

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (NEW) EXAMINATION – WINTER 2021****Subject Code:3130702****Date:19-02-2022****Subject Name:Data Structures****Time:10:30 AM TO 01:00 PM****Total Marks:70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) What is time complexity? Explain with example. **03**
 (b) Explain malloc and free functions in 'C'. Also discuss advantages of dynamic over static memory allocation. **04**
 (c) Explain following: **07**
 (i) priority queue (ii) primitive data structures (iii) non-primitive data structures (iv) linear data structures (v) nonlinear data structures (vi) applications of stack (vii) sparse matrix
- Q.2** (a) Write an algorithm for infix to postfix conversion. **03**
 (b) Write an algorithm to evaluate postfix expression. Explain working of the algorithm using appropriate example. **04**
 (c) Write a 'C' program to reverse a string using stack. **07**
- OR**
- (c) Write algorithm to (i) insert, and (ii) delete elements in circular queue. **07**
- Q.3** (a) Write user defined 'C' function to insert node at a specific location in singly linked list. **03**
 (b) Write user defined 'C' function to delete node from end in circular linked list. **04**
 (c) Write a 'C' program to implement queue using linked list. **07**
- OR**
- Q.3** (a) Write user defined 'C' function to insert node at the end in circular linked list. **03**
 (b) Write user defined 'C' function to delete node from a specific location in doubly linked list. **04**
 (c) Write a 'C' program to implement stack using linked list. **07**
- Q.4** (a) Construct a binary tree from the traversals given below: **03**
 Inorder: D, B, A, E, G, C, H, F, I
 Preorder: A, B, D, C, E, G, F, H, I
 (b) Write a short on AVL tree. **04**
 (c) Explain the concept of B-tree with suitable example and list its applications. **07**
- OR**
- Q.4** (a) Construct a binary search tree from the following numbers. **03**
 38, 13, 51, 10, 12, 40, 84, 25, 89, 37, 66, 95
 (b) Explain BFS and DFS. **04**
 (c) Explain B+ tree with example. **07**
- Q.5** (a) Explain Prim's algorithm. **03**
 (b) Write a 'C' program for selection sort. **04**
 (c) List out different hash methods and explain any three. **07**

OR

- Q.5 (a) Define terms with respect to file: fields, records, database 03
(b) Compare sequential and binary search methods. 04
(c) Apply quick sort for the following data: 07
9, 7, 5, 11, 12, 2, 14, 3, 10, 6

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