Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III (New) EXAMINATION – WINTER 2019

Subject Code: 2130702 Date: 28/11/2019

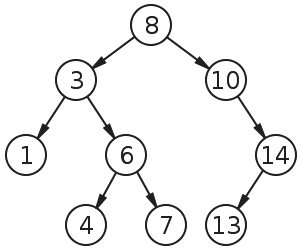
Subject Name: Data Structure

Time: 02:30 PM TO 05:00 PM Total Marks: 70

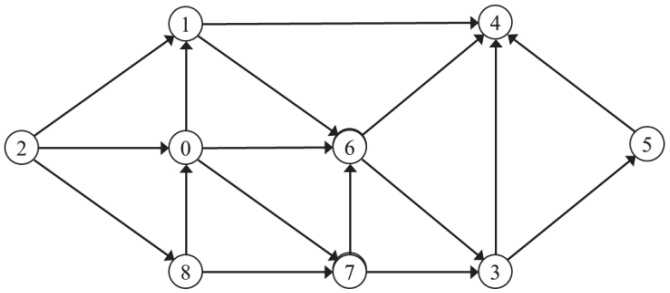
Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Define primitive and non-primitive data types with example.	**03**
	(b)	Differentiate linear and non-linear data structures.	**04**
	(c)	Write algorithms for PUSH and POP stack operations.	**07**
Q.2	**(a)**	Enlist applications of stack and queue.	**03**
	(b)	Evaluate the following postfix expression using stack. Show each step. 5 3 + 6 2 / * 3 5 * +	**04**
	(c)	Write a C functions for insertion and deletion operation in simple queue.	**07**
		OR	
	(c)	Write an algorithm to delete an element from circular queue. Show the steps of insertion and deletion operation in sample circular queue.	**07**
Q.3	**(a)**	Describe the advantages of linked list over array.	**03**
	(b)	Write an algorithm to insert a node at last position in doubly linked list.	**04**
	(c)	Write an algorithm to print the singly linked list in reverse order using stack.	**07**
		OR	
Q.3	**(a)**	Describe following terms with respect to binary tree: (1) depth of tree (2) balanced tree (3) complete tree	**03**
	(b)	Construct the binary tree for the following tree traversals. Inorder: B F G H P R S T W Y Z Preorder: P F B H G S R Y T W Z	**04**
	(c)	Write an algorithm to insert a node into binary search tree.	**07**
Q.4	**(a)**	Prove that a binary tree with 20 nodes have 21 null branches.	**03**
	(b)	Write a recursive algorithm for preorder traversal of binary tree.	**04**
	(c)	Describe Prim's minimum spanning tree algorithm with example.	**07**
		OR	
Q.4	**(a)**	Show the resultant BST after applying following operations in sequence on given tree. Delete 8 b) Insert 9 c) Delete 7	**03**



	(b)	Enlist and describe different ways for representing graph data structure with example.	**04**
	(c)	Show the steps of BFS and DFS traversal for following graph starting from vertex 2. Consider adjacency list is sorted in ascending order.	**07**



Q.5	**(a)**	Write an algorithm for linear searching.	**03**
	(b)	Describe indexing structure for index file.	**04**
	(c)	Write an algorithm for merge sort. Show the steps of its working with sample data.	**07**

OR

Q.5	**(a)**	Define hash function. Describe any two hash methods with example.	**03**
	(b)	Write an algorithm for binary searching.	**04**
	(c)	Apply bubble sort on following data and show all steps. 123, 34, 65, 105, 27, 79, 12, 10, 125, 156	**07**

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