

Registration No. :

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Total number of printed pages – 2

MCA
MCC 201

Special Examination – 2012
DATA STRUCTURE USING 'C'

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory and any **five** from the rest.
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2 × 10
- (a) What is a Priority queue ?
 - (b) Elaborate the applications of binary search trees ?
 - (c) What is the time complexity of Quick Sort ?
 - (d) What is a recursion ?
 - (e) What is a sparse matrix ?
 - (f) Convert the given input expression to equivalent postfix notation :
$$a + b/(c - d) + e * g - h$$
 - (g) What is hash function ?
 - (h) Mention two important applications of a circular queue in computer field.
 - (i) Show how a node in linked list is declared in C.
 - (j) How many distinct binary trees can be constructed using 3 nodes ?
2. (a) Device a formula to calculate the address of an any variable say $a[i][j]$ for any valid value of i and j . 5
- (b) Describe the representation of sparse matrix in memory. 5
3. (a) Write an algorithm to transform Infix Expression into postfix expression using stack data structure. 5
- (b) Elaborate two-way lists. Discuss the various operations performed on two-way lists with proper examples. 5

P.T.O.

4. (a) What is a Queue ? Write down the algorithms for various operations performed on a queue. 5
- (b) Write the merge Sort algorithm and calculate its time complexity. 5
5. (a) Suppose a linked list consists some numeric values. Design an algorithm to find maximum value in the list. 5
- (b) Translate the following infix expressions into Postfix notations : 5
- (i) $((A + B)*D) \uparrow (E - F)$
- (ii) $A + (((B - C) * (D - E) + F)/G) \uparrow (E - D)$
6. (a) Define the binary tree. Draw two binary trees that are similar, and draw two binary trees that are equivalent. 5
- (b) Define the inorder traversing. Write an algorithm/Program for inorder/traversing method. 5
7. (a) What is a graph ? Explain the adjacency matrix to represent the directed graph. 5
- (b) Write an algorithm/program to traverse the graph using the breadth first traversal method. 5
8. (a) How merge sort works ? Explain it with suitable example. On what types of data set the method is suitable; explain in brief. 5
- (b) What is hashing ? Explain various methods to find hash functions. How collision situation can be avoided ? 5