

Roll No. ....

Total Pages : 3

**PMCA/M-20**

**10623**

**DATA STRUCTURES**

Paper–CS-DE-13

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. All questions carry equal marks.

**Compulsory Question**

1. Write answer of the following : 2×8=16

- (a) What do you mean by Identity and Triangular matrices?
- (b) State the purpose of substring operation in a string.
- (c) How two-way list is different from one-way linked list?
- (d) State the operations that can be performed on stacks.
- (e) What is recursion?
- (f) Comment on the complexity of heap sort.

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- (g) What is path matrix?
- (h) Name a sorting technique that should be preferred if most of the data in the input list is sorted.

### **UNIT-I**

- 2. (a) What is a data structure? Describe the major operations that can be performed on data structures? How the complexity of an algorithm is calculated? Explain. 8
- (b) Describe the various ways to store string in Computer memory. 8
- 3. (a) How can find the location of a pattern in a given text? Write and explain the algorithm for the same. 8
- (b) Write and explain the algorithms for insertions and deletion of an element in an array. 8

### **UNIT-II**

- 4. Write and explain the insertion and searching algorithm in each type of linked list. 16
- 5. What is meant by dequeue and priority queue? Explain insertions and deletion algorithms in both types of queues. 16

### **UNIT-III**

6. How the tree traversal is performed in a binary tree?  
Write and explain any two algorithms for traversing  
a binary tree. 16
7. What is a Binary search tree? How can you search,  
insert and delete an element in a BST? Explain using  
suitable example. 16

### **UNIT-IV**

8. (a) Write and explain Warshall's algorithm for finding  
the shortest path. 8
- (b) Write and explain the algorithm for DFS in  
graph. 8
9. Write algorithm for sorting the data using merge  
sort. Explain using suitable example. Also discuss  
the complexity of merge sort. 16