

Hall Ticket Number:

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Code No. : 15245 S N

**VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD**

Accredited by NAAC with A++ Grade

**B.E. V-Semester Supplementary Examinations, June-2023**

**Artificial Intelligence**

(Common to CSE &amp; AIML)

Time: 3 hours

Note: Answer all questions from Part-A and any FIVE from Part-B

Max. Marks: 60

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO																		
1.	Formulate the PEAS description of the task environment for an Automated vehicle.	2	1	1	1,2																		
2.	Utilize the following start node and goal node for the 8- Puzzle Problem Start node <table border="1" style="display: inline-table; margin-right: 20px;"> <tr><td>2</td><td>8</td><td>3</td></tr> <tr><td>1</td><td>6</td><td>4</td></tr> <tr><td>7</td><td></td><td>5</td></tr> </table> Goal node <table border="1" style="display: inline-table;"> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>8</td><td></td><td>4</td></tr> <tr><td>7</td><td>6</td><td>5</td></tr> </table> Figure shows an 8-puzzle problem with the start state and the goal state. Assuming that the heuristic function $h_2(N)$ Manhattan distance, calculate the heuristic value of the start state.	2	8	3	1	6	4	7		5	1	2	3	8		4	7	6	5	2	3	1	1,3
2	8	3																					
1	6	4																					
7		5																					
1	2	3																					
8		4																					
7	6	5																					
3.	Construct the Three Player Game and mark the best move at the root.	2	3	2	1,3																		
4.	Differentiate Horn and definite Clause	2	2	2	1,2																		
5.	Construct the statements in the form of assertions and queries in first order logic using TELL and ASK.	2	3	3	1,2																		
6.	Write the syntax of first order logic with equality specified in Backus-Naur Form	2	2	3	1,4																		
7.	Consider the Crypt arithmetic If KANSAS + OHIO = OREGON Then find the value of G + R + O + S + S?	2	3	4	1,4,5																		
8.	What is Constraint Propagation?	2	1	4	1,2																		
9.	State the Bayes Rule with its usage.	2	2	5	1,3																		
10.	Given $P(s m)=0.7$ , $P(m)=1/50000$ , $P(s)=0.01$ Calculate $P(m s)$	2	3	5	1,4																		

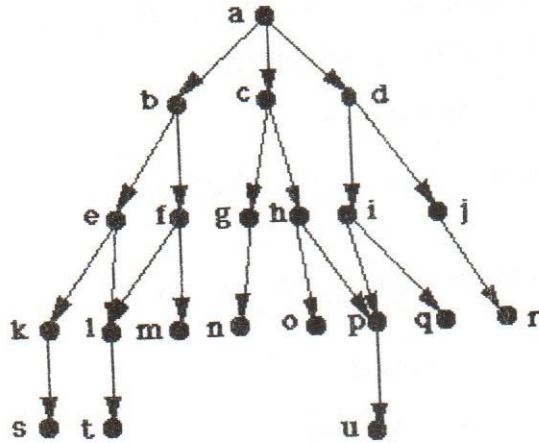
**Part-B (5×8 = 40 Marks)**

11. a) Write a pseudo code agent programs for Model Based Agents.

4 1 1 1,2

b) Construct the Depth first search function and examine the order in which it traverse the nodes

4 3 1 1,3,4

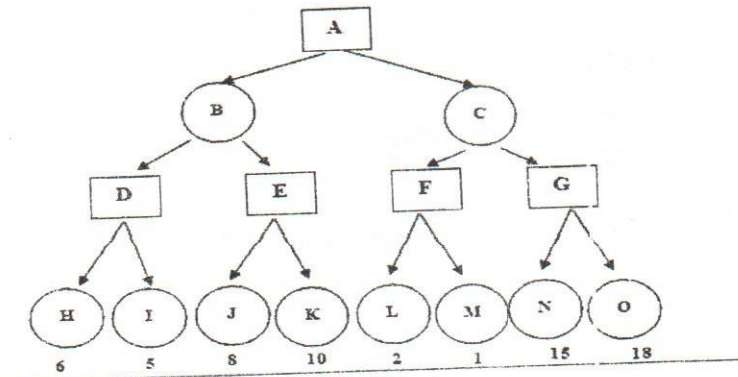


12. a) What is a Wumpus world? Construct a Simple knowledge-based wumpus agent exploring the environment.

