Printed pages: 02 **Sub Code:NMCA213**

Paper Id: **214221** **Roll No:** | | | | | | | | | | |

MCA

(SEM II) THEORY EXAMINATION 2018-19

DATA STRUCTURE USING C

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. Define asymptotic notations.
b. Define sparse matrix.
c. Explain Garbage Collection and Compaction with example.
d. Define recursion. Explain the function of recursion.
e. Define Priority Queue.
f. What are the operations perform on data structures.
g. Explain Cycle and Hamilton cycle in graph.
h. Differentiate between Binary Tree and complete Binary Tree.
i. What is graph? List the various representations of graph?
j. Define PUSH and POP operations in stack.

SECTION B

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

a. What do you mean by Data Structures? Explain linear and non- linear data structures with example.
b. Write an algorithm and or a C function to reverse a single linked list.
c. Write a short note on Huffman algorithm explaining various steps with example.
d. What is AVL tree? Explain the balancing methods of AVL trees with an example.
e. Explain the Kruskal's algorithm to find out minimum cost spanning tree with an example.

SECTION C

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

(a) Each element of an array Data [20][50] requires 4 bytes of storage. Base address of data is 2000. Determine the location of Data [10][10] when the array is stored as
(i) Row major
(ii) Column major

(b) Write an algorithm to evaluate postfix expression using stack. And also evaluate following postfix expression by using stack:

6 2 3 + - 3 8 2 / + * 2 ↑ 3 +

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

(a) Define Queue also write the algorithm for insertion and deletion of element in a Queue.

(b) How a polynomial equation can be represented through link list? Explain the method to add two given polynomial equations using link list.

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

(a) What is Threaded Binary Tree? Explain the advantages and disadvantages of using this Tree.

(b) Define Hash function. Explain Collision resolution strategies.

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

(a) What is binary search tree? Write an algorithm to implement for recursive search or iterative search for a binary search tree.

(b) Write the algorithm for quick sort. Using quick sort algorithm to sort following elements.

36,15,40,1,60,20,55,25,50,20 .

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

(a) Write the difference between a B-tree and B^+tree. When you might prefer to use B^+ tree instead of a B-tree?

(b) Briefly explain basic operations that can be performed on a file. Explain indexed and sequential file organization.