Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_

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**End Semester Examination – Nov/Dec – 2018**

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| **Code : 14CS2001** |  | **Duration :** | **3hrs** |
| **Sub. Name : ANALYSIS OF ALGORITHMS** |  | **Max. marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Demonstrate Bubble sort algorithm with example and examine it’s time efficiency for best and worst case inputs. | CO1 | 10 |
| b. | Write a recursive solution for finding the number of binary digits in the binary representation of a positive integer. Set up a recurrence relation for the algorithm’s basic operation and solve it. | CO3 | 10 |
| (OR) | | | | |
| 2. | a. | Discuss the asymptotic notations Big-oh, Big-omega and Big-theta with appropriate examples. | CO1 | 10 |
| b. | Design an algorithm for matrix multiplication of two matrices of size n X n and analyze it’s time complexity. | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | Write selection sort algorithm and apply it on the input 20,80,50,10,70,30,60,40 on the algorithm and show each steps. Analyze it’s time complexity. | CO1 | 10 |
| b. | Write the algorithm of Quick Sort and apply it for the following list in ascending order: 14, 6, 70, 12, 89, 60, 70, 100 | CO3 | 10 |
| (OR) | | | | |
| 4. | a. | Design an algorithm to find minimum and maximum number in a list using divide-and-conquer technique. Evaluate it’s time complexity. | CO3 | 10 |
| b. | Write the Brute Force string matching algorithm. Explain its best case and worst case complexities. | CO2 | 10 |
|  |  |  |  |  |
| 5. | a. | Apply dynamic programming technique to find the common subsequence of the strings “AGGCTCATCTC” and “GATGCAT” | CO2 | 10 |
| b. | Apply Floyd’s algorithm to find shortest path between every pair of vertices in the following graph.  Image result for floyd's algorithm graph | CO2 | 10 |
| (OR) | | | | |
| 6. |  | The following instance gives weights and values of 4 items. Using dynamic programming technique, find the most valuable subset of the items that fit into the knapsack of capacity 9.   |  |  |  | | --- | --- | --- | | *Item* | *Weight*  *(kg)* | *Value*  *(Rupees in lacs)* | | 1 | 6 | 36 | | 2 | 2 | 8 | | 3 | 3 | 30 | | 4 | 4 | 20 | | CO2 | 20 |
|  |  |  |  |  |
| 7. | a. | Construct Huffman tree for the following data and obtain it’s Huffman code:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Symbol | R | T | S | U | W | | Frequency | 45 | 30 | 20 | 10 | 5 | | CO2 | 10 |
| b. | Construct Minimum Spanning Tree for the following graph by applying greedy technique: | CO2 | 10 |
| (OR) | | | | |
| 8. | a. | Find the shortest path from the node ‘A’ to all other nodes in the following graph:  Image result for dijkstra's shortest path algorithm example | CO2 | 10 |
| b. | Compute the optimal merge pattern to merge the sorted files of lengths 3, 5, 7, 9, 12, 14, 15 and17. | CO2 | 10 |
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|  | | **Compulsory**: |  |  |
| 9. |  | Explain the backtracking solution for sum of subsets and n-queen’s problem. | CO2 | 20 |