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



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **17CS2001** | **Duration :** | **3hrs** |
| **Sub. Name :** | **DATA STRUCTURES AND ALGORITHMS – I** | **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. | Describe memory address calculation using row-major and column-major addressing for two dimensional arrays. | CO1 | 10 |
| b. | Explain the array implementation of stack for insertion and deletion. | CO2 | 10 |
| **(OR)** | | | | |
| 2. | a. | Illustrate how stack frames help in executing recursive calls by tracing the recursive algorithm for computing factorial of a number. | CO1 | 10 |
| b. | Explain with an example the application of stack for converting infix expression to postfix expression. | CO1 | 10 |
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| 3. | a. | Explain the advantage of circular queue over linear queue. Write the pseudocode for insertion and deletion operations in circular queue. | CO2 | 10 |
| b. | Compare linked list and array. Write the pseudocode to insert an element at the end of linked list. | CO2 | 10 |
| **(OR)** | | | | |
| 4. | a. | Discuss the pros and cons of doubly linked list. Give the pseudocode for deleting the node at nth position. | CO2 | 10 |
| b. | How the enqueue and dequeue can be performed in linked list implementation of queue with an algorithm. | CO4 | 10 |
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| 5. |  | Explain the (worst and best case) analysis of non-recursive algorithms by analyzing the algorithms for the following:   1. Multiplication of two matrices 2. Finding the maximum among n numbers | CO5 | 20 |
| **(OR)** | | | | |
| 6. |  | Solve the recurrence relation M(n) = 2 M(n) + 1, M(1) = 1 by using   1. Substitution method 2. Recursion tree method | CO5 | 20 |
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| 7. | a. | Apply Brute Force technique to find the match of a string in a given text. Analyze the time complexity of the algorithm. | CO3 | 10 |
| b. | Illustrate bubble sort algorithm with a suitable example. | CO3 | 10 |
| **(OR)** | | | | |
| 8. | a. | Demonstrate the insertion sorting with an algorithm and example. | CO3 | 10 |
| b. | Discuss the ways how collision is handled in hashing with appropriate example. | CO4 | 10 |
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|  | | **Compulsory**: |  |  |
| 9. | a. | Apply divide and conquer technique to find the minimum and maximum among n numbers. | CO6 | 10 |
| b. | Demonstrate quick sort by sorting the numbers 23, 45, 34, 89, 12, 65, 72, 52, 43, 49 and write the algorithm. | CO6 | 10 |