

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA INTEGRATED– SEMESTER III- EXAMINATION –WINTER-2023

Subject Code:4430602**Date: 07/12/2023****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. Use of simple calculators and non-programmable scientific calculators are permitted.

- Q-1 (a)** Answer the following questions: **07**
1. Explain KWIC.
 2. List out Asymptotic notations.
 3. List out application of stack.
 4. Define Spanning tree
 5. Define AVL Tree.
 6. Differentiate complete binary tree and full binary tree
 7. Define Data Structure
- (b)** What do you mean by analysis of an algorithm? Explain different ways of measuring time and space complexity during algorithm analysis **07**
- Q.2 (a)** Explain the steps of implementing Dijkstra's algorithm with example. **07**
- (b)** Explain Tower of Hanoi problem by moving 3 discs. **07**
- OR**
- (b)** (1) What is a sparse matrix? Explain the sequential representation of sparse Matrix. **04**
- 03**
- (2) Explain the difference between DFS and BFS.
- Q.3 (a)** Convert following infix expression into postfix by using stack table. **07**
- $A * B + C - D / E * F ^ G$
- (b)** How to create node of one variable polynomial? Write an algorithm to add two polynomials. **07**
- OR**
- Q.3 (a)** What is Linked list? Explain types of linked list in detail. **07**
- (b)** Explain all the deletion processes in a binary tree with example **07**
- Q.4 (a)** Write an algorithm for binary search and compare its performance with linear search for various possible cases **07**
- (b)** Define binary tree? Explain the deletion operations in a binary search tree with an example **07**

OR

Q.4 (a) Find out postorder traversal from the given traversals. **07**

Inorder : A B D F G H J K L N

Preorder: G D B A F J H L K N

(b) What is graph? Explain all the representation of graphs with suitable example **07**

Q.5 (a) What is head in threaded binary tree? Explain threaded binary tree with proper example. **07**

(b) Write an algorithm for quick sort and sort the following values using quick sort: 18, 5, 9, 2, 15, 11 **07**

OR

Q.5 (a) What is MST? Explain Kruskal's algorithm by giving suitable example **07**

(b) What is hashing? Explain various techniques for collision resolution with appropriate example. **07**
