

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. **04**
 $5\ 3\ +\ 6\ 2\ /\ * 3\ 5\ * +$
 (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**

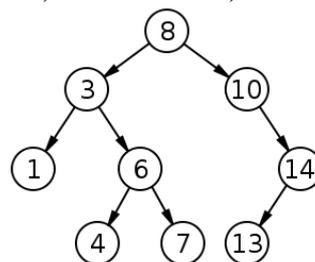
OR

- Q.3** (a) Describe following terms with respect to binary tree: **03**
 (1) depth of tree (2) balanced tree (3) complete tree
 (b) Construct the binary tree for the following tree traversals. **04**
 Inorder: B F G H P R S T W Y Z
 Preorder: P F B H G S R Y T W Z
 (c) Write an algorithm to insert a node into binary search tree. **07**

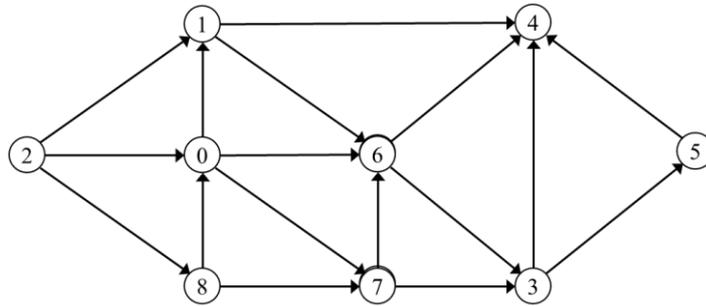
- Q.4** (a) Prove that a binary tree with 20 nodes have 21 null branches. **03**
 (b) Write a recursive algorithm for preorder traversal of binary tree. **04**
 (c) Describe Prim's minimum spanning tree algorithm with example. **07**

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. **07**
 123, 34, 65, 105, 27, 79, 12, 10, 125, 156
