

Roll No. ....

Total Pages : 3

MCA/M-13

10201

**DATA STRUCTURES USING 'C'**

Paper-MCA-201

Time Allowed : 3 Hours]

[Maximum Marks : 80

**Note :** Attempt **five** questions in all, selecting at least **one** question from each Unit. Question No. 1 is compulsory.

1. (i) What do you mean by an Array? How an array is represented in computer memory?  
(ii) What do you mean by complexity of algorithms?  
(iii) What is Deque? When it should be used?  
(iv) Distinguish between array and linked list.  
(v) Write applications of Huffman algorithm.  
(vi) Explain any two Hash Functions.  
(vii) Define AVL tree.  
(viii) What is an adjacency matrix? 8×3=24

**UNIT-I**

2. (a) What do you mean by Data Structure? How can you classify data structure? Explain along with various operations that can be applied on data structures. 7  
(b) What is a Sparse matrix? How sparse matrices are stored in computer memory? Explain with the help of an example. 7

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3. (a) Write down a recursive program in C to perform binary search on a given list of numbers. 7  
(b) How strings are stored in computer memory? Write an algorithm to find a pattern from a given text. 7

**UNIT-II**

4. Write a program in 'C' to insert and delete the elements from a one-way linked list. The program must have following options :  
(a) Insert at the beginning of the list  
(b) Insert after a given node  
(c) Delete after a given node  
(d) Display the linked list. 14
5. What do you understand by Stack? How stack can be represented in computer memory? Explain various operations that can take place on a stack using each representation with the help of algorithms. 14

**UNIT-III**

6. (a) Define Binary Tree and Threaded Tree. How can you create a threaded tree? What is the purpose of creating a threaded tree? 7  
(b) Explain the procedure to create a Binary Search Tree. Also explain how to delete an element from a BST. 7
7. (a) What is m-way search tree? Explain the procedure to create m-way search tree. 7  
(b) Write and explain the algorithm to traverse a binary tree using post-order traversal. 7

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#### UNIT-IV

8. (a) Write an algorithm for traversing a Graph using Breadth-first search. Also explain with the help of suitable example. 7  
(b) Explain Radix Sort with the help of suitable example. 7
9. What do you understand by Graph, Multi-graph and Directed graph? Write an algorithm for finding the shortest path in a graph and explain the same with the help of an appropriate example. 14