MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL IINS III (A constituent unit of MAHE, Manipal)

SIXTH SEMESTER B.Tech. (E & C) DEGREE END SEMESTER EXAMINATION - APRIL/MAY 2018 SUBJECT: DATA STRUCTURE AND ALGORITHMS (ECE - 4024)

TIME: 3 HOURS

MAX. MARKS: 50

Instructions to candidates

- Answer **ALL** questions.
- Missing data may be suitably assumed.
- 1A. Define a STUDENT class with USN, Name and Marks in 3 tests of a subject. Create an array objects for 'n' student using dynamic memory allocation. Using appropriate function, find the average of two better marks for each student. Write a program to display the USN, Name and the average marks of all the students.
- 1B. What is Recursion? Explain with an example.
- 1C. is very useful in situation when data have to be stored and then retrieved in reverse order.

(5+4+1)

- 2A. Write an algorithm and program in C++ to delete an element from the array of size 20.
- 2B. Write an interactive C++ program to implement circular linked list using arrays.
- 2C. The use of pointers to refer elements of a data structure in which elements are logically adjacent is

(5+4+1)

- 3A. Create a class called LIST with member function to insert an element at the front as well as to delete an element from the front of the single linked list and also display the link list details. Write an interactive C++ program to demonstrate all the functions.
- 3B. Write an algorithm to evaluate postfix expression where each operand is expressed as a single digit. Use this algorithm to evaluate the expression: 5 3 2 + 8 * + (operands are in single digit). Show the stack content in each step.
- 3C. A binary search tree is generated by inserting in order the following integers: 50, 15, 62, 5, 20, 58, 91, 3, 8, 37, 60, 24. The number of nodes in the left subtree and right subtree of the root respectively are

(5+4+1)

- 4A. Construct a BST for the input sequence: 20, 10, 5, 1, 7, 15, 30, 25, 35, 32, 40 in the order of the given values for the initial empty tree. How do you construct a threaded binary tree? Using the same, convert the BST drawn by you into the threaded binary tree.
- 4B. Construct an AVL tree with the following values: 15, 20, 24, 10, 13, 7, 30, 36, 25

4C.in Object Oriented Programming is supported by Function overloading and default arguments feature of C++.

(5+4+1)

- 5A. Describe the Binary search algorithm and also implement the same using C++.
- 5B. Describe the following representation of graph data structure with example.
 - a. Adjacency Matrix b. Adjacency List
- 5C. In, search starts at the beginning of the list and checks every element in the list.

(5+4+1)