

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**MCA – SEMESTER II - EXAMINATION – WINTER-2022**

**Subject Code: 629401**  
**Subject Name: Data Structures**  
**Time: 10:30 AM TO 01:00 PM**  
**Instructions:**

**Date: 13/12/2022**

**Total Marks: 70**

1. Attempt all questions.
2. Make Suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q:- 1(a)** Explain following Terms. **07**  
1. Algorithm  
2. Spanning Tree  
3. KWIC indexing?  
4. Binary Tree  
5. Graph  
6. Primitive data structure  
7. DFS
- (b)** Explain stack. List out the applications of stack. Write an algorithm to PUSH & POP using array representation. **07**
- Q:-2 (a)** Explain Tower of Hanoi problem by moving 3 discs. **07**
- (b)** Explain circular queue with example. Write an algorithm for insertion and Deletion in circular queue. **07**
- OR**
- (b)** Convert the following infix expression to its prefix form using stack **07**  
 $A + B - C * D / E + F$ . Show diagrammatically each step of conversion.
- Q:-3 (a)** What is doubly linked list? Write procedure to insert and delete an element from doubly linked list. **07**
- (b)** Explain Breadth First Search traversal of Graph using an example. **07**
- OR**
- (a)** Write notes on application of Linked list. **07**
- (b)** What is sparse matrix? Explain multi-linked structure for sparse matrix with example. **07**
- Q:-4 (a)** Explain Bubble sort algorithm with an example. **07**
- (b)** What is spanning trees? Explain DFS and BFS spanning trees in detail. **07**

**OR**

- (a) Explain binary search technique with suitable example. **07**
- (b) Discuss all the Tree Traversal techniques in detail. **07**
- Q:-5** (a) What is hashing? Explain various techniques for collision resolution with appropriate example. **07**
- (b) Discuss how following numbers are sorted using Quick Sort. **07**  
38,81,22,48,13,69,93,14,45,58,79,72
- OR**
- (a) Sorted elements using heap sort using max heap. **07**  
4,1,3,2,16,9,10,14,8,7
- (b) Explain how height balance tree improve searching process compare to binary tree. How balance factor for height balance tree is calculated? **07**  
Explain LL and RR rotation with suitable example.

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