# National Institute of Technology Silchar

## End-Semester (PG/Ph.D) Examinations, Nov-Dec 2023

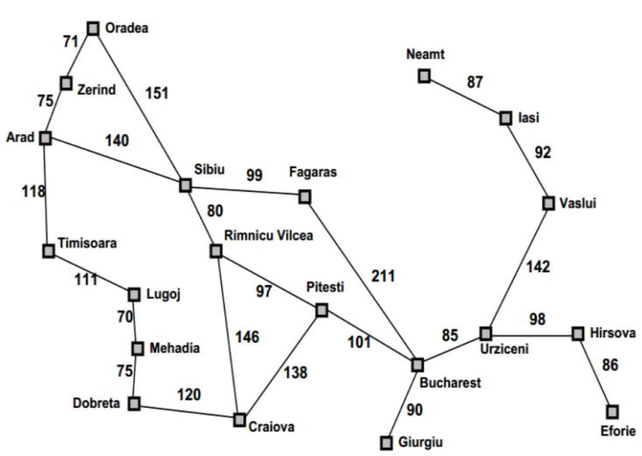
**Subject Code**: CS 5202 **Subject**: Artificial Intelligence

**Semester**: 1st Semester **Department**: Computer Science & Engineering

**Duration**: Two Hours **Total Marks**: 50

***Answer any 5 (five) questions.***

| | | Marks | CO |
|---|---|---|---|
| **1. (a)** | Explain various types of Agents. | **4** | **CO-1** |
| **(b)** | What is state-space search approach? Explain state-space for vacuum cleaner problem. | **4** | **CO-1** |
| **(c)** | Though computing is a relatively new discipline, philosophers and mathematicians have been thinking about the issues involved in automated problem solving for thousands of years. What is your opinion of the relevance of these philosophical issues in the development of intelligent machine? | **2** | **CO-2** |
| **2. (a)** | Explain Uniform Cost Search Algorithm with an example. | **4** | **CO-1** |
| **(b)** | Find the optimal path by using A* algorithm, if any: Start: Timisoara Goal: Bucharest | **6** | **CO-4** |

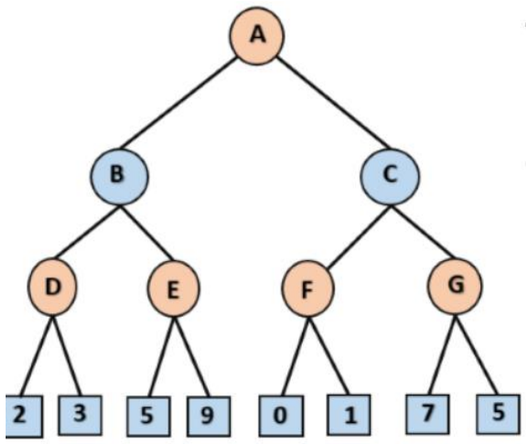



| Straight-line distance to Bucharest | |
|---|---|
| Arad | 366 |
| Bucharest | 0 |
| Craiova | 160 |
| Dobreta | 242 |
| Eforie | 161 |
| Fagaras | 178 |
| Giurgiu | 77 |
| Hirsova | 151 |
| Iasi | 226 |
| Lugoj | 244 |
| Mehadia | 241 |
| Neamt | 234 |
| Oradea | 380 |
| Pitesti | 98 |
| Rimnicu Vilcea | 193 |
| Sibiu | 253 |
| Timisoara | 329 |
| Urziceni | 80 |
| Vaslui | 199 |
| Zerind | 374 |

| | | | |
|---|---|---|---|
| **3. (a)** | What is Constraint Satisfaction Problem? | **4** | **CO-3** |
| **(b)** | Write value of SEND+MORE=MONEY. Constraints in this Cryptarithmetic Problem are:<br>• *Each alphabet takes only one number from 0 to 9 uniquely.*<br>• *No two digits can be assigned to the same latter.*<br>• *Only the single digit number can be assigned to a letter.*<br>• *Sum of two single digit numbers can be maximum 19.* | **6** | **CO-3** |
| **4. (a)** | Prove this problem by using Resolution Refutation method. Consider the following axioms:<br>• *Anyone passing his AI exam and winning the lottery is happy.*<br>• *Anyone who studies or is lucky can pass all his exams.*<br>• *John did not study but he is lucky.*<br>• *Anyone who is lucky wins the lottery.*<br>Prove that *John is happy*. | **6** | **CO-3** |
| **(b)** | Explain Monotonic and Non-monotonic reasoning with example. | **4** | **CO-1** |

**[PTO]**

| | | Marks | CO |
|---|---|---|---|
| **5. (a)** | Explain Modus Ponens and Modus Tollens with example. | **4** | **CO-1** |
| **(b)** | Write short notes on:<br>• Semantic Nets<br>• Frames<br>• Conceptual Graphs | **6** | **CO-2** |
| **6. (a)** | Explain Bayes' theorem with example. | **4** | **CO-1** |
| **(b)** | Explain Min-Max algorithm and Alpha-beta pruning algorithm of the following example: | **6** | **CO-4** |




**[END]**