

11. What is an AVL tree ? Explain the insertion and deletion operation with example.
12. Explain the concept of Big-O notation and its significance in algorithm analysis.
13. Explain the principles behind divide and conquer algorithms. Provide examples of problems that can be solved using this approach.

**MSCCS-07/MSCCS-201/
MSCCSC-201/MCA-201**

**December – Examination 2023
MSCCS (Final)/MCA (IInd Year)
Examination
DATA STRUCTURE AND ALGORITHM
Paper : MSCCS-07/MSCCS-201/MSCCSC-
201/MCA-201**

Time : 3 Hours]

[Maximum Marks : 100

Note :- The question paper is divided into three Sections A, B and C. Write answers as per the given instructions.

Section–A

10×2=20

(Very Short Answer Type Questions)

Note :- Answer all questions. As per the nature of the question delimit your answer in one word, one sentence or maximum up to **30** words. Each question carries 2 marks.

1. (i) Define the degree of a vertex.

- (ii) What is meant by the term sparse matrix ?
- (iii) What is linked list ?
- (iv) What is the purpose of a stack ?
- (v) Differentiate between breadth-first search (BFS) and depth-first search (DFS).
- (vi) Define Binary Search Tree.
- (vii) Briefly explain time complexity.
- (viii) What is an array ?
- (ix) What is an algorithm ?
- (x) What is a connected graph ?

Section-B **4×10=40**

(Short Answer Type Questions)

Note :- Answer any *four* questions. Each answer should not exceed **200** words. Each question carries 10 marks.

- 2. Explain the basic operations on stack.
- 3. What is B tree ? Explain with example.
- 4. Explain the Prim's Algorithm with example.
- 5. Define the heap. Explain heap sort.

- 6. Define the term 'recursion' in the context of algorithms. Provide an example of a problem that can be solved using recursion.
- 7. What is the difference between an array and a linked list ? Provide a brief explanation and one advantage of each.
- 8. What is the difference between a greedy algorithm and a dynamic programming approach ? Provide examples of problems suited for each.
- 9. Describe the process of balancing a binary search tree. Why is it important and what are the consequences of having an unbalanced tree ?

Section-C **2×20=40**

(Long Answer Type Questions)

Note :- Answer any *two* questions. You have to delimit your each answer maximum up to **500** words. Each question carries 20 marks.

- 10. Describe *three* main methods of tree traversal with example.