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Printed Pages: 02 **Sub Code: NMCA 213**

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MCA

(SEM II) THEORY EXAMINATION 2017-18

Data Structure Using C

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

Note: Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

a. Compare Primitive and non-primitive data structure with example.
b. Define stack and queue with proper example.
c. Write an algorithm to transpose a matrix.
d. Define graph, connected-graph and planer graph.
e. Define non-lineardata structure? List the basic operations carried out in a linked list.
f. Write C code to find the factorial of a given number using iterative method.
g. Define some primitive data types.
h. Write a short note on balanced binary tree.
i. Discuss space and time complexity of insertion sorting.
j. Write the time complexity of quick sort.

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SECTION B

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

a. Define Data structure. What is the role of data structure in computer science? Explain.
b. Define recursion. When it is Good and Bad,explain with suitable example.
c. Define priority queue data structure. Write the algorithms for insertion and deletion operation.
d. What is stack? What are its applications? Reverse the string with the help of stack.
e. Write a C code to findthe multiplication of two matrix A_{3x3} and B_{3x3}. Also fine its time complexity

SECTION C

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

(a) Illustrate the execution of INSERTION-SORT on the array.

A = <16,4,13,5,2,10,30,17,6>

(b) Write an algorithm to sort a list of n items using Merge sort method. Illustrate your algorithm with an example.

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

(a) What is a Data Structure? What are the factors that influence the choice of a particular data structure?

(b) Differentiate Between Iteration & Recursion using suitable example.

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

(a) Write an Algorithm to convert the Infix Expression to Postfix Expression.

(b) Convert the following infix expression into prefix expression:
((8+9)*5+(1*(2+3)*7)+12).

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

(a) Write a procedure SORT, which sorts a linked list without changing any value in information field of the node.

(b) Suppose a linked list consists some numeric values. Design an algorithm to find maximum value in the list.

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

(a) Define the inorder traversing. Write an algorithm/program for inorder traversing method.

(b) What is Sparse matrix? How sparse matrices could be represented in memory efficiently?

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