

Roll No. ....

Total No. of Pages : 3

MCA/M11 5201

Data Structures Using C  
Paper : MCA-201

Time : Three Hours]

[Maximum Marks : 80

Note :— Attempt question no. 1. Attempt **FOUR** more questions selecting **ONE** question from each Unit—  
I, II, III & IV.

1. (i) Write an example of diagonal matrix and explain its storage in memory.  
(ii) What is a record ? Write C syntax of record and explain its memory representation.  
(iii) Write the structure of linked list in C. Write memory allocation of a node of linked list.  
(iv) Write algorithm to delete an element from a queue.  
(v) Write memory representation of a complete binary tree with suitable example.  
(vi) Define B tree and write an example of the B tree.  
(vii) Differentiate between path matrix and adjacency matrix of a graph G.  
(viii) Write breadth first search algorithm to find path from a node A to the node B in a graph G. 8x3

UNIT—I

2. Write algorithm for Insertion sort and Selection sort respectively. Which sorting technique is more efficient ? 14

5201

1

(Contd.)

3. (a) Write algorithm to count the number of paragraphs used in a short story S. 7  
(b) Write algorithm to count the number of lines a pattern P exists in the text T. 7

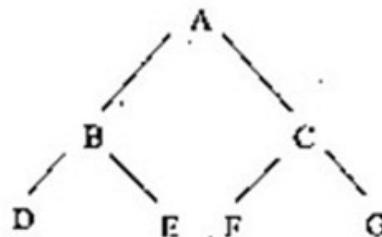
UNIT—II

4. (a) Write algorithm to search an element from the linked list and write the corresponding C syntax. 9  
(b) Write advantages and disadvantages of linked list over an array. 5
5. Describe the structure stack and explain its use in evaluation of an arithmetic expression :  

$$6 (5 + 9) - 8/2 + 7$$
  
and write algorithm for the same. 14

UNIT—III

6. (a) Write algorithm for pre-order traversal of a binary tree and apply the algorithm to the following tree : 8

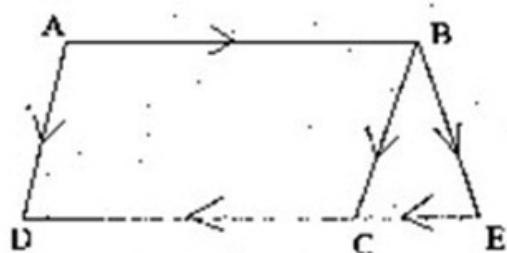


- (b) Define in-way search tree and write an example of the tree. 6

7. Write algorithm for Heap Sort and describe its complexity. Apply the algorithm to sort following numbers :  
58, 38, 69, 99, 44, 77, 33. 14

**UNIT—IV**

8. Write algorithm to find in-degree and out-degree for each node of a Digraph D. Apply the algorithm to the digraph : 14



9. Write algorithm to insert an edge in a graph G. Explain the algorithm with suitable example. 14