

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-III (NEW) EXAMINATION – WINTER 2020****Subject Code:3130702****Date:10/03/2021****Subject Name:Data Structures****Time:10:30 AM TO 12:30 PM****Total Marks:56****Instructions:**

1. Attempt any **FOUR** questions out of **EIGHT** questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		<b>Marks</b>
<b>Q.1</b>	(a) Compare array and linked list.	<b>03</b>
	(b) Compare primitive and non primitive data types. datastructures	<b>04</b>
	(c) Write an algorithm to perform insert and delete operations on simple queue.	<b>07</b>
<b>Q.2</b>	(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	<b>03</b>
	(b) Apply merge sort algorithm to the following elements. 20, 10, 5, 15, 25, 30, 50, 35	<b>04</b>
	(c) Write a 'C' program for bubble sort.	<b>07</b>
<b>Q.3</b>	(a) What is stack? Why do we use multiple stacks?	<b>03</b>
	(b) Convert the following infix expressions to their prefix and postfix equivalents. 1. $A*B+C/D$ 2. $(A*B)+(C/D)-(D+E)$	<b>04</b>
	(c) What is priority queue? Discuss its applications and implementation details.	<b>07</b>
<b>Q.4</b>	(a) Evaluate the following postfix expression using stack. $53+62/*35*+$	<b>03</b>
	(b) Design an algorithm to perform insert operation in circular queue.	<b>04</b>
	(c) Design an algorithm to merge two linked list.	<b>07</b>
<b>Q.5</b>	(a) Define: 1. Acyclic graph 2. Leaf node 3. Complete binary tree	<b>03</b>
	(b) For following expressions, construct the corresponding binary tree. 1. $A+B/C*D-E$ 2. $((A+B)-(C*D))\%((E^F)/(G-H))$	<b>04</b>
	(c) How are graphs represented inside a computer's memory? Which method do you prefer and why?	<b>07</b>
<b>Q.6</b>	(a) Define: 1. Connected graph 2. Threaded tree 3. Degree of node	<b>03</b>
	(b) Differentiate between depth first search and breadth first search.	<b>04</b>
	(c) Design an algorithm to insert a given value in the binary search tree.	<b>07</b>
<b>Q.7</b>	(a) Explain basic file operations.	<b>03</b>
	(b) List out applications of hashing.	<b>04</b>
	(c) What is file organization? Briefly summarize different file organizations.	<b>07</b>

- Q.8** (a) Give a brief note on indexing. **03**
- (b) Build a chained hash table of 10 memory locations. Insert the keys 131, 3, 4, 21, 61, 24, 7, 97, 8, 9 in hash table using chaining. Use  $h(k) = k \bmod m$ . ( $m=10$ ) **04**
- (c) Consider the hash table of size 10. Using quadratic probing, insert the keys 72, 27, 36, 24, 63, 81, and 101 into hash table. Take  $c_1=1$  and  $c_2=3$ . **07**

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