Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA – SEMESTER-II EXAMINATION –SUMMER-2020

Subject Code:3620002 Date:05-11-2020

Subject Name:Data Structures (DS)

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.**

Q.1 **(a)** Define following Terms: **07**

i. Stack
ii. Queue
iii. Linked List
iv. Tree
v. Graph
vi. Sorting
vii. Array

(b) Discuss on storage representation of Array. **07**

Q.2 **(a)** Write an algorithm to insert and delete element from Queue **07**

(b) Convert following infix expression to RPN using Stack. **07**

a-b+c*d/e/f+g*h

OR

(b) What is Hashing? List different Hashing functions. Explain any two with example. **07**

Q.3 **(a)** i. What is double ended queue? What are the variants of it? **03**
ii. Write an algorithm to insert and delete element from stack. **04**
iii.

(b) What is polynomial? Explain the node Structure for polynomial in one and two variable with example. **07**

OR

Q.3 **(a)** i. What is the need of Data Structure? List different types of Data Structure. **03**
ii. What are the advantages of Linked List over Arrays? **04**

(b) Write a short note on Linear Probing. **07**

Q.4 **(a)** Sort the following data using Heap sort: 34, 32, 11, 78, 56, 98, 14 **07**

(b) What are AVL trees? Assume an empty AVL tree and insert the following data into it: 1, 2, 3, 4, 7, 6, 5 **07**

OR

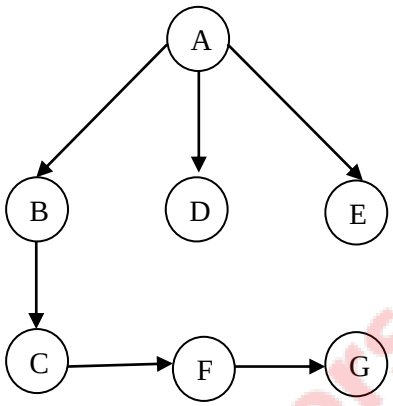
Q.4 **(a)** Sort the following data using Merge sort: 77, 22, 44, 55, 33, 66, 11, 45, 32, 90 **07**

(b) Write a brief account on 2-3 trees. **07**

Q.5 **(a)** Define the following in terms of graph: **07**

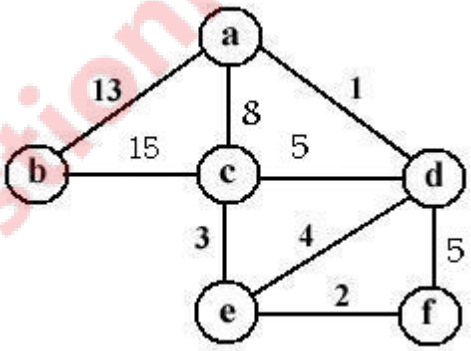
1. Cyclic graph
2. Directed graph
3. Spanning tree
4. Sparse matrix
5. Adjacency matrix
6. Path
7. Loop

(b) Write an algorithm for DFS. Also give the result for DFS for the following graph: **07**



OR

Q.5 **(a)** Find the minimal spanning tree for the given graph using Kruskal's algorithm. **07**



(b) Write short notes on the following: **07**

1. Adjacency list
2. Write an algorithm on binary search.

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