

Roll No.

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Total No. of Pages : 02

Total No. of Questions : 09

MCA (2015 Batch) (Sem.-2)

DATA STRUCTURES

Subject Code : MCA-203

Paper ID : [72878]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTIONS-A, B, C & D contains TWO questions each carrying TEN marks each and students has to attempt any ONE question from each SECTION.**
2. **SECTION-E is COMPULSORY consisting of TEN questions carrying TWENTY marks in all.**
3. Use of non-programmable **scientific calculator** is allowed.

SECTION-A

- 1 What is Recursion? What are its merits and demerits? Write and explain an algorithm to create a Fibonacci series using recursion.
- 2 Explain the following :
 - a) Time space complexity
 - b) Types of array and linked list

SECTION-B

- 3 What is AVL tree? How it is different from B-Tree and B+Tree? Write and explain an algorithm to delete a node from B-Tree.
- 4 Write notes on the following :
 - a) Representation of binary tree in memory.
 - b) Procedure to create a binary tree from general tree.

SECTION-C

- 5 What is significance of a graph? What are its different types? Write an algorithm to demonstrate that how a node is created and deleted in a graph.
- 6 Write notes on the following :
 - a) Dijkstra Algorithm
 - b) Representation of Graph in memory

SECTION-D

- 7 Write and explain an algorithm to sort an array using quick sort. Give an example to support your answer.
- 8 What is hashing? Explain different applications of hashing.

SECTION-E

- 9 **Write briefly :**
 - a) What is use of sparse array?
 - b) How is an array represented in memory?
 - c) Why a doubly linked list is more useful than a singly linked list?
 - d) What are various applications of priority queue?
 - e) Write applications of graph.
 - f) What is Stack? How it is different from queue?
 - g) What are uses of binary tree?
 - h) What is use of big-oh notation?
 - i) Write an algorithm to search an item using linear search.
 - j) Write various characteristics of an algorithm.