Sem III ... Data Structure

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 using recursion. **5**
(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 queue data structure. **5**
(d) Compare and contrast Quicksort and Radix sort on basis of their advantages and disadvantages. **5**

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 a computer. Give 'C' language representations for the same. **5**

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 operations : **10**
(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 list. Write a C-program for the same. **15**
(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 advantages of using Indexed Sequential Search over Sequential Search? **10**