

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

MCA - SEMESTER-II • EXAMINATION – SUMMER • 2014

Subject Code: 2620001

Date: 13-06-2014

Subject Name: Data Structures

Time: 10:30 am - 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 questions. **07**
- (1) Define : Data Structure
 - (2) What is KWIC?
 - (3) What is simulation?
 - (4) Define asymptotic notation.
 - (5) What is the time required for binary search?
 - (6) Define sparse matrix.
 - (7) List out the applications of tree.
- (b)**
- (1) Write an algorithm to insert an element in a queue. **02**
 - (2) Write an algorithm to pop an element from a stack. **02**
 - (3) Write an algorithm to implement sequential search. **02**
 - (4) Which sorting technique is better from insertion sort and merge sort and justify your answer by explaining reason. **01**
- Q.2 (a)**
- (1) What is string? List the operations that can be performed on string. **03**
 - (2) Write markov algorithm. **04**
- (b)** Write and analyze insertion sort algorithm to obtain the best case and worst case required time. **07**
- OR**
- (b)** Write an algorithm to create and insert an element in sorted doubly linked linear list. **07**
- Q.3 (a)** Write and explain the steps to convert the given unparenthesized infix expression into postfix expression. Convert the following infix expression into reverse polish notation. **07**
- $A + B * C / D - E + F * G + H$
- (b)** Explain the delete operation to delete an element from a binary tree by giving suitable example with following cases. **07**
- (1) Delete a leaf node
 - (2) Delete a node having single child node (left or right)
 - (3) Delete a node having two child nodes
- OR**
- Q.3 (a)** Write an algorithm to insert and delete a node from a simple queue implemented through pointer allocation. **07**
- (b)** What is graph? Explain all the representation of graphs with suitable example. **07**
- Q.4 (a)**
- (1) Differentiate BFS Vs DFS. **03**
 - (2) Explain threaded tree with suitable example. **02**
 - (3) Explain AVL tree with suitable example. **02**
- (b)** Write an algorithm for quick sort and sort the following data using it. **07**
- 10 24 47 90 67 5 55 87 36 17
- OR**
- Q.4 (a)** (1) Differentiate Array Vs Link Linear list. **03**

- (2) Explain trie structures with suitable example. **02**
- (3) Give the storage structure representation of. Polynomial of your choice using linked liner list. **02**
- (b)** Write an algorithm for merge sort and sort the following data using it. **07**
12 24 84 60 36 72 96 48
- Q.5 (a)** Explain hash table search technique. Explain various hashing functions with example. **07**
- (b)** What is sparse matrix? Explain array and multi-linked structure for sparse matrix with example. **07**
- OR**
- Q.5 (a)** What is collision in hashing? Explain collision resolution techniques. **07**
- (b)** Write an algorithm to implement binary search. Also give how much time requires for sorting N elements. **07**
