Roll No. : .....

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67008–N

MCA 1st Semester (Regular) Examination, March–2022

(MCA 2 Year Programme)

(w.e.f. 2020-21)

Paper–20MCA21C5

ADVANCE DATA STRUCTURES USING C++/JAVA

Time : Three Hours] *[Maximum Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note :– Attempt *five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) What is Divide and Conquer method ?
   (b) What are minimal spanning tree ?
   (c) What do you mean by Recurrences ?
   (d) What is threaded binary tree ?

(e) What are Euler graphs ?

(f) What do you mean by non-deterministic algorithms ?

(g) What is Prim's algorithm ?

(h) What is topological sort ? 2×8=16

Unit-I

2. (a) What do you mean by complexity of algorithms ? What is the importance of algorithm and data structure in computer science ? Explain.

(b) What is Strassen's method ? How is it significant ? Illustrate. 8,8

3. Explain the following :

(a) Recurrence Tree Method

(b) Substitution Method 8,8

Unit-II

4. (a) What is binary search ? Determine its complexity and write down an algorithm for binary search technique.

(b) What are AVL trees ? What are their applications ? How are these implemented ? Illustrate. 8,8

5. Explain the following :

(a) B-tree and their implementation using C++/Java

(b) Concept of heap and heap operations 8,8

Unit-III

6. (a) What is a spanning tree ? How Kruskal's algorithm results in a minimum-cost spanning tree ? Illustrate.

(b) How is DFS traversal different from BFS traversal ? Discuss their pros and cons. 8,8

7. Explain the following :

(a) Ford-Fulkerson algorithm

(b) Max flow-Min cut theorem 8,8

Unit-IV

8. (a) What is 0/1 Knapsack problem ? How Greedy method can be applied to solve the Knapsack problem ? Justify.

(b) What is Knuth-Morris-Pratt algorithm ? How is it significant ? Explain. 8,8

9. Explain the following :

(a) NP Complete problems

(b) 8-Queens problem 8,8