

Roll No.

Total Pages : 3

MCA-I/M-16

10763

DATA STRUCTURES

Paper : CS-DE-13

Time : Three Hours]

[Maximum Marks : 80

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

Compulsory Question

1. Answer the following questions in brief :

- (a) Discuss few applications of Stack. 16
- (b) Write the formula to calculate address of an element in two-dimensional Array.
- (c) Can a string be stored in an Array ? Discuss.
- (d) Explain the applications of Linked Lists.
- (e) Discuss the limitations of Linear Queue.
- (f) What is a Full binary tree and Complete binary tree?
- (g) What are Directed Graphs?
- (h) Explain Heap Sort.

UNIT-I

2. What do you understand by data structure? How can you classify data structures? Explain major operations that can be applied on data structures. 16

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3. (a) What is a String? Explain various operations that can be performed on strings. 8
- (b) What is a Sparse matrix ? How can you store a sparse matrix using linear array ? Explain. 8

UNIT-II

4. (a) Write an algorithm to search an element from a given linked list. 8
- (b) What is a Queue? Write the algorithms for inserting and deleting an element in a queue. 8
5. (a) Explain Dequeue and Priority Queue. Discuss the applications of priority queue. 6
- (b) What is a Stack? How stack can be represented in computer? Explain various operations that can take place on a stack using each representation with the help of algorithms. 10

UNIT-III

6. (a) Define Recursion. Write a recursive algorithm to find factorial of a number. 8
- (b) Write the algorithm for Quick Sort and explain it with the help of an example. 8
7. (a) Explain various methods of representation of a binary tree along with their advantages and disadvantages. 8
- (b) How do you create a Binary Search Tree? Also explain how to delete an element from a BST. 8

UNIT-IV

8. Write Warshall's algorithm for finding the shortest path in a graph. Explain the algorithm with the help of suitable example. 16
9. (a) Explain selection sort and bubble sort using suitable examples. 10
- (b) Explain Adjacency matrix and Path matrix. 6