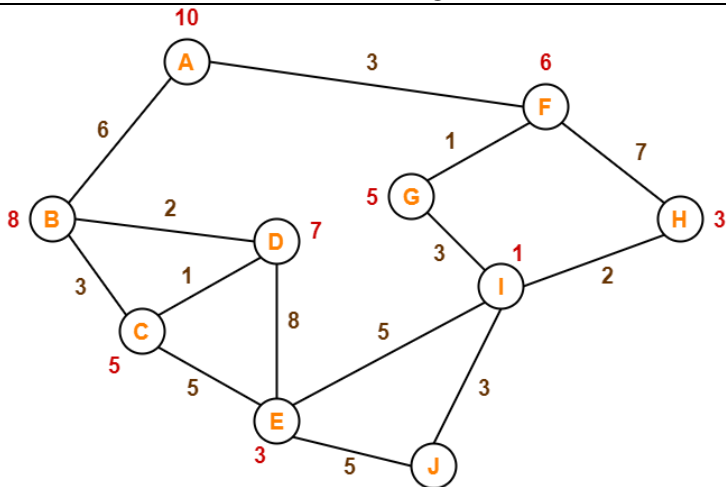
	<p>B.M.S. COLLEGE OF ENGINEERING, BANGALORE-19</p> <p>(Autonomous Institute, Affiliated to VTU)</p> <p><b>Department Name: Computer Science and Engineering</b></p>		
<p><b>INTERNALS-1</b></p>			
<b>Course Code : 20CS56PCAIP</b>		<b>Course Title : Artificial Intelligence</b>	
<b>Semester : V</b>		<b>Maximum Marks: 40</b>	<b>Date: 21/10/2020</b>
<b>Faculty Handling the Course:</b>		<b>Dr. Jyothi S Nayak and Dr. Kavitha Sooda</b>	
<b>Instructions:</b> <i>Instructions: Internal choice is provided in Part C.</i>			

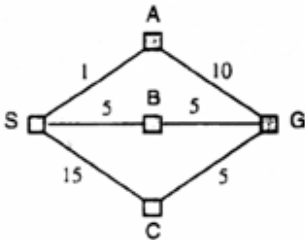
**PART –A (5 marks)**

No.	Question	Marks
1	Describe the interaction with vacuum cleaner agent with its environment.	5

**PART –B (15 marks)**

No.	Question	Marks
2.a)	 <p>Find the most cost-effective path to reach from start state 'A' to final state 'J' by applying A* Algorithm. The numbers written on edges represent the distance between the nodes. The numbers written on nodes represent the heuristic value. Note since 'J' is the destination node, the heuristic value =0.</p>	5
2.b)	Analyze how consistent heuristics result in optimal solution in A* Search algorithm.	5
2.c)	Provide the standard formulation for 8-queens problem, (i). if queen placed initially at random, (ii). If queen placed the top left most position initially Discuss the state space reduction in case (i) and (ii)	5

**PART –C (20 marks)**

No.	Question	Marks																		
3.a)	<p>Apply the Greedy Best First search algorithm for 8 Puzzle problem with Start state and Goal state shown below. Also draw the states resulted from the Start state to the Goal state.</p> <table border="1"> <tr><td>3</td><td>1</td><td>2</td></tr> <tr><td></td><td>4</td><td>6</td></tr> <tr><td>7</td><td>5</td><td>8</td></tr> </table> <p style="text-align: center;"><b>Start state</b></p> <table border="1"> <tr><td>1</td><td>2</td><td>3</td></tr> <tr><td>4</td><td>5</td><td>6</td></tr> <tr><td>7</td><td>8</td><td></td></tr> </table> <p style="text-align: center;"><b>Goal state</b></p>	3	1	2		4	6	7	5	8	1	2	3	4	5	6	7	8		10
3	1	2																		
	4	6																		
7	5	8																		
1	2	3																		
4	5	6																		
7	8																			
<b>OR</b>																				
3.b)	<div style="text-align: center;">  </div> <p>Discuss the Frontier queue style, Whether it is complete and optimal? What is the time and space complexity? How is it better than Breadth first search?</p>	10																		

Graph showing the road network between 14 Romanian cities. The cities are represented as nodes, and the roads with their distances are represented as edges.

Nodes (Cities): Oradea, Zerind, Arad, Sibiu, Fagaras, Rimnicu Vilcea, Pitesti, Bucharest, Giurgiu, Urziceni, Hirsova, Vaslui, Lugoj, Mehadia, Drobeta, Timisoara.

Edges (Roads and Distances):

- Oradea - Zerind: 71
- Oradea - Sibiu: 151
- Zerind - Arad: 75
- Arad - Sibiu: 140
- Arad - Timisoara: 118
- Timisoara - Lugoj: 111
- Lugoj - Mehadia: 70
- Mehadia - Drobeta: 75
- Drobeta - Craiova: 120
- Craiova - Pitesti: 138
- Sibiu - Fagaras: 99
- Sibiu - Rimnicu Vilcea: 80
- Rimnicu Vilcea - Pitesti: 97
- Pitesti - Bucharest: 101
- Pitesti - Fagaras: 211
- Fagaras - Bucharest: 90
- Bucharest - Giurgiu: 90
- Bucharest - Urziceni: 85
- Urziceni - Hirsova: 98
- Hirsova - Vaslui: 142
- Vaslui - Iasi: 92
- Iasi - Neamt: 87
- Neamt - Oradea: 380

Table showing the straight-line distance to Bucharest for each city:

City	Straight-line distance to Bucharest
Arad	366
Bucharest	0
Craiova	160
Dobreta	242
Eforie	161
Fagaras	176
Giurgiu	77
Hirsova	151
Iasi	226
Lugoj	244
Mehadia	241
Neamt	234
Oradea	380
Pitesti	193
Rimnicu Vilcea	253
Sibiu	329
Timisoara	80
Vaslui	199
Zerind	374

**OR**

You are given two jugs, a 4-litre one and a 3-litre one. Neither has any measuring markers on it. There is a pump that can be used to fill the jugs with water. How can you get exactly 2 liters of water into 4-litre jug. Give the initial state, Goal state, operators and path cost function for the problem. Also write the state space diagram.

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