

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA - SEMESTER-II • EXAMINATION – SUMMER • 2014

Subject Code: 620001

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) Do as Directed** **07**
1. Which is the best sorting method in worst case?
 2. What is the prerequisite of binary search?
 3. What is difference between depth and height of the tree?
 4. What is articulation point in Graph?
 5. Insertion and deletion are easy in linked list as compare to array. State true or false.
 6. What will be the address of the element $a(i, j)$ in an array, where data is stored as column major with m rows and n columns.
 7. Name any two notations used for representing the complexity of an algorithm.
- (b) Write an algorithm to convert infix expression into reverse polished notation and convert the following infix expression into prefix expression.** **07**
 $A+B*C/E^{(F-G)}*(H+K)$
- Q.2 (a) What is hashing? Explain any three hashing and collision resolution techniques.** **07**
- (b) Explain step by step Heap sort tracing for following set of data.** **07**
35,67,59,47,23,100,90,43
- OR**
- (b) Write an algorithm of quick sort.** **07**
- Q.3 (a) Answer the following:-** **07**
1. Differentiate between array and linked list data structure. Write down the algorithm to insert node at last in singly linked list. **04**
 2. Write an iterative algorithm to traverse a binary tree in inorder traversal. **03**
- (b) Define Graph. Show various representations for undirected, directed and weighted Graph.** **07**
- OR**
- Q.3 (a) Write an algorithm to add two one variable polynomials.** **07**
- (b) Answer the following:-** **07**
1. Construct a binary search tree by inserting following elements in given order and delete any two nodes having two children. **04**
10,5,8,2,6,7,20,15,12,14,25,22,21
 2. Write short note on B+Tree. **03**
- Q.4 (a) Construct a 3-way B-tree by inserting the following elements in the given order. 10, 30, 20, 27, 15, 108, 99, 81, 40,50,60,70.** **07**
- (b) What is the significance of circular queue? Write an algorithm to insert and delete an element from the circular queue.** **07**

OR

- Q.4 (a)** Construct an AVL tree by inserting the following elements in the given order. 15, 35, 23, 25, 12, 138, 90, 84, 41, 56, 66, 73. **07**
- Q.4 (b)** Show Linked list representation of Queue and write an algorithm for add and remove element from the queue using linked list. **07**
- Q.5 (a)** Answer the following **07**
1. Explain the Trie structure and its types in detail by giving suitable example. **04**
 2. Write short note threaded binary tree. **03**
- (b)** Explain Dijkstra's algorithm by giving suitable example **07**
- OR**
- Q.5 (a)** Answer the following **07**
1. Write an algorithm to insert and delete an element from doubly linked list. **04**
 2. Explain KWIC indexing with suitable example. **03**
- (b)** Explain Prim's algorithm by giving suitable example **07**
