Q.P. Code :06212

[Time: 3 Hours]   [Marks:80]

Please check whether you have got the right question paper.

N.B:
- Questions 1 are compulsory.
- Answer any 3 form the remaining 5 questions.
- Provide illustrations wherever required.

Q.1 A. What is a data structure? Explain and differentiate between the different types of data structures   10
        B. Explain the concept of sorting. Consider the following set of 10 elements   10
           43 12 56 69 21 105 63 72 36 23
           Show the steps to sort the elements using insertion sort showing the passes and write the algorithm.

Q.2 A. What is a heap? Write algorithms for   10
           1. Building a heap
           2. Deleting a heap
        B. Define a B-tree. Given the following set of numbers create a B-tree of order 3   10
           43   10   35   111   44   54   42   76   89   23
           Show the deletion of three numbers form the B-tree

Q.3 A. Define a minimum spanning tree. Explain the Krushkal's algorithm to generate a minimum spanning tree with a suitable example   10
        B. Explain the doubly linked list. For a doubly linked list write algorithms to   10
           1. Find the number of elements in the list
           2. Delete an element in the list

Q.4 A. What is analysis of an algorithm? Explain the various notations used while analyzing an algorithm (Big – O, Ω, θ)   10
        B. What is an expression tree? Construct the expression tree and explain the tree traversals of an expression tree using the following expression.   10
           a / b*(c+d)* e−(a*c)

Q.5 A. Write an algorithm for binary search. For the following array of 10 elements search 167 using binary search. Also trace the steps.   10
           25   62   71   86   92   106   110   134   167   178
        B. Explain the Queue as a data structure. Write algorithms for adding to and deleting an element from the Queue.   10

Q.6 A. What is a Binary search tree? Write algorithms for   10
           a) Finding the minimum element from the Binary search -tree
           b) Inserting an element in the Binary search -tree
        B. Build an AVL tree with the following values: 10
           15, 20, 24, 10, 13, 7, 30, 36, 25
           Remove 24 and 20 from the AVL tree.