

GUJARAT TECHNOLOGICAL UNIVERSITY
BACHELOR OF ENGINEERING – SEMESTER 3 – EXAMINATION – SUMMER 2026

Subject Code: BE03000081

Date: 22/06/2026

Subject Name: DATA STRUCTURES

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.**

- Q.1** (a) Differentiate between Linear and Non-Linear Data Structures. **03**
(b) Explain storage representation of Primitive and Non Primitive Data Structures . **04**
(c) Convert the following expression to postfix using stack. Show each step clearly **07**
((A-B)+D/((E+F)*G))
- Q.2** (a) Differentiate Array and Linked lists. **03**
(b) Explain the memory representation of a one-dimensional and two-dimensional array with examples. **04**
(c) Write an algorithm for the following stack operations. 1) PUSH 2) POP 3) DISPLAY **07**
- OR
- Q.2** (c) What is queue? Explain operations on queue in detail. **07**
- Q.3** (a) Explain Circular queue in detail. **03**
(b) Write Algorithm to insert new node after given location in singly linked list. **04**
(c) Write an algorithm to delete a node from a binary search tree. **07**
- OR
- Q.3** (a) Construct a binary tree from the traversals given below: **03**
Inorder: D, B, A, E, G, C, H, F, I
Preorder: A, B, D, C, E, G, F, H, I
(b) What is a graph? Explain various representations of graphs. **04**
(c) What is doubly linked list? Write Algorithm for insertion and deletion in doubly linked list. **07**
- Q.4** (a) Define the following: 1. Binary Search Tree 2. Complete Binary Tree 3. Complete Graph **03**
(b) Differentiate: BFS and DFS. **04**
(c) Explain Kruskal's algorithm with suitable example. **07**
- OR
- Q.4** (a) Search the number 50 from the given data using binary search technique. Illustrate the searching process. 10, 14, 20, 39, 41, 45, 49, 50, 60 **03**
(b) Explain Conversion of General Trees To Binary Trees with example. **04**
(c) Explain Prim's algorithm with suitable example. **07**
- Q.5** (a) Compare linear search and binary search in terms of their time complexity. **03**
(b) Write an algorithm to sort an array using insertion sort method. **04**
(c) Describe various collision resolution techniques in hashing. **07**

OR

- | | | |
|------------|---|-----------|
| Q.5 | (a) Explain Sequential file organizations and list its advantages and disadvantages. | 03 |
| | (b) What is hashing? Explain any two hash functions in detail. | 04 |
| | (c) Write an algorithm for merge sort. | 07 |
