Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA INTEGRATED– SEMESTER -III EXAMINATION –WINTER-2021

Subject Code: 4430602 Date: 27/12/2021

Subject Name: Data Structure

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)** Answer the following. **07**

1) Define Data structure.
2) Which data structure is used for DFS algorithm?
3) Define sparse matrix.
4) What is garbage collection?
5) Define Heap.
6) What is the full form of KWIC?
7) Linked list is a non linear data structure. (True/False)?

(b) 1) Explain Trie structure **03**

2) List out the various asymptotic notations and explain them. **04**

Q.2 **(a)** Define Searching. Give the difference between Linear search and Binary Search. Also give the algorithm for Binary search. **07**

(b) Write the algorithm for converting the infix expression to prefix and also explain it with example. **07**

OR

(b) Write a short note on simple queue. **07**

Q.3 **(a)** Write the algorithm for insertion sort and trace it for the following data. **07**
34,15,22,18,2,10,92,56,44,78,55.

(b) Give the node structure for polynomial with two variables represented using linked list. Also give the algorithm to add two polynomials using linked lists. **07**

OR

Q.3 **(a)** Write and explain the radix sort. Trace it for the following data. **07**
112,342,116,765,345,902,104,651,333,298,789,100.

(b) Define a linked list. Write the algorithm for inserting elements at the (end, beginning and middle) of the singly linked list. **07**

Q.4 **(a)** Write a note on threaded binary tree. **07**

(b) Explain Prim's algorithm for finding the minimum spanning tree from a graph. **07**

OR

Q.4 **(a)** Define BST. Draw the BST for the following data. **07**
23,45,12,22,78,16,10,24,32,18,78,98,56,77. Which traversal will give the data in sorted fashion? Trace it and prove it.

(b) 1) Explain the matrix representation of graphs **03**

2) Convert the following infix expression to postfix : **04**
(a+b)/(c-d)*e/f*g/h-(m+p)

Q.5 **(a)** Explain the various collision resolution techniques. **07**

(b) 1) Give the limitations of singly linked lists over double linked lists **03**

2) Write a note KWIC indexing. **04**

OR

Q.5 **(a)** Write a short note on 2-way merge sort. **07**

(b) Explain the rotations of the AVL trees. **07**

****