

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

# GUJARAT TECHNOLOGICAL UNIVERSITY

MCA Sem-II Examination July 2010

Subject code: 620001

Subject Name: Data Structures

Date: 03 /07 /2010

Time: 11.00 am – 01.30 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** Attempt following. **14**
- (a) Give definition of Data structure. List various primitive and nonprimitive data structure with example.
- (b) Write algorithm of change operation of stack.
- (c) What is ADT? Explain it with example.
- (d) Compare recursion and iteration.
- (e) Write an algorithm to insert an element into circular queue.
- (f) Give definition and explain following.
1. Binary tree
  2. Height of tree
- (g) Explain matrix and list representation of a graph
- Q.2** (a) Write an algorithm to convert parenthesized infix string to reverse polish notation. **07**
- (b) Write algorithm of factorial using recursion and iteration. Discuss which is better and why. **07**
- OR**
- (b) Write an algorithm for following **07**
1. Delete an element from singly link list.
  2. Delete an element form doubly link list.
- Q.3** (a) Write an algorithm to traverse a tree in preorder using iteration. Take example data and trace the content of stack for traversal. **07**
- (b) Write short note on threaded storage representation of binary tree. **07**
- OR**
- Q.3** (a) Compare BFS and DFS. **06**
- (b) Write short note on 2-3 tree. **04**
- (c) Write short note on Hashing function. **04**
- Q.4** (a) Translate the infix string  $a + b * c - d / e * h ^ I ^ j$  into Reverse Polish expression and trace the content of stack. **07**
- (b) Construct AVL tree for the following set of months **07**
- March , May, August, April, January, December, July ,February, June, October, September

**OR**

- Q.4 (a)** A binary tree T has 9 nodes. The inorder and preorder traversals of T yield the following sequence of nodes: **07**  
Inorder : E A C K F H D B G  
Preorder: F A E K C D H G B  
Draw the binary tree. And show its postorder traversal sequence.
- (b)** Create binary search tree for following data and show how to delete the node which has both left and right child. With same data. **07**  
50 , 25 , 75, 22, 40, 60, 80, 90, 15, 30
- Q.5 (a)** Using heap sort , sort the following data : **07**  
42, 23, 74, 11, 65, 58, 94, 36, 99, 87
- (b)** 1. What is KWIC Indexing? **07**  
2. Write algorithm for binary searching
- OR**
- Q.5 (a)** Explain Quick sort with algorithm and example **07**  
**(b)** Compare various sorting methods using their Average case , worst case **07**  
and space usage using Big O notation

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