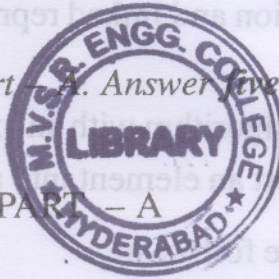# FACULTY OF INFORMATICS
B.E. 2/4 (IT) I Semester (Main) Examination, December 2010
DATA STRUCTURES

Time: 3 Hours]   [Max. Marks: 75

*Note : Answer **all** questions of Part – A. Answer five questions from Part – B.*

PART – A   **(10×2.5=25 Marks)**

1. What is testing and debugging ?

2. What do you understand by time and space complexity of algorithms ?

3. Compare and contrast DFS and BFS.

4. State the difference between Stacks and Queues. What are the applications of Queues ?

5. Define AVL trees and splay trees.

6. State the difference between complete binary tree and full binary tree.

7. What is a weighted graph ? How is it represented ?

8. What are the advantages of doubly linked lists over singly linked lists ?

9. Define a leftist tree. What are its advantages ?

10. What are the various applications of Graphs ?

PART – B   **(5×10=50 Marks)**

11. Write an algorithm to insert an element any where in the list implemented using formula based representation. Determine its time complexity.   10

12. Write a C++ program to implement a stack with linked representation.   10

13. a) For the following key sequences determine the B-Tree obtained of order three when the keys are inserted one-by-one in the order given into an initially empty tree

    2, 7, 1, 8, 4, 5, 9, 0, 3, 6   5

    b) The preorder traversal of a binary tree is ABCDEFG and its converse inorder is GDFEABC construct the tree.   5

(This paper contains 2 pages)   1   **P.T.O.**

14. a) Explain AVL Rotations in detail with examples.   5

     b) Explain insertion and removal of items in leftist tree.   5

15. Write C++ program to insert into and removal of items from a linear list using array representation and linked representation. Compare their time complexities.   (5+5)

16. a) Explain Kruskal's Algorithm with an example.   5

     b) Explain how to insert an element into a max heap.   5

17. Write short notes on the following :   10

     a) Algorithm Analysis

     b) Priority Queues

     c) Tree Traversals.