

Roll No. ....

**24032**

**B. Tech. 3rd Sem. Electronics &  
Communication Engg. (Branch – III)  
Examination – December, 2011**

**DATA STRUCTURE USING 'C'**

**Paper : CSE-201-F**

***Time : Three hours ]***

***[ Maximum Marks : 100***

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

**Note :** Attempt any *five* questions.

1. (a) What do you mean by sparse matrices? Give a suitable data structure that uses minimum storage to efficiently store a sparse matrix in memory. 10
- (b) What is an array ? Discuss the various operations that are allowed on array data structure. Describe the formula for calculating the address of any element of a two dimensional array. 10

2. (a) Write a non recursive algorithm for reversal of a string of integers. 10
- (b) Write a program that takes two linked lists pointed by List-1 and List-2. Write a program that concatenates the two lists in such a manner that the final list is pointed by the pointer called LIST-1 10
3. (a) Describe bubble sort algorithm and trace the steps of bubble sort for sorting the list - 12, 19, 33, 26, 29, 35, 22. Find the total number of comparison made. 10
- (b) What is a deque ? Write a program that implements a deque ? 10
4. (a) Write an algorithm of complexity  $O(n)$  to find the  $k^{\text{th}}$  smallest element in an array  $\text{num}[n]$ , where  $n$  and  $k$  are given as input. 10
- (b) Explain Binary search algorithm and compare it with linear search algorithm. 10

5. (a) Define Heap and heap sort with suitable example.

10

(b) Write a program which counts the number of times a vowel appears in a text file.

10

6. (a) Write quick sort algorithm and derive the expression for its run time complexity in best, average and worst case.

12

(b) What is threaded binary tree? Discuss with the help of examples.

8

7. (a) Draw the directed graph that corresponds to the following adjacency matrix :

	V0	V1	V2	V3
V0	0	1	1	0
V1	0	0	1	1
V2	0	0	0	1
V3	1	0	0	0

Also write down the adjacency list corresponding to the graph.

12

(b) Write an algorithm that inserts an edge into a directed graph represented using a suitable representation ?

8

**8. Write Short notes on any two of the following :      20**

- (i) Applications of sets
- (ii) Data structure for a spell checker
- (iii) Skip Lists

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