Roll No. : .....

Total No. of Questions : **9**] [Total No. of Pages : **4**

67008-N

M.C.A. 1st Semester (Regular)
(Two Year Programme)
Examination, April-2021
(w.e.f. 2020-21)

ADVANCED DATA STRUCTURES USING C++/JAVA

Paper-20MCA21C5

*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. Question No. **1** is compulsory. All questions carry equal marks.

1. (a) What is Dijkstra's algorithm ?
   (b) What is 8-Queens problem ?
   (c) What do you mean by Non-deterministic algorithms ?
   (d) What is Divide and Conquer method ?
   (e) What is Skew Heap ?
   (f) What do you mean by Recurrences ?
   (g) What are Euler graphs ?
   (h) What is DFS traversal ? 2×8=16

Unit–I 16 each

2. (a) What is Substitution Method ? How is it significant ? Illustrate.
   (b) What do you mean by Complexity of Algorithms ? What is the importance of algorithm and data structure in computer sciences ? Explain.
3. Explain the following :
   (a) Master Method
   (b) Recurrence Tree Method

Unit–II 16 each

4. (a) What are AVL Trees ? What are their applications ? How are these implemented ? Illustrate.

(b) What is Binary Search ? Determine its complexity and write down an algorithm for binary search technique.

5. Explain the following :

(a) Splay tree and their implementation

(b) Threaded binary tree

Unit–III 16 each

6. (a) What are Kruskal's algorithms ? How these results in a minimum cost-spanning tree ? Illustrate.

(b) What is Max flow-Min cut theorem ? How is it relevant ? Illustrate.

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

7. Explain the following :

(a) Prim's algorithm and its relevance

(b) Ford-Fulkerson algorithm

Unit–IV 16 each

8. (a) What is Dynamic Programming ? How is it different from greedy methods ? Which techniques contribute to dynamic programming ? Explain.

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

9. Explain the following :

(a) Knuth-Morris-Pratt algorithm

(b) NP Complete problems

(c) 8-Queens problem