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

**College of Engineering and Technology**

**School of Computing**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamilnadu

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

**Test: CLA-T**3  **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** | ***2*** | ***3*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO2** | ***-*** | ***3*** | ***2*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO3** | ***-*** | ***3*** | ***3*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO4** | ***3*** | ***2*** | ***3*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO5** | ***2*** | ***3*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| **CO6** | ***-*** | ***2*** | ***3*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |

| **Part - A**  **(10 x 1 = 10 Marks)**  **Instructions: Answer all** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Q. No** | **Question** | **Marks** | **BL** | **CO** | **PO** | **PI Code** |
| **1** | Backtracking algorithm is implemented by constructing a tree of choices called as? a) State-space tree b) State-chart tree c) Node tree d) Backtracking tree | **1** | **1** | **CO4** | **PO1** | **1.3.1** |
| **2** | Of the following given options, which one of the following is a correct option that provides an optimal solution for 4-queens problem? a) (3,1,4,2) b) (2,3,1,4) c) (4,3,2,1) d) (4,2,3,1) | **1** | **2** | **CO4** | **PO2** | **2.1.3** |
| **3** | How many Hamiltonian paths does the following graph have?    a) 4  b) 2 c) 1d) 3 | **1** | **2** | **CO4** | **PO2** | **2.1.3** |
| **4** | Which of the following is not a branch and bound strategy to generate branches? a) LIFO branch and bound b) FIFO branch and bound c) Lowest cost branch and bound d) Highest cost branch and bound | **1** | **1** | **CO4** | **PO1** | **1.3.1** |
| **5** | The Data structure used in standard implementation of Breadth First Search is?   1. Stack 2. Queue 3. Tree 4. Linked List | **1** | **1** | **CO4** | **PO1** | **1.3.1** |
| **6** | What is a Randomized Quick Sort?   1. The leftmost element is chosen as the pivot 2. The rightmost element is chosen as the pivot 3. Any element in the array can be chosen as the pivot 4. Pivot element can not be chosen | **1** | **1** | **CO6** | **PO2** | **2.1.1** |
| **7** | What is the purpose of using randomized quick sort over deterministic quick sort?   1. so as to avoid worst case space complexity 2. so as to avoid worst case time complexity 3. to improve accuracy of output 4. to improve average case time complexity | **1** | **2** | **CO6** | **PO2** | **2.1.1** |
| **8** | \_\_\_\_\_\_\_\_\_ is the class of decision problems that can be solved by non-deterministic polynomial algorithms. a) NP b) P c) Hard d) Complete | **1** | **1** | **CO5** | **PO1** | **1.3.1** |
| **9** | What is the basic principle in Rabin Karp algorithm? a) Hashing b) Sorting c) Augmenting d) Dynamic Programming | **1** | **1** | **CO6** | **PO2** | **2.1.1** |
| **10** | Hamiltonian path problem is \_\_\_\_\_\_\_\_\_ a) NP class problem b) P class problem c) NP complete problem d) None of the above | **1** | **2** | **CO5** | **PO2** | **2.1.1** |
| **Part – B**  **( 4 x 10 Marks = 40 Marks)**  **Instructions: Answer any 4 Questions** | | | | | | |
| **11** | Find all the sum of subsets using the state space tree corresponding to m=35, w=(20,18,15,12,10,7,5). | **10** | **4** | **CO4** | **PO2** | **2.4.1** |
| **12** | Explain Travelling sales person problem LCBB procedure with the following instance and draw the portion of the state space tree and find an optimal tour.   |  | 1 | 2 | 3 | 4 | | --- | --- | --- | --- | --- | | 1 | ∞ | 5 | 1 | 10 | | 2 | 1 | ∞ | 4 | 12 | | 3 | 3 | 6 | ∞ | 4 | | 4 | 7 | 1 | 3 | ∞ | | **10** | **3** | **CO4** | **PO2** | **2.2.1** |
| **13** | Find the single source shortest paths using Dijkstra’s algorithm for the following graph. The source vertex is 0. | **10** | **3** | **CO4** | **PO3** | **3.2.1** |
| **14** | Show the implementation of Rabin Karp String Matching algorithm for the following example.  Text: d d b d d b b f e c b  Pattern: e c b | **10** | **4** | **CO6** | **PO2** | **2.4.1** |
| **15** | Define the following   1. Class P 2. Class NP 3. NP hard 4. NP Complete | **10** | **3** | **CO5** | **PO1** | **1.3.1** |

**\*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**