1 5 4
   (A) 5 (B) 6
   (C) 7 (D) 9

23. Which university introduced expert systems? 1 1 5 4
   (A) Massachusetts Institute of Technology (B) University of Oxford
   (C) Stanford University (D) University of Cambridge

24. Which of the following is not a capabilities of expert systems? 1 1 5 4
   (A) Advising (B) Demonstrating
   (C) Explaining (D) Expanding

25. Which of the following is incorrect application of expert systems? 1 1 5 4
   (A) Design domain (B) Monitoring systems
   (C) Knowledge domain (D) Systems domain

PART – B (5 × 10 = 50 Marks) Marks BL CO PO

Answer **ALL** Questions

26. a.i. Write about problem space and search. 5 3 1 4

   ii. Give details about production system. 5 3 1 5

(OR)

   b.i. Give short notes on intelligent agents. 5 3 1 8

   ii. Goals based agents explain with example. 5 3 1 8

27. a.i. Explain search techniques. 5 3 2 7

   ii. Compare A^* algorithm and $A0^*$ algorithm. 5 4 2 7

(OR)

   b.i. Define hill climbing search. 5 4 2 3

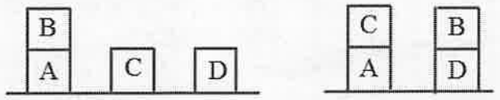
   ii. If point + zero = energy , then E + N + E + R + G + Y = ? 5 4 2 4

28. a.i. Explain min-max algorithm. 5 3 3 5

   ii. Give notes on alpha-beta pruning. 5 3 3 6

(OR)

31. a. Explain goal stack planning and solve the following.

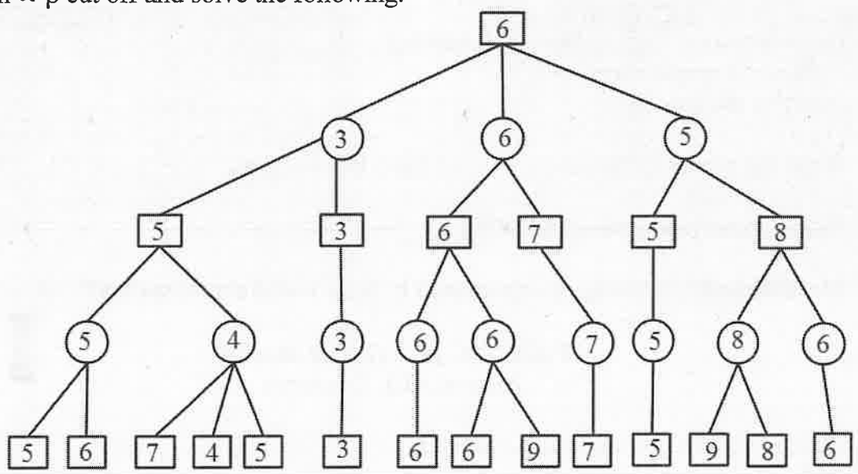


Initial state: Goal state:

(OR)

b. Explain various levels of NLP.

32. a. Explain ∝-β cut off and solve the following.



(OR)

b. Draw the architecture of expert system. Explain all individual components.

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Reg. No.														

B.Tech. DEGREE EXAMINATION, NOVEMBER 2019
Third to Seventh 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. Artificial intelligence is defined as
   (A) Transferring your intelligence into computers (B) Programming with your intelligence
   (C) Making machine intelligent (D) Putting more memory to computer

2. What is the term used for describing the judgment or common sense part of problem solving?
   (A) Heuristic (B) Critical
   (C) Value based (D) Analytical

3. AND-OR graph is related with
   (A) Hill climbing (B) Simulated annealing
   (C) DFS (D) Problem reduction

4. The data structure for DFS is
   (A) Stack (B) Queue
   (C) Priority queue (D) Linked list

5. Heuristic is used in
   (A) Informed search (B) Un-informed search
   (C) Brute force (D) Blind search

6. The time complexity for breadth-first search is
   (A) O (b^d) (B) O (bd)
   (C) O (d) (D) O (n)

7. In A^* algorithm if $g(n) = 0$ then it becomes
   (A) Hill climbing (B) AND-OR graph
   (C) Linear search (D) Heuristic search

8. Consider a complete search tree of depth 15, every node at node 0 to 14 has 10 children and every node at depth 15 is a leaf node. In the complete tree
   (A) There will be O (15^{10}) children (B) There will be O (10^{15})
   (C) There will be 15 children (D) There will be 15×10 children

9. If P is a proposition the P takes the value
   (A) [0, 1] (B) {0, 1}
   (C) 0 (D) 1

10. If P, $P \rightarrow Q \vdash Q$ then the differencing procedure is known as
   (A) Modus tollens (B) Syllogism
   (C) Modus ponens (D) Tautology

11. If NQ, $P \rightarrow Q \vdash ?$
   (A) P (B) Q
   (C) NP (D) NQ

12. $A \vee V$, $NB \vdash A$ is known as
   (A) Unit resolution (B) Modus ponens
   (C) Modus tollens (D) FOL

13. Temporal logic is related with
   (A) Time (B) Space
   (C) Models (D) Planning

14. Strips is related with
   (A) Goal stack planning (B) Learning
   (C) Knowledge representation (D) Propositional logic

15. ATN is used to check
   (A) Parse a sentence in NLP (B) Check the syntax
   (C) Intermediate representation (D) Correctness of sentences

16. In NLP F measure is given as
   (A) (3 * precision * recall) / (precision + recall) (B) (2 * precision * recall) / (precision + recall)
   (C) (Precision + recall) / (precision − recall) (D) (Precision − recall) / (precision + recall)

17. Utility function denotes
   (A) Numeric value for a terminal state (B) Numeric value for a start state
   (C) It is a heuristic value (D) It denotes the value for intermediate state

18. In zero-sum game
   (A) No player wins (B) It is a draw
   (C) Game doesn't take place (D) If one player wins then other loses

19. ∝-β 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

20. The height *h(A)* of a fuzzy set A is defined as $h(A) = \sup A(x)$ where x belongs to A. Then the fuzzy set A is called normal when
   (A) $h(A) = 0$ (B) $h(A) < 0$
   (C) $h(A) = 1$ (D) $h(A) < 1$

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

21. What is Turing test?

22. Define a state space search problem in AI with example.

23. Define Heuristic value for
   (i) Travelling salesman problem
   (ii) 8 puzzle problem

24. In propositional logic define the following
   (i) Completeness
   (ii) Soundness

25. Write the syntax of first order logic in Backus-Naur form.

26. State various predicates in STRIPS.

27. Illustrate how knowledge is represented in fuzzy based expert system?

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

28. a. Explain various problem characteristics.

(OR)

b. Explain water jug problem. Construct production rules for the problem where 2 jugs, one 4 g and another 3g with no measurement. Assume a pump is available from which any amount of water can be taken. Find 2g water in 3g jug.

29. a. Explain A^* algorithm with a suitable example.

(OR)

b. Explain the following
   (i) Depth limited search
   (ii) Best first search

30. a.i. Explain unification algorithm. (4 Marks)

ii. The law says that "it is a crime for an American to sell weapons to hostile nations. The country "Nano", an enemy of America has some missiles, and all of its missiles were sold by colonel west, who is an American".
Use resolution principle to prove that west is a criminal. (8 Marks)

(OR)

b. Explain the following
   (i) Semantic network
   (ii) Frame with suitable example.

Goal state is defined as

1	2	3
4	5	6
7	8	

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

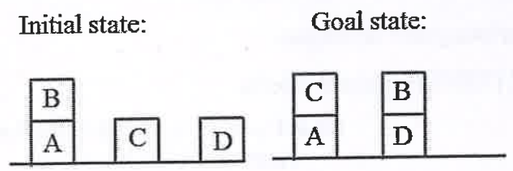
ii. Represent wumbus word problem in FOL. (7 Marks)

(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

32. a. Explain alpha-beta pruning procedure with an example.

(OR)

b. Discuss in detail about expert system with its architecture diagram.

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Reg. No.															

B.Tech. DEGREE EXAMINATION, NOVEMBER 2018
3rd to 7th 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. What is Artificial Intelligence?
   (A) Putting your intelligence into computer
   (B) Programming with your own intelligence
   (C) Making a machine intelligence
   (D) Playing a game

2. What is state space?
   (A) The whole problem
   (B) Your definition to a problem
   (C) Problem you design
   (D) Representing your problem with variable and parameter

3. A search algorithm takes _____ as an input and returns _____ as an output.
   (A) Input, output
   (B) Problem, solution
   (C) Solution, problem
   (D) Parameters, sequence of actions

4. A problem is a search space defined by one of these state.
   (A) Initial state
   (B) Last state
   (C) Intermediate state
   (D) Final state

5. Which search method takes less memory?
   (A) Depth-first search
   (B) Breadth-first search
   (C) Optimal search
   (D) Linear search

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

7. Which function will select the lowest expansion node at first for evaluation?
   (A) Greedy best-first search
   (B) Best-first search
   (C) Depth-first search
   (D) Linear search

8. A production rule consists of _____.
   (A) A set of rules
   (B) A sequence of steps
   (C) Set of rules and sequence of steps
   (D) Arbitrary representation to problem

9. Which is not a property of representation of knowledge?
   (A) Representation verification (B) Representational adequacy
   (C) Inferential adequacy (D) Inferential efficiency

10. Which is used to construct the complex sentences?
   (A) Symbols (B) Connectives
   (C) Logical connectives (D) Symbols and connectives

11. How many proposition symbols are there in AI?
   (A) 1 (B) 2
   (C) 3 (D) 4

12. What will happen if two literals are identical?
   (A) Remains the same (B) Added as three
   (C) Reduced to one (D) One variable less

13. Which of the following search belongs to totally ordered plan search?
   (A) Forward state-space search (B) Hill-climbing search
   (C) Depth-first search (D) Breadth-first search

