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Roll No. ....

## MCA-203

M. C. A. (Second Semester)  
EXAMINATION, June, 2012

(Grading/Non-Grading)

DATA STRUCTURE

(MCA-203)

Time : Three Hours

Maximum Marks :  $\begin{cases} GS : 70 \\ NGS : 100 \end{cases}$   
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Note : Attempt *one* question from each Unit. All questions carry equal marks.

### Unit-I

1. (a) Write insertion and deletion function in C/C++ language simulating insertion and deletion in queue which is implemented by linked list. 10
- (b) Convert the following infix expression to postfix expression and give various steps in evaluating this using stacks : 10

$$(5 * 3 \uparrow 2) / (3 + (7 + 3) / 10)$$

Or

2. (a) Why circular queue is preferred ? Write algorithm to insert an element into circular queue. Also write C function for algorithm. 15

- (b) What are the advantages and disadvantages of representing a group of items as an array versus a linear linked list ? 5

## Unit - II

3. Write the algorithm for the following operations which are performed as doubly linked list : 20

- (i) Creation
- (ii) Traversing
- (iii) Insertion
- (iv) Deletion
- (v) Concatenation

Or

4. (a) Write a program to create a linked list of 10 elements and to traverse the list. 12
- (b) Write short notes on the following : 8
- (i) Circular linked list
  - (ii) Linked list using array

## Unit - III

5. (a) Construct a binary tree whose inorder and postorder traversals are as follows :

Inorder - D B A E C G F H

Postorder - D B E G H F C A

and also write the algorithm for inorder and postorder tree. 10

- (b) Define complete and full binary tree. If no. of leaves in binary tree are "n" then how many minimum and maximum no. of nodes will be there if : 10
- (i) Tree is full binary tree
  - (ii) Tree is complete binary tree

Or

6. (a) Write an algorithm to delete a node from a binary tree that replaces the node with its inorder predecessor, rather than its inorder successor. 12
- (b) Write an efficient insertion algorithm for a binary search tree to insert a new record whose key is. 8

## Unit - IV

7. (a) Compare quick sort and merge sort algorithm in terms of time and space complexities. 10
- (b) What are applications of trees ? Draw a binary tree expression which is given in infix expression : 10

$$((x - y + z)/(u - v) + w) + t$$

Or

8. Write sort the following string using :

- (i) Quick sort
- (ii) Max heap sort

10, 4, 12, 2, 14, 8, 16, 6, 18

Write the algorithm for quick sort and heap sort. Also calculate the complexity of algorithm. 20

## Unit - V

9. What is B<sup>+</sup> tree Compare it with B trees. Insert the following elements into an initially empty B trees of order 5 : 10

a, g, f, b, k, c, h, n, j, d, r, i, s, x, e, l, m, t, u, v.

Or

10. Explain the Kruskal and Dijkstra algorithm with example and also calculate the complexity of algorithm. 20