

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– III(OLD) EXAMINATION – WINTER 2022****Subject Code:130702****Date:22-02-2023****Subject Name:Data and File 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) Explain Time and Space analysis of algorithms. **07**  
 (b) Explain Linear and Non-Linear Data Structures. **07**

- Q.2** (a) Give the applications of Stack, Queue and Linked Lists **07**  
 (b) Explain recursion with the example of Tower of Hanoi problem. **07**

**OR**

- (b) Convert the expression  $a + b * c / d ^ e + 7 * 8$  to reverse polish notation. **07**

- Q.3** (a) (1) Consider the status of following doubly ended queue. What will be the state of this queue and F, R after all the operation in sequence? **03**

5	8	2	-	-
F		R		

1. Insert 7 and delete one element.
2. Insert 3.
3. Insert 4.
4. Insert 9 and delete one element.

- (2) Explain the Insert operations on Doubly Linked Lists. **04**

- (b) Explain the linked implementation of Stack with example. **07**

**OR**

- Q.3** (a) (1) Give an example of C representation of Linked Lists. **03**

- (2) List the differences between Graphs and Trees. **04**

- (b) What are AVL trees? Construct an AVL tree by inserting following integers step by step. **07**

88, 77, 22, 11, 55, 66, 33, 44

- Q.4** (a) (1) Define Terminal Node, Forest and Sibling Node. **03**

- (2) Explain the Linked list representation of binary tree. **04**

- (b) Explain threaded binary tree with example and justify its performance advantage over normal binary trees. **07**

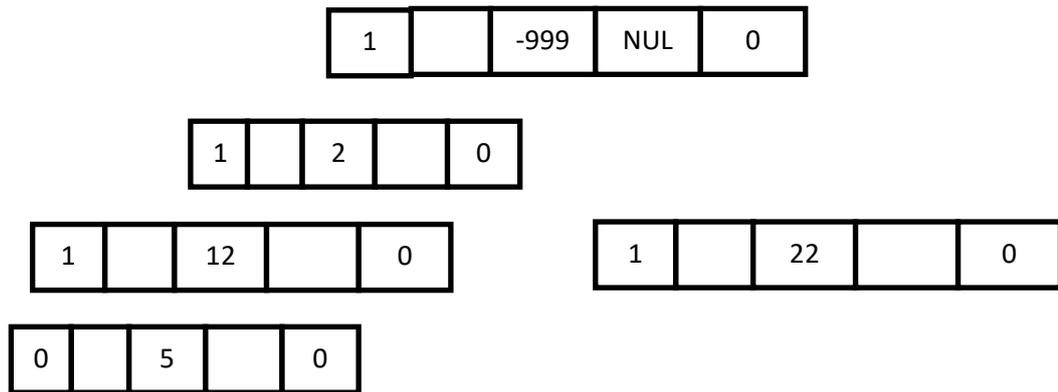
**OR**

- Q.4** (a) (1) Define Complete Graph, Connected Graph and Multi-Graph. **03**

- (2) Explain the adjacency list representation of a graph. **04**

- (b) Perform the B-tree insertion on following values. Consider the insertion on a B-Tree of degree 4. The values are as follows: 9, 8, 1, 5, 11, 13, 7, 3, 9, 8, 20, 19 **07**

- Q.5** (a) Explain in brief the Hashing functions. **07**  
 (b) Make the following tree a threaded binary tree. **07**



**OR**

- Q.5** (a) Explain Collision resolution techniques. **07**  
 (b) What is MST? Perform Prims algorithm to find MST on following graph. **07**

