Roll No. .....

Subject Code—2075

M.C.A. (Second Year) EXAMINATION

(5 Years Integrated Course)

DATA STRUCTURES AND ALGORITHMS

MCA-201

Time : 3 *Hours* *Maximum Marks* : 100

Note : Attempt any *Five* questions. All questions carry equal marks.

1. (a) Define Data type, Data structure and Abstract Data Type (ADT). **10**

   (b) What is an array ? How two-dimensional array is stored in the memory ? How an address of an element of two-dimensional is calculated ? **10**

2. (a) Write an algorithm for binary search and compute its time-complexity. **10**

(b) Write an algorithm for pattern matching in a string. 10

3. (a) Differentiate between binary tree and threaded binary tree. Which one is better and when ? Explain through an example. 10

(b) What do you mean by tree traversal ? Write an algorithm for post-order tree traversal. 10

4. (a) Explain heap sort through an example along with its complexity and algorithm. 10

(b) Explain the structure of a circularly linked list. Write algorithms for inserting an item and deleting an item from it. 10

5. (a) What is doubly linked list ? Write algorithms for insertion and deletion operations on it. 10

(b) What is linked list ? Explain any one application of linked list in detail. 10

6. (a) What is threaded binary tree ? Discuss the applications of threaded binary tree. **10**

(b) What is Hashing ? How and where is it used ? **10**

7. Write the algorithm for the following and also compute their complexity :

(a) Insertion Sort **10**

(b) Quick Sort. **10**

8. (a) What is Graph ? Discuss different schemes of representation of a graph in memory. **10**

(b) What is minimum spanning tree ? Explain with an example. **10**