F–6092	Sub. Code
	7BCE3C1

B.Sc. DEGREE EXAMINATION, NOVEMBER 2021.

Third Semester

Computer Science

DATA STRUCTURES AND COMPUTER ALGORITHMS

(CBCS – 2017 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A $(10 \times 2 = 20)$

Answer **all** questions.

1. Define data structure. Give an example.

2. Give an example for single and two dimensional arrays.

3. Give an application for stack and queue.

4. Draw a circular queue and list the advantage of circular queue.

5. Differentiate tree and binary tree.

6. Draw an expression tree and state its advantage.

7. Define the terms Finiteness and Definiteness with respect to an algorithm.

8. State the time complexity of merge sort and quick sort.

9. Define Connected graph and give an example.

10. State the objective function and the constraints involved in knapsack problem.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain insertion and deletion in single linked list

Or

(b) Explain how to perform search and reversal in a doubly linked list.

12. (a) Explain how stack can be implemented using arrays and linked list.

Or

(b) Explain insertion and deletion operations on queue with suitable example.

13. (a) Explain how the Inorder successor can be found in a Threaded binary tree.

Or

(b) Construct the binary tree from the following preorder and inorder traversal sequence: Preorder: ABCDEF Inorder: CBAEDF.

14. (a) Sort the following set of elements using merge sort. Provide stepwise explanation. 12, 24, 8, 71, 4, 23, 6, 80.

Or

(b) Write an algorithm that performs binary search. Analyse the algorithm with respect to space and time complexity

15. (a) Explain Kruskal algorithm with an example.

Or

(b) Explain the graph traversal techniques with example.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Explain with example how insertion and deletion can be performed on a circular linked list under the following three conditions.

    (a) Element is to be inserted/deleted at the beginning

    (b) Element is to be inserted/deleted before a particular element

    (c) Element is to be inserted/deleted at the end.

17. Write the algorithm to convert infix to postfix expression using stacks. Explain with an example.

18. Explain the various ways of representing a binary tree and explain the various tree traversal techniques.

19. Explain Strassen's Matrix multiplication and mention its advantage.

20. Apply Dijsktra's algorithm for the following graph and find the shortest path from vertex 1 to all other vertices.