7. (a) Explain Binary tree with the help of examples. Discuss the properties of binary tree that need to be considered. (8)

(b) What do you mean by tree traversal ? What kind of operations are possible on a node of a binary tree ? Give an algorithm for inorder traversal of a binary tree. Taking an example, discuss how the binary tree can be traversed using inorder traversal. (8)

UNIT-IV

8. (a) What is meant by quick sort ? What are the advantages/disadvantages of quick sort over merge sort ? (8)

(b) Draw a directed graph with five vertices and seven edges. Exactly one of the edges should be a loop, and should not have any multiple edges. (8)

9. (a) Write a program that sorts a given list of numbers using bubble sort. (8)

(b) Draw an undirected graph with five edges and four vertices. The vertices should be called v1, v2, v3, v4 and there must be a path of length three from v1 to v4. (8)

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M.C.A. 2nd Semester (with new notes) M.M. 80 w.e.f. May, 2013

Examination–May, 2017

DATA STRUCTURE (NEW)

Paper-MCA-201

Time : 3 hours   *Max. Marks : 80*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard will be entertained after the examination.

Note : Attempt **five** questions in all. Question No.1 is **compulsory** and attempt **four** more questions by selecting **one** question from each unit. All questions carry equal marks.

(2×8=16)

1. (a) Define the term 'time complexity'. How can the time complexity of a given algorithm be found ?

(b) What are the user defined data structures ? Give some examples.

(c) How can a string be stored in an array?

(d) Explain overflow and underflow conditions of a stack with examples.

(e) What is the need for a linked list? On what account, linked lists are better than arrays?

(f) What is a Tree? Discuss why definition of tree is recursive. Why is it said to be non-linear?

(g) What is the difference between bubble sort and selection sort?

(h) What is meant by sorting? What are the types of sorting?

UNIT-I

2. (a) What are the steps that can be suggested for developing an algorithm? Consider a suitable scenario and develop an algorithm for solving the problem. Explain each step while developing the algorithm. (6)

(b) Write an algorithm that sorts a given list of numbers in ascending order. (6)

(c) Differentiate between linear and non-linear data structures. Explain with the help of examples. (4)

3. (a) Write an algorithm that determines whether a number is even or odd. (8)

(b) What are control structures? Explain the sequence control structures with the help of examples. (8)

UNIT-II

4. (a) What do you understand by a queue? Write an algorithm for inserting and deleting of a data element from the queue. (12)

(b) Explain prefix, infix and postfix expression with examples. (4)

5. (a) Differentiate between linear queue and circular queue. Which one is better and why? (8)

(b) Write a program that takes a sparse matrix A and find its transpose A and display it. (8)

UNIT-III

6. (a) What are the advantages of doubly linked list over singly linked list? (8)

(b) Write an algorithm to search an element from a given linear linked list. (8)