

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER– III EXAMINATION – SUMMER 2020****Subject Code: 3130702****Date: 27/10/2020****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.

		Marks
<b>Q.1</b>	(a) Differentiate between data types and data structures.	<b>03</b>
	(b) Answer the followings:	<b>04</b>
	(1) Give examples of Linear and Non-Linear Data Structures.	
	(2) What do you mean by Abstract Data Types?	
	(c) Discuss and write a program to implement queue functions using arrays.	<b>07</b>
<b>Q.2</b>	(a) Distinguish between stack and queue.	<b>03</b>
	(b) What is top of stack? Why stack is called LIFO list?	<b>04</b>
	(c) What is a circular queue? How do you check the queue full condition? Write an algorithm to count the nodes in a circular queue.	<b>07</b>
<b>OR</b>		
	(c) Explain creation, insertion and deletion of doubly linked list with example.	<b>07</b>
<b>Q.3</b>	(a) What are binary trees? Mention different types of binary trees with example.	<b>03</b>
	(b) What is a graph? Explain various representations of graphs.	<b>04</b>
	(c) Write an algorithm to add a node into a binary search tree.	<b>07</b>
<b>OR</b>		
<b>Q.3</b>	(a) What is B -tree of order m? Draw a B-tree of order 3.	<b>03</b>
	(b) Construct a binary tree having the following traversal sequences: Preorder traversal A B C D E F G H I Inorder traversal B C A E D G H F I	<b>04</b>
	(c) Discuss algorithm of Breadth First Search (BFS) traversal for a Graph. Explain with an example.	<b>07</b>
<b>Q.4</b>	(a) Explain Sequential file organizations and list its advantages and disadvantages.	<b>03</b>
	(b) How access of record is performed in multi key file organization?	<b>04</b>

- (c) Describe various collision resolution techniques in hashing. **07**

**OR**

- Q.4** (a) Explain indexed sequential file structure. **03**  
(b) Explain minimal spanning tree. **04**  
(c) What is hashing? What are the qualities of a good hash function? Explain any two hash functions in detail. **07**

- Q.5** (a) Define topological sort? **03**  
(b) Compare sequential searching with binary searching in detail. **04**  
(c) Examine the algorithm for Insertion sort and sort the following array: 77, 33, 44, 11, 88, 22, 66, 55 **07**

**OR**

- Q.5** (a) What do you mean by internal and external sorting? **03**  
(b) Write an algorithm for quick sort. **04**  
(c) What is Binary Search Tree? Construct a binary search tree for the following elements **07**  
21, 16, 24, 18, 22, 25, 26, 27, 29, 33