

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.

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

- 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**
