

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER- III(NEW) EXAMINATION – WINTER 2022

Subject Code:3130702

Date:22-02-2023

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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Differentiate primitive and non-primitive data structures **03**
 (b) Define time complexity? Explain worst case and best case complexity with examples. **04**
 (c) Convert following infix expression into postfix expression using stack. **07**
 $(A-B)/C*D^(E/F)^(G+H)$

- Q.2** (a) What is Sparse matrix? Write efficient vector representation of following Sparse matrix. **03**

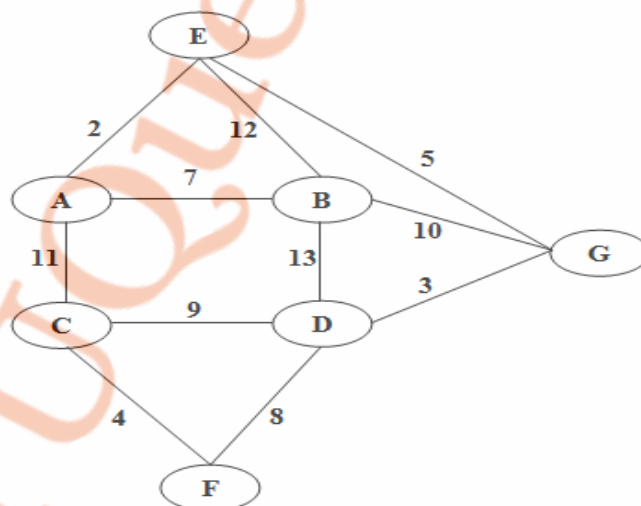
1	0	0
0	2	0
0	0	3

- (b) What is the worst case complexity of binary search? Write an algorithm for binary search. **04**
 (c) Create Binary Search Tree for following Data and write pre-order traversal, in-order traversal and post-order traversal of the constructed tree. **07**
 10 15 28 09 39 31 30 14 07 08

OR

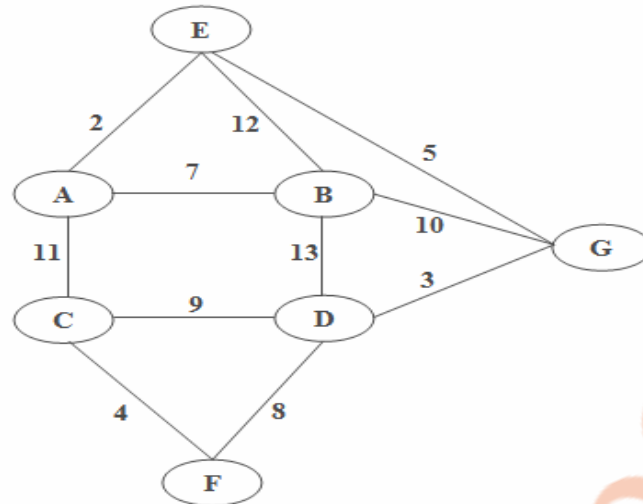
- (c) Create AVL tree for following Data and write pre-order traversal of the constructed tree. **07**
 10 15 28 09 39 31 30 14 07 08

- Q.3** (a) Write c program for bubble sort. **03**
 (b) Write algorithm to insert into simple queue and mention the limitation of simple queue? **04**
 (c) Find the minimum spanning tree of following graph using Kruskal’s method. **07**



OR

- Q.3** (a) Write c program for selection sort. 03
 (b) Write algorithm to delete from circular queue and mention the advantage of circular queue over simple queue? 04
 (c) Find the minimum spanning tree of the following graph using prim's method. 07



- Q.4** (a) What is priority queue? Is simple queue is anyhow priority queue? Explain your answer. 03
 (b) Write C program to find the Fibonacci sequence of n terms using recursion. 04
 (c) Explain DFS and BFS with appropriate example. 07

OR

- Q.4** (a) What is linked list? States the advantages of linked list over array. Also list various types of the linked list. 03
 (b) Write recursive solution for tower of Hanoi. How many moves require for transferring three discs? 04
 (c) Explain Dijkstra's shortest path algorithm with appropriate example 07

- Q.5** (a) Define following terms 03
 1) Balance factor
 2) Hash function
 3) Cyclic graph
 (b) Sort following data using merge sort. 04
 10 15 28 09 39 31 30 14 07 08
 (c) Define hash collision? Explain collision various resolution techniques. 07

OR

- Q.5** (a) Define following terms 03
 1) Hash table
 2) Graph
 3) Complete binary tree
 (b) Sort following data using quick sort. 04
 10 15 28 09 39 31 30 14 07 08
 (c) What is file? Explain various types of file organization. 07