

[Total No. of Questions - 9] [Total No. of Printed Pages - 2]  
(2123)

1506

**MCA 2nd Semester Examination**

**Data Structures (C++ and Java)**

**MCA-201**

**Time : 3 Hours**

**Max. Marks : 60**

*The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.*

**Note :** Candidate arc required to attempt one question from each sections A, B, C, D and the entire section E.

**SECTION - A**

1. What is Object Oriented Programming? Discuss the role of encapsulation, inheritance in OOP by taking suitable examples. (12)
2. What is multidimensional array? What is its need? Explain how 3-Dimensional array is represented in memory. (12)

**SECTION - B**

3. Define priority queue? What is its role in data structure? Explain how a priority queue is represented using one way list and an array. (12)
4. What is stack? How it is different from linked list? Explain how stack is implemented using a linked list. (12)

**SECTION - C**

5. Write and explain Dijkstra's algorithm for finding shortest path in a graph. (12)

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[P.T.O.]

6. The order of nodes of a binary tree in Preorder and Inorder traversal are given as below:  
Preorder: A B C D F H J M K E G I L N  
Inorder : A D J M H K F C I N L G E B  
Draw the corresponding binary tree. (12)

#### SECTION - D

7. What is selection sort? Write and explain the working of selection sort for sorting the following list of numbers:  
44, 22, 76, 12, 52, 115, 35, 6, 98, 62 (12)
8. What is file organization? Discuss the advantages and disadvantages of sequential, Index sequential and direct file organization. (12)

#### SECTION - E

9. (i) Define hashing. What are its applications?  
(ii) What is algorithm complexity? How it is measured?  
(iii) Define heap. List its various applications.  
(iv) Define sparse array? What is its need?  
(v) Write an algorithm to delete a node from singly linked list.  
(vi) Define the terms Path Matrix and Strongly connected components in graph.  
(vii) Define abstraction.  
(viii) List various merits and demerits of binary search.  
(ix) What is complete binary tree?  
(x) What is graph? How it is different from tree?  
(xi) What are linear and non linear data structures?  
(xii) Write an algorithm to traverse a linked list. (12×1=12)