

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
 (AUTONOMOUS)

**MCA I Year II Semester Regular & Supplementary Examinations June/July-2025**  
**DATASTRUCTURES**

**Time: 3 Hours****Max. Marks: 60**(Answer all Five Units  $5 \times 12 = 60$  Marks)

**UNIT-1**

1. a) What is an Array? Explain the representation of an array. [6M]  
 b) Apply various operations that can perform on array. [6M]

**OR**

2. a) Explain Linear and Non Linear Data structure with examples [6M]  
 b) Differentiate linear and non -linear data structure . [6M]

**UNIT-2**

3. Develop various queue operations using arrays. With example [12M]

**OR**

4. a) What is linked list? What are the different types of linked list? [6M]  
 b) Explain the advantages of linked list over arrays. [6M]

**UNIT-3**

5. a) Prepare an algorithm to insert an element into B+ Tree. [6M]  
 b) Prepare an algorithm to delete an element in B + Tree. [6M]

**OR**

6. a) Analyze the steps to insert elements into Binary Search Tree. [6M]  
 b) Analyze the steps to search element in Binary Search Tree. [6M]

**UNIT-4**

7. a) Prepare an algorithm for Quick sort with example. [6M]  
 b) Prepare an algorithm for Merge sort with example. [6M]

**OR**

8. a) Explain bubble sort with an algorithm and example. [5M]

b) Design a program to demonstrate bubble sort.

[7M]

**UNIT-5**

9. Explain about shortest path problem with an algorithm and example.

[12M]

**OR**

10. a) Discuss BFS Graph Traversal with an algorithm.

[3M]

b) Explain BFS Graph traversal with steps for the following Graph .

[9M]