14. One of the main challenges of NLP is _____.
   (A) Handling ambiguity of sentences (B) Handling tokenization
   (C) Handling POS-Tagging (D) Linguistics

15. Machine translation
   (A) Converts one human language to another (B) Converts human language to machine language
   (C) Converts any human language to English (D) Converts machine language to human language

16. How many types of quantifiers are available in AI?
   (A) 6 (B) 2
   (C) 3 (D) 4

17. General games involves _____.
   (A) Single agent (B) Multi agent
   (C) Neither single-agent nor multi-agent (D) Only single-agent and multi-agent

18. The initial state and legal moves for each side define the _____ for the game.
   (A) Search tree (B) Game tree
   (C) State space search (D) Forest

19. _____ is/ are the well known expert systems for medical diagnosis systems.
   (A) MYCIN (B) CADUCEUS
   (C) DENDRAL (D) SMH·PAL

20. The main components of the expert systems are _____.
   (A) Inference engine (B) Knowledge base
   (C) Inference engine and knowledge base (D) Meta data

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

21. What is AI? Write the properties of AI.

22. State the requirements for good control strategy and explain it.

23. What is iterative deepening? Give example.

24. State the differences between BFS and DFS.

25. How is predicate logic helpful in knowledge representation and state the syntax of first order predicate logic?

26. Name the expert system tools used for research.

27. State the applications of expert systems.

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

28. a. What is problem characteristics? Explain briefly the various problem characteristics.

(OR)

b. Explain about defining the problem as a state space search by using water jug problem with (4,3) quantity jugs. Assume the initial state of the problem as (0,0) and goal state as (2,0).

29. a. What do you mean by searching? Explain A^* algorithm in detail with an example.

(OR)

b. What are the problems encountered during hill climbing and what are the ways available to deal with these problems and write the hill climbing algorithm.

30. a. Explain various approaches to knowledge representation.

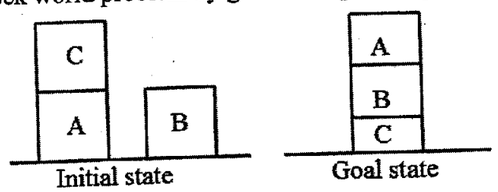
(OR)

b. Explain the knowledge representation using predicate and propositional logic with an unification algorithm.

31. a. Describe the components of planning in detail.

(OR)

b. Solve the following block world problem by goal-stack planning method.



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(OR)

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* * * * *

Reg. No.															

B.Tech. DEGREE EXAMINATION, NOVEMBER 2018
3rd to 7th Semester

15CS401 – ARTIFICIAL INTELLIGENCE
(For the candidates admitted during the academic year 2015-2016 to 2017-2018)

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Time: Three Hours

Max. Marks: 100

PART – A (20 × 1 = 20 Marks)
Answer **ALL** Questions

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   (A) Putting your intelligence into computer
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PART – B (5 × 4 = 20 Marks)
Answer **ANY FIVE** Questions

21. What is AI? Write the properties of AI.

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23. What is iterative deepening? Give example.

24. State the differences between BFS and DFS.

25. How is predicate logic helpful in knowledge representation and state the syntax of first order predicate logic?

26. Name the expert system tools used for research.

27. State the applications of expert systems.

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

28. a. What is problem characteristics? Explain briefly the various problem characteristics.

(OR)

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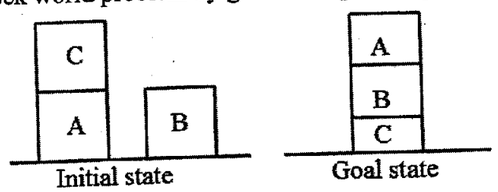


ii. Solve room colouring problem with an example using CSP. 5 4 1 2

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

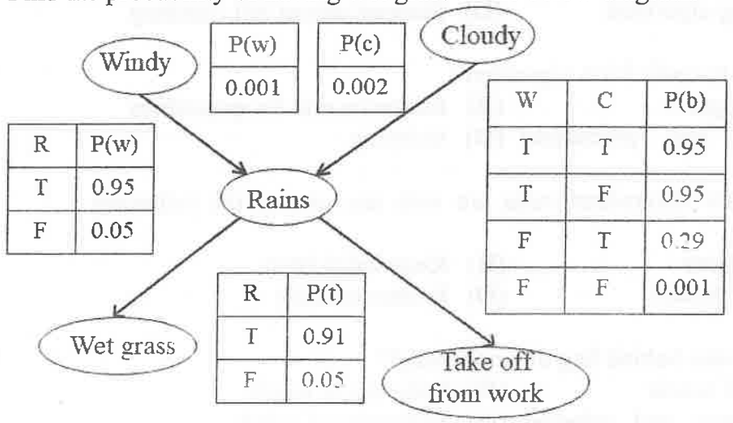
ii. Prove by resolution that John likes peanuts from the given statements. 7 3 3 2

(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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Reg. No.														

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) Marks BL CO PO
Answer **ALL** Questions

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

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 1 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
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A P P L E
```

(OR)

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