Printed pages: 02 **Sub Code: CA 204**

Paper Id: **214204** **Roll No:** | | | | | | | | | | |

MCA

(SEM II) THEORY EXAMINATION 2018-19

DATA STRUCTURES AND FILE HANDLING

Time: 3 Hours ***Total Marks: 100***

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 x10 = 20

a. Explain the different ways of analyzing algorithm.
b. `
c. Define sparse matrix.
d. What is the Tower of Hanoi problem?
e. Define Dequeue and priority queue.
f. What is binary search tree? Define its property.
g. Compare B tree and B^+ tree.
h. Define Graph. List some applications of the graph.
i. Explain Cycle and Hamilton cycle in graph.
j. Differentiate between Array and Lists.

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

a. Define Data structure and also write down the primitive and non-primitive data structure in detail with examples.
b. Why circular queues are better than simple queue? Write an algorithm to insert and delete an item from the circular queue.
c. Define quick sort. Illustrate the quick sort algorithm with a suitable example.
d. Define Hash function. Explain Collision resolution strategies. How collision is resolved using separate chaining concept?
e. Write and explain the breadth first search and depth first search traversal algorithm. What are their complexities?

SECTION C

3. Attempt any *one* part of the following: 10 x 1= 10

(a) Discuss solutions of the Tower of Hanoi problem where the numbers of disks are 3 and numbers of pegs/rods are 3. Also write its algorithm.

(b) Write an algorithm for binary search and discuss its speed compared with linear search.

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) What is doubly linked list? Write an algorithm to add an element in the doubly linked list before the given element.

(b) Discuss Huffman's algorithm with example.

5. Attempt any *one* parts of the following: 10 x 1 = 10

(a) What is threaded binary tree? Explain the important types of threaded binary tree.

(b) The pre-order and in-order traversal of binary tree is given below, construct the tree:

preorder:-FAEKCDHGB
in-order:-EACKFHDBG

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) What is searching and sorting? Write an algorithm for linear search and binary search.

(b) Write the algorithm for the merge sort. Explain its complexities, sort the following elements using merge sort:
75,10,20,70,80,90,100,40,30,50

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Define spanning tree. Describe the Dijikstra's algorithm for finding shortest path with the help of suitable example.

(b) What is compaction and garbage collection? What are the different techniques of garbage collection?