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| BLACK_VVIT ORGINAL LOGO.jpg | **VASIREDDY VENKATADRI INSTITUTE OF TECHNOLOGY:: NAMBURU** | |
| **YEAR/SEM:** III – B. Tech - I-Sem | **NAME OF THE EXAM:** MID – II |
| **SUBJECT: Design and Analysis of Algorithms** | **SUBJECT CODE: 19CST503/19ITT503** |
| **BRANCH:** CSE / IT | **DATE:** 19-01-2022 |

***ANSWER ALL QUESTIONS***

**Time:** 90 Minutes **Max. Marks:** 30

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | **CO** | **BL** | **PO** | **Marks** |
| **1** |  | Find shortest paths between every pair of nodes in the graph represented by below adjacency matrix   |  |  |  |  | | --- | --- | --- | --- | | ∞ | 4 | ∞ | 7 | | 2 | ∞ | ∞ | 3 | | ∞ | 6 | ∞ | ∞ | | ∞ | 8 | 5 | ∞ | | 3 | 3 | 1, 2, 3, 4 | 6 |
| **2.** | **a.** | Write backtracking algorithm of N-Queens problem and derive its time complexity | 4 | 3 | 1, 2, 3, 4 | 6 |
|  | **b.** | Find all possible ways of coloring the following graph using 3 colors | 4 | 3 | 1, 2, 3, 4 | 6 |
| **3.** | **a.** | Discuss the three versions of branch and bound method | 5 | 2 | 1, 2, 3, 4 | 4 |
|  | **b.** | Draw the portion of the state space tree generated by LC branch and bound of knapsack problem for an instance n=4, (P1, P2, P3, P4) = (10, 10, 12, 18), (w1, w2, w3, w4)=(2, 4, 6, 9), and m=15 | 5 | 3 | 1, 2, 3, 4 | 8 |

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|  | | | **CO** | **BL** | **PO** | **Marks** |
| **1** | **a.** | Find least cost sequence of operations for transforming string X=aabab into string Y=babb. Cost of insert operation is 1, cost of delete operation is 1 and cost of change operation is 2. | 3 | 3 | 1, 2, 3, 4 | 6 |
| **2.** | **a.** | Write backtracking algorithm of Graph coloring problem and derive its time complexity | 4 | 3 | 1, 2, 3, 4 | 6 |
|  | **b.** | Draw the state space tree to find all Hamiltonian cycles present in the following graph | 4 | 3 | 1, 2, 3, 4 | 6 |
| **3.** | **a.** | Find an optimal tour of the following Travelling Sales Person problem using LCBB   |  |  |  |  | | --- | --- | --- | --- | | ∞ | 10 | 15 | 20 | | 5 | ∞ | 9 | 10 | | 6 | 13 | ∞ | 12 | | 8 | 8 | 9 | ∞ | | 5 | 3 | 1, 2, 3, 4 | 12 |

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| --- | --- | --- | --- | --- | --- | --- |
|  | | | **CO** | **BL** | **PO** | **Marks** |
| **1** | **a.** | Find optimal tour of the following traveling salesperson problem using dynamic programming method   |  |  |  |  | | --- | --- | --- | --- | | 0 | 10 | 15 | 20 | | 5 | 0 | 9 | 10 | | 6 | 13 | 0 | 12 | | 8 | 8 | 9 | 0 | | 3 | 3 | 1, 2, 3, 4 | 6 |
| **2.** | **a.** | Draw the state space tree to find all solutions of 4-queens problem | 4 | 3 | 1, 2, 3, 4 | 6 |
|  | **b.** | Write an algorithm to determine the Hamiltonian Cycles in a given graph using backtracking | 4 | 3 | 1, 2, 3, 4 | 6 |
| **3.** | **a.** | Draw the portion of the state space tree generated by FIFO branch and bound of knapsack problem for an instance n=4, (P1, P2, P3, P4) = (10, 10, 12, 18), (w1, w2, w3, w4)=(2, 4, 6, 9), and m=15 | 5 | 3 | 1, 2, 3, 4 | 12 |