Reg. No.									

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent Institution of MAHE, Manipal)

VII SEMESTER B.TECH (ELECTRICAL & ELECTRONICS ENGINEERING)

MAKEUP EXAMINATIONS, DECEMBER 2017

SUBJECT: DATA STRUCTURES & ALGORITHMS [ELE 4018]

REVISED CREDIT SYSTEM

Time: 3 Hours **Date: 26 December 2017** **Max. Marks: 50**

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A Solve the following recurrences: (assume T (0) = T (1) =1)

i) $T(n) = 16T(n/4) + n$
ii) $T(n) = 3T(n/2) + n$
iii) $T(n) = 3T(n/3) + n/2$
iv) $T(n) = T(n-1) + 100$
v) $T(n) = T(n-1) + n$

05

1B Explain the concept of asymptotic notations as applicable to algorithm analysis.

05

2A Write a pseudo code algorithm to find the maximum element and its index in an unsorted array. Also obtain the time complexity for the code.

05

2B Write a pseudo code algorithm to display the contents of an ordinary queue. Also highlight the criteria for implementing a queue data structure.

05

3A With suitable examples compare and define strictly binary search tree and a complete binary search tree?

04

3B Write a pseudo code algorithm to check if a given graph is connected or disconnected. Trace the algorithm for a given graph and obtain the time complexity for the code.

06

4A Write a pseudo code algorithm to return the data in 'n' th node of the linked list.

05

4B Fill a 20ml bottle with the contents shown below, to maximize the value of the bottle.

Item	1	2	3	4	5
Weight	4	8	2	6	1
Cost	Rs 12	Rs 32	Rs 40	Rs 30	Rs 50

05

5A Show how Karatsuba's algorithm improves the time complexity of multiplying two large integers. Trace the algorithm for multiplying 1245 and 0398. **05**

5B Given a set of non-negative integers A = [1, 3, 5, 11], and a value sum W=6, determine and illustrate if there is a subset of the given set with sum equal to given sum. Clearly show all the steps. **05**