**SRM Institute of Science and Technology Set B**

**College of Engineering and Technology**

**School of Computing**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

**Academic Year: 2021-22 (Even)**

**Test: CLA-T3** **Date: 29-06-2022**

**Course Code & Title: 18CSC204J Design and Analysis of Algorithms** **Duration:** 100 min

**Year & Sem: II Year / IV Sem** **Max. Marks:** 50

**Course Articulation Matrix:**

| **Course Outcome** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO1** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO2** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO3** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO4** | ***-*** | ***6*** | ***2*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO5** | ***-*** | ***5*** | ***2*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO6** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |

| **Part – A**  **(10 x 1 = 10 Marks)**  **Instructions: Answer all** | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Q. No** | | **Question** | **Marks** | **BL** | **CO** | **PO** | **PI Code** |
| **1** | | **In what manner is a state-space tree for a backtracking algorithm constructed?**   1. **Breadth First Search** 2. **Depth First Search** 3. **Nearest Neighbor method** 4. **Twice around the tree** | **1** | **1** | **CO4** | **PO2** | **2.1.2** |
| **2** | | **For how many queens was the extended version of Eight Queen Puzzle applicable for n\*n squares?**   1. **5** 2. **8** 3. **6** 4. **n** | **1** | **3** | **CO4** | **PO2** | **2.4.1** |
| **3** | | **What is the Time Complexity of DFS?**   1. **O(V + E)** 2. **O(E)** 3. **O(V)** 4. **O(V \* E)** | **1** | **4** | **CO4** | **PO2** | **2.2.2** |
| **4** | | **What is the optimal solution for the Travelling Salesman Problem?**    **a. A-B-D-E-C-A**  **b. A-B-C-E-D-A**  **c. A-B-C-D-E-A**  **d. A-D-E-B-C-A** | **1** | **5** | **CO4** | **PO3** | **3.2.3** |
| **5** | | **Which is the true statement?**   1. **Breadth first search is single source shortest path algorithm that works on un-weighted graphs** 2. **Depth first search is single source shortest path algorithm that works on un-weighted graphs.** 3. **Both a and b are true.** 4. **None of the above is true.** | **1** | **2** | **CO4** | **PO2** | **2.1.1** |
| **6** | | **Which of the following options match the given statement:**  **Statement: The algorithms that use the random input to reduce the expected running time or memory usage, but always terminate with a correct result in a bounded amount of time.**   1. **Las Vegas Algorithm** 2. **Monte Carlo Algorithm** 3. **Atlantic City Algorithm** 4. **None of the mentioned** | **1** | **2** | **CO5** | **PO3** | **3.2.3** |
| **7** | | **What is a Rabin and Karp Algorithm?**   1. **String Matching Algorithm** 2. **Shortest Path Algorithm** 3. **Minimum spanning tree Algorithm** 4. **Approximation Algorithm** | **1** | **1** | **CO5** | **PO2** | **2.1.2** |
| **8** | | **Problems that can be solved in polynomial time are known as?**   1. **Intractable** 2. **Tractable** 3. **Decision** 4. **Complete** | **1** | **4** | **CO5** | **PO2** | **2.2.2** |
| **9** | | **Choose the correct answer for the following statements:**  **I. The theory of NP–completeness provides a method of obtaining a polynomial time for NP algorithms.**  **II. All NP-complete problem are NP-Hard.**   1. **I is FALSE and II is TRUE** 2. **I is TRUE and II is FALSE** 3. **Both are TRUE** 4. **Both are FALSE** | **1** | **2** | **CO5** | **PO2** | **2.1.1** |
| **10** | | **Which of the following is true**   1. **NP is subset of P** 2. **P is subset of NP** 3. **P and NP are equal** 4. **None of the Above** | **1** | **1** | **CO5** | **PO2** | **2.1.2** |
| **Part – B**  **( 4 x 10 Marks = 40 Marks)**  **Instructions: Answer any 4 Questions** | | | | | | | |
| **11** | **Solve N Queens problem for 4\*4 chessboard using backtracking approach and draw the state space tree.** | | **10** | **3** | **CO4** | **PO2** | **2.4.1** |
| **12** | **Solve Travelling Salesman Problem using Branch and Bound Algorithm in the following graph** | | **10** | **5** | **CO4** | **PO2** | **2.4.1** |
| **13** | **Write the algorithm for Depth First Search and explain it with an example.** | | **10** | **4** | **CO4** | **PO3** | **3.1.6** |
| **14** | **Demonstrate how the Rabin Karp Algorithm works for below text string and pattern string.**  **Text String**   | **a** | **e** | **v** | **e** | **s** | **a** | **p** | **n** | **g** | | --- | --- | --- | --- | --- | --- | --- | --- | --- |   **Pattern string:**   | **e** | **s** | **a** | **p** | | --- | --- | --- | --- | | | **10** | **3** | **CO5** | **PO2** | **2.4.1** |
| **15** | **Discuss in detail about the NP- Complete Problem with suitable example.** | | **10** | **4** | **CO5** | **PO3** | **3.1.6** |

**\*Program Indicators are available separately for Computer Science and Engineering in AICTE examination reforms policy.**

**Course Outcome (CO) and Bloom’s level (BL) Coverage in Questions**

**Approved by the Audit Professor/Course Coordinator**