



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
Q.1	(a) Differentiate between data types and data structures.	03
	(b) Answer the followings:	04
	(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.	07
Q.2	(a) Distinguish between stack and queue.	03
	(b) What is top of stack? Why stack is called LIFO list?	04
	(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.	07
	OR	
	(c) Explain creation, insertion and deletion of doubly linked list with example.	07
Q.3	(a) What are binary trees? Mention different types of binary trees with example.	03
	(b) What is a graph? Explain various representations of graphs.	04
	(c) Write an algorithm to add a node into a binary search tree.	07
	OR	
Q.3	(a) What is B -tree of order m? Draw a B-tree of order 3.	03
	(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	04
	(c) Discuss algorithm of Breadth First Search (BFS) traversal for a Graph. Explain with an example.	07
Q.4	(a) Explain Sequential file organizations and list its advantages and disadvantages.	03
	(b) How access of record is performed in multi key file organization?	04

**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