4 2 2 1,3,4

b) Given the following search tree, apply the alpha-beta pruning algorithm to it and show the search tree that would be built by this algorithm. Make sure that you show where the alpha and beta cuts are applied and which parts of the search tree are pruned as a result.

4 3 2 1,2,4



13. a) Construct the process of knowledge engineering with an appropriate example.

4 2 3 1,2

b) Differentiate between forward chaining and backward chaining in inference in FOL.

4 3 3 1,4

14. a) What is Local Search in CSPs? Explain the min Conflict algorithm with example.

4 2 4 1,3

b) Construct a solution to a planning problem in the block world



4 3 4 1,4

15. a) Define Uncertainty? Explain the Efficient representation of Conditional distribution.

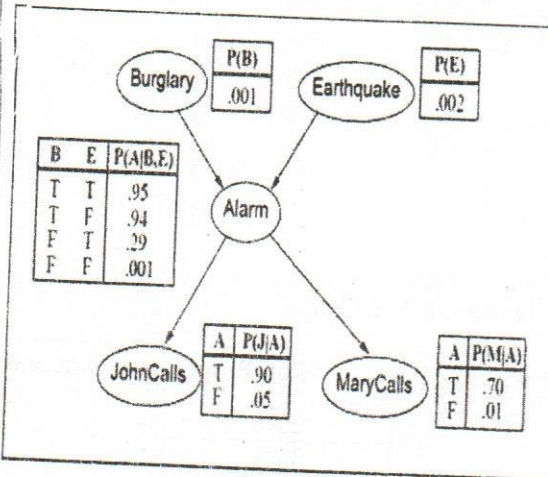
4 2 5 1,2

b) For the Belief Network given below and the corresponding probabilities, compute the following probabilities.

4 3 5 1,3

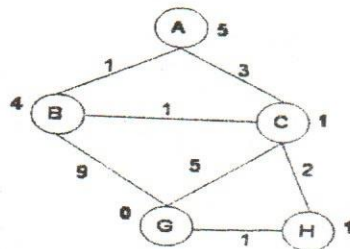
i.  $P(B, E, A, J, M)$

ii.  $P(\text{John calls} \mid \text{Burglary})$



16. a) Consider the graph shown below where the numbers on the links are link costs and the numbers next to the states are heuristic estimates. Note that the arcs are undirected. Let A be the start state and G be the goal state.

4 3 1 1,3



Simulate A\* search with a closed list on this graph.

b) What is Minimax algorithm? Explain with an example.

4 2 2 1,2

17. Answer any *two* of the following:

- a) Construct the first order logic for the following sentences.  
 1. Everyone loves everyone      2. Someone loves everyone  
 3. Everyone loves someone      4. Someone is loved by everyone
- b) Construct a PDDL for an Air cargo transport problem involving loading and unloading cargo and flying it from place to place.
- c) Given the full joint distribution table

4 3 3 1,2,4  
 4 3 4 1,2,4  
 4 3 5 1,2,4

	toothache		!toothache		sum
	catch	!catch	catch	!catch	
cavity	0.108	0.012	0.072	0.008	0.200
!cavity	0.016	0.064	0.144	0.576	0.800
sum	0.124	0.076	0.216	0.584	
sum_table	1.000				

calculate the following:

- a) P(Toothache)      b) P(Cavity)  
 c) P(Toothache| cavity)      d) P(Cavity| Toothach V catch)

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level - 1	20%
ii)	Blooms Taxonomy Level - 2	35%
iii)	Blooms Taxonomy Level - 3 & 4	45%

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