

Code No: MC2014/20

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY- GURAJADA VIZIANAGARAM
MCA I Semester (R20) Regular/Supple Examinations-January-2025

DATA STRUCTURES

Time: 3 Hours

Max. Marks: 70

Question Paper consists of FIVE units, each carrying 14 marks
Each unit has TWO questions; either of them should be answered
All parts of a question must be answered at one place.

UNIT-I

1. a) Explain the concept of constants and variables in C with examples. 7M
- b) Write a C program to find the largest and smallest numbers in an array. 7M

(OR)

2. a) Discuss branching and looping in C with examples for if-else and while constructs. 7M
- b) Write a program to reverse the elements of an array using loops in C. 7M

UNIT-II

3. a) Explain the difference between call by value and call by reference with examples. 7M
- b) Write a program to demonstrate the use of pointers to access and modify array elements. 7M

(OR)

4. a) Describe the concept of file handling in C. Write a program to read and write data to a file. 7M
- b) Explain structures and unions in C with suitable examples. 7M

UNIT-III

5. a) Define recursion. Write a recursive function to calculate the factorial of a number. 7M
- b) Explain the difference between singly linked list and doubly linked list. Write a program to implement a singly linked list with insertion operation. 7M

(OR)

6. a) What is algorithm complexity? Explain its significance in data structures. 7M
- b) Write a program to delete a node from a circular linked list. 7M

UNIT-IV

7. a) Explain the array and linked representations of a stack. Write a program to implement a stack using an array. 7M
- b) What are hash functions? Explain collision resolution techniques like separate chaining and linear probing. 7M

(OR)

8. a) Describe the operations on a queue. Write a program to implement a circular queue using an array. 7M
- b) Explain extendible hashing with a suitable example. 7M

UNIT-V

9. a) Write the algorithm for quicksort and explain its complexity. 7M
- b) Define binary tree traversal. Write a program to implement in-order, pre-order, and post-order traversal of a binary tree. 7M

(OR)

10. a) Explain the concept of binary search trees (BST). Write a program to insert and search elements in a BST. 7M
- b) Compare merge sort and selection sort with respect to their time complexity and applications. 7M