00002   MCA (Revised) / BCA (Revised)

Term-End Examination

December, 2017

MCS-021(S) : DATA AND FILE STRUCTURES

Time : 3 hours   *Maximum Marks : 100*

(Weightage 75%)

*Note : Question number 1 is **compulsory**. Attempt any **three** questions from the rest. All algorithms should be written nearer to 'C' language.*

1. (a)   Write an algorithm that takes two polynomials as input and displays the sum of the two polynomials.   *10*

   (b)   What is a Circular Queue ? Write the algorithms for adding and deleting elements in/from a circular queue.   *10*

(c) Using Kruskal's algorithm, find the Minimum Cost Spanning Tree (MST) of the graph given below (Figure 1). (Show intermediate steps in the process) *10*
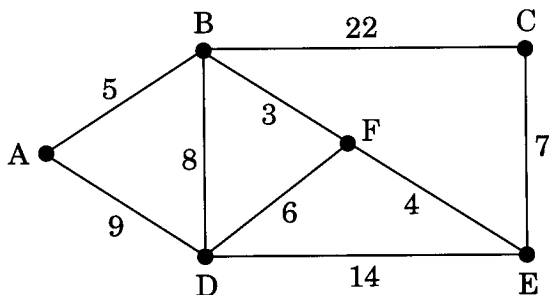

Figure 1

(d) What is a RED-BLACK tree ? Explain the procedure to insert elements in a RED-BLACK tree with the help of an example. *10*

2. (a) Write an algorithm for the implementation of a doubly linked list. *10*

(b) What is an AVL tree ? Explain how a node is inserted in an AVL tree. *10*

3. (a) What is Binary Search ? Write the Binary Search algorithm and find its time complexity. *10*

(b) Explain Quick Sort algorithm and trace the algorithm for the following set of data : *10*

    25, 0, 8, 4, 6, 18, 28

4. (a) What is File Organization ? Briefly explain any two approaches of file organization. Also describe the use of Hashing in file organization. *10*

(b) What is a Graph ? Write/Represent the following graph (Figure 2) in adjacency list representation : *10*
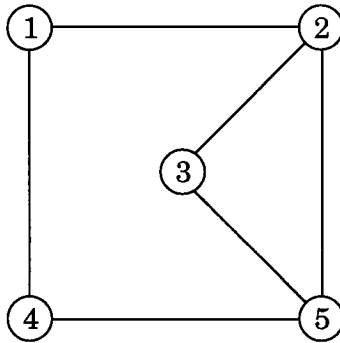

Figure 2

5. (a) Write the Bubble Sort Algorithm. Find its time complexity and sort the following set of data using Bubble Sort : *10*

8, 4, 2, 9, 18

(b) Write an algorithm for inserting an element into a linear array and find its time complexity. *10*