

Printed pages: 02

Sub Code: RCA 202

Paper Id: 214234

Roll No:

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MCA
(SEM II) THEORY EXAMINATION 2018-19
DATA STRUCTURES

Time: 3 Hours**Total Marks: 70**

- Note:** 1. Attempt all Sections. If require any missing data; then choose suitably.
2. Any special paper specific instruction.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14
- What is a sparse matrix? Also give its important properties.
 - Discuss the differences between Array and lists.
 - Write two applications of Linked Lists.
 - Explain a method to store a graph in computer.
 - Explain Complete Binary Tree and Extended Binary Tree.
 - Differentiate between directed and Undirected graph.
 - Explain Garbage Collection with example.

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21
- What do you understand by complexity of an algorithm? Describe the different notations used to describe the asymptotic running time of an algorithm.
 - How a linked list can be used to represent a polynomial $5x^3 + 4x^2 + 3x + 2$? Give an algorithm to perform addition of two polynomials using linked list.
 - What is AVL tree? Explain the balancing methods of AVL trees with an example.
 - Compare Linear search and Binary search algorithms with examples with their complexities.
 - Describe the minimum cost spanning tree with suitable example.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7
- Define Stack. Convert the expression **infix to prefix** using stack:
 $A*(B+D)/E-F*(G+H/K)$.
 - What is the Tower of Hanoi problem? Explain the solutions of the Tower of Hanoi problem where the numbers of disks are 3 and numbers of pages are 3.
4. Attempt any *one* part of the following: 7 x 1 = 7
- Explain circular queue and Double ended queue with example.
 - Give an algorithm to perform following operations in a singly linked list.
 - Insert a new node after a given node.
 - Delete last node.

5. **Attempt any *one* part of the following:** **7 x 1 = 7**
- (a) How records are organized into blocks? Discuss any one method for the same with an example.
 - (b) What is threaded binary tree? Explain the operation of threaded binary tree.
6. **Attempt any *one* part of the following:** **7 x 1 = 7**
- (a) Write algorithm for Insertion sort. Also illustrate insertion sort with an example.
 - (b) Write an algorithm for heap sort technique. Illustrate with an example.
7. **Attempt any *one* part of the following:** **7 x 1 = 7**
- (a) Define hashing. What are the properties of a good hash function? With necessary examples explain four different hashing techniques.
 - (b) Write a note on the following: (i) B+ tree. (ii) Internal sorting.

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