Total No. of Questions : 8] [Total No. of Printed Pages : 2

Roll No. .....

CS/IT–401(O)

B. E. (Fourth Semester) EXAMINATION, Dec., 2009

(Old Scheme)

(Common for CS & IT Engg. Branch)

DATA STRUCTURES AND ALGORITHMS

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

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

1. (a) Write the different operations that are normally performed on any linear array. Write algorithm for two such functions. 10

   (b) Differentiate between non-linear and linear data structure. 5

   (c) What are triangular arrays ? Explain. 5

2. (a) What is structured programming ? What are its advantages ? Explain top down and bottom up design. 10

   (b) Explain recursion with example. Compare iteration with recursion. 10

3. (a) Explain how two stacks can be implemented using same array. Write algorithms for Push and Pop. 10

P. T. O.

(b) How the conversion of infix expression to prefix expression takes place ? Explain. 10

4. (a) Change the following infix expressions into its prefix and postfix : 10

(i) $A + (((B - C) * (D - E) + F)/G)$

(ii) $(5 + 3 \uparrow 2)/(3 + (7 + 3)/10)$

(b) How polynomials are represented in memory and their manipulