# Data Structure and Programming Methodology

**(CS-207(new), Dec. 2005)**

Time: 3 Hrs Max Marks: 60

Note: Section A is compulsory. Attempt any five questions from Section B and C at least two questions from each section.

## Section-A

1. (a) What are data items?
   (b) For a linear search algorithm, calculate complexity of the algorithm for the best care.
   (c) What data structure operations can be applied to stacks?
   (d) What is the complexity of Merge sort?
   (e) What are the limitations of queues?
   (f) Write a recursion function to calculate factorial.
   (g) What is overflow?
   (h) Write a function to PUSH a new item to STACK.
   (i) Draw a tree corresponding to expression $(2x + y)(3x + 5)^2$
   (j) What are uses of stacks?

## Section-B

2. What is Data structure? What are different data structures operations?
3. What are two way lists? What are the main advantages of two way lists?
4. Explain with the help of some suitable example that records can managed in parallel arrays.
5. Consider the post fix expression
   P: 12, 7, 3,-, 1, 2, 1, +,*, +
   Write the procedure and evaluate the expression.
6. What are priority queues? Explain how are the priority queues represented by using arrays?

## Section-C



7. (a) Explain the radix sort procedure to sort the following data in ascending order:
   541, 243, 342, 123, 129, 345, 543, 435, 439
   (b) What are Hash functions?
8. (a) A binary tree has 9 nodes. The in order and preorder traversal sequences are given below:
   Inorder: E A C K F H D B G
   Preorder:F A E K C D H G B
   Draw the tree
   (b)Write an algorithm for binary search and discuss its limitations.
9. (a)Suppose that n data elements $x_1$, $x_2$ ……$x_n$ are sorted in descending order. These elements are to be inserted into an empty binary search tree. Generate the final tree. What will be the depth of this tree.
   (b) Write Warshall's algorithm for shortest path.