Roll.No. 21UCSCT3004

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai - 600 044.
B.Sc.Computer Science - END SEMESTER EXAMINATIONS - NOVEMBER 2025
SEMESTER - III
**21UCSCT3004 - Data Structures and Algorithms**

Total Duration : 2 Hrs.30 Mins. Total Marks : 60

## Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. Define a data structure and explain the difference between primitive and composite data types.
2. Classify and explain the various types of binary trees.
3. Implement a simple program to demonstrate the working of a Map.
4. Define an algorithm. List and explain the characteristics of a good algorithm
5. Illustrate the operations of a stack with an example.
6. Construct a Binary Search Tree (BST) for the following keys: 45, 30, 60, 25, 35,50, 70.
7. Illustrate the concept of hash tables with an example.
8. What is asymptotic analysis? Assess the significance of Big-O notation.

## Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Discuss the application of recursion. Also Write a recursive function to compute the factorial of a number.
10. Compare and contrast between singly and doubly linked lists with suitable examples.
11. Evaluate the process of an inserting and deleting a node from a BST with an example.
12. Evaluate the performance of Breadth-First Search (BFS) and Depth-First Search (DFS) for graph traversal.
13. Differentiate between Merge Sort and Quick Sort in terms of their functionality,time and space complexities.

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