

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER– III EXAMINATION – SUMMER 2026****Subject Code:3134201****Date:17-06-2026****Subject Name:Data Structures and Algorithms****Time:02:30 PM TO 05:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

**Marks**

- Q.1** (a) Arrange the following growth rates in increasing order:  $2^n$ ,  $n^2$ ,  $n^{1/2}$ ,  $n \log n$ . **03**
- (b) Differentiate between arrays and linked lists. **04**
- (c) Explain all asymptotic notations used in algorithm analysis. **07**
- Q.2** (a) Why do we need to solve the recurrence relation? **03**
- (b) Explain bubble sort with example. **04**
- (c) Convert the following infix expression into postfix format showing stack status after every step in tabular form. **07**  
 $(A + B^C * D) * (E + F / G)$
- OR**
- (c) Write algorithm to insert and delete elements in circular queue. **07**
- Q.3** (a) Explain the structure of Circular linked list. **03**
- (b) What is the difference between DFS and BFS? **04**
- (c) Apply the merge sort algorithm for the following data and show the steps. **07**  
67, 32, 41, 23, 56, 89, 8, 82, 22, 51, 44, 77
- OR**
- Q.3** (a) Define 1) Degree of a node 2) Complete binary tree 3) Forest. **03**
- (b) Write a brief note on AVL Tree. **04**
- (c) Write user defined 'C' function to insert and delete the first and last node in singly linked list. **07**
- Q.4** (a) Explain double hashing in brief. **03**
- (b) Explain multiplication of two large integer numbers with example. **04**
- (c) Write an algorithm for Quick sort and explain with example. **07**
- OR**
- Q.4** (a) What is Collision in Hashing? List the qualities of a good Hash function. **03**
- (b) Explain Prim's algorithm. **04**
- (c) What is a binary search tree? Write an algorithm for Inorder, Preorder and Postorder traversals. **07**
- Q.5** (a) What is Traveling Salesman Problem? **03**
- (b) Give difference between Greedy approach and Dynamic approach. **04**
- (c) Explain knapsack problem using dynamic programming approach with suitable example. **07**
- OR**
- Q.5** (a) Explain Job Scheduling Problem. **03**
- (b) Explain the backtracking concept and apply the same to the 4-queen problem. **04**
- (c) Solve Making change problem using dynamic technique.  $d1=1$ ,  $d2=5$ ,  $d3=8$ . Calculate for making change of Rs. 9. **07**

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