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 peep 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 childe node (left or right)
(3) Delete a node having two childe 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**

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