QP Code :14605

(3 Hours)   [Total Marks : 80

N.B :   (1) Question no.1 is **compulsory**.
       (2) Attempt any **three** questions out of the remaining **five** questions.
       (3) **Figures** to the **right** indicate **full** marks.
       (4) Make suitable assumptions wherever necessary with justification.

1.   (a)   What is recursion? Write a 'C' program to calculate sum of 'n' natural numbers   5
           using recursion.
    (b)   What is a Mutiway Search Tree. Explain with an example.   5
    (c)   Give ADT for the queue data structure. Discuss in brief any two applications of the   5
           queue data structure.
    (d)   Compare and contrast Quicksort and Radix sort on basis of their advantages and   5
           disadvantages.

2.   (a)   Write a 'C' program to implement a priority queue.   8
    (b)   What are different types of files? Explain various file handling operations in 'C'.   7
    (c)   Explain with examples different techniques to represent the graph data structure on   5
           a computer. Give 'C' language representations for the same.

3.   (a)   Consider the following list of numbers :—   10
           67, 12, 89, 26, 38, 45, 22, 79, 53, 9, 61.
           Sort these numbers using Heap Sort.
    (b)   Write a 'C' program to implement a singly Linked List which supports the following   10
           operations :
           (i)   Insert a node in the beginning
           (ii)   Insert a node in the end
           (iii)   Insert a node after a specific node
           (iv)   Deleting a specific node
           (v)   Displaying the list

4.   (a)   Write a 'C' program to convert a polish notation to reverse polish notation.   10
    (b)   Consider the following list of numbers :   10
           18, 25, 16, 36, 08, 29, 45, 12, 32, 19.
           Create a binary search tree using these numbers and display them in a nondecreasing
           order. Write a 'C' program for the same.

5.   (a)   Discuss how memory allocation for a sparse matrix can be optimized using a linked   15
           list. Write a C-program for the same.
    (b)   Write a function for DFS traversal of graph. Explain its working with an example.   5

6.   (a)   Insert the following elements in AVL tree :   10
           44, 17, 32, 78, 50, 88, 48, 62, 54.
           Explain the different rotations that will be used.
    (b)   Write a 'C' program to search a list using Indexed Sequential Search. What are the   10
           advantages of using Indexed Sequential Search over Sequential Search?