

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM
I B. Tech II Semester Supplementary Examinations January-2025
DATA STRUCTURES

(Common to CSE, IT, CSE(DS), CSE(AI), CSE(CS), CSE(AI&ML), AI&DS, AI&ML)

Time: 3 hours

Max. Marks:

70

Question paper consists of Part A & Part B.
Part A is compulsory, Answer all questions.
In Part B, Answer any one question from each unit.

PART-A

(20 Marks)

- 1 a) Write the algorithm for bubble sort? [2]
- b) Define linear data structures and list types of linear data structures. [2]
- c) Explain malloc() function. [2]
- d) List any two applications of linked list. [2]
- e) What are the primary operations of a stack? [2]
- f) Difference between stack overflow and stack under flow. [2]
- g) What is the primary advantage of using a circular queue over a linear queue? [2]
- h) What is the key difference between queue and double ended queue? [2]
- i) List tree traversal techniques? [2]
- j) Describe collision in hash table construction? [2]

PART-B

(50 Marks)

Unit-1

- 2 a) Explain the algorithm for selection sort. Highlight its time complexity for best, worst, and average cases. [5]
 - b) Demonstrate binary search algorithm. [5]
- (OR)
- 3 a) What is Abstract Data Types (ADTs)? Explain their implementation with an example. [5]
 - b) Describe time complexity with example algorithm. [5]

Unit-2

- 4 a) Create a single linked list and display the content of created linked list. [5]
b) Distinguish between arrays and linked list. [5]

(OR)

- 5 a) Create a double linked list and display the content of double linked list. [5]
b) Write an algorithm to reverse the single linked list. [5]

Unit-3

- 6 a) Demonstrate basic operations of the stack. [5]
b) Construct an algorithm to convert infix expression to postfix expression. [5]

(OR)

- 7 a) Explain the differences between implementing a stack using an array and a linked list. Highlight the advantages and disadvantages of each approach. [5]
b) Explain how backtracking can use the stacks. [5]

Unit-4

- 8 a) Construct a C program to implement a queue using arrays, including enqueue, dequeue, and display operations. [5]
b) Describe the double ended queues. [5]

(OR)

- 9 a) Demonstrate circular queue with neat diagram. [5]
b) Discuss the role of queues in Breadth-First Search (BFS). Provide an algorithm and explain with an example. [5]

Unit-5

- 10 a) Construct a binary search tree with the following data [5]
47,12,75,88,90,73,57,85,50,62
b) Explain delete operation in binary search tree with example. [5]

(OR)

- 11 a) Illustrate any four types of hash functions with examples. [5]
b) Construct a hash table whose keys in order are 7, 24, 18, 52, 36, 54, 11, and 23 into a hash table of size 9 using $h(k) = 2k+3 \text{ mod } m$. [5]
