Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VI SEMESTER B. TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

MAKE-UP EXAMINATIONS, JUNE 2019

SUBJECT: DATA STRUCTURES AND ALGORITHMS [ELE 4018]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 14, June 2019** **Max. Marks: 50**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.
- Write algorithms in pseudo-code only.

1A. Explain asymptotic analysis of algorithms. ***(03)***

1B. Solve the following recurrences:

a) T(n) = 0.5 T(n/2) + 1/n

b) T(n) = 3 T(n/2) + n

c) T(n) = 16 T(n/4) + n ***(03)***

1C. Write iterative and recursive algorithm to find nth power of a given number. Trace the algorithm to find cube of 2. ***(04)***

2A. Define "Abstract Data Structure". Give examples. ***(03)***

2B. What is "Tower of Hanoi" puzzle? Obtain its time complexity. ***(03)***

2C. Write a pseudo-code algorithm to obtain "Huffman code" for given characters and their frequency. ***(04)***

3A. Write pseudo-code algorithms to insert and delete items from a STACK data-structure. Assume array implementation. ***(03)***

3B. Explain the concept of "Binary Search Tree" with a suitable example. ***(03)***

3C. Write a pseudo-code algorithm to search for an item contained in singly linked-list. Find the time complexity of the algorithm. ***(04)***

4A. Define the following terms as applicable to GRAPHS

a) Edge b) Degree C) Path ***(03)***

4B. Write a recursive algorithm to search a graph depth-first wise. Illustrate with a suitable example. ***(04)***

4C. With a suitable example explain "Merge Sort" Algorithm. What is the time complexity of the algorithm? ***(03)***

5A. Using the algorithm to obtain a Fibonacci series, compare time complexities of Divide & Conquer and Dynamic programming techniques. ***(03)***

5B. Explain the concept of graph coloring with suitable example. ***(03)***

5C. What is a "Minimum Spanning Tree"? Illustrate with a suitable example. ***(04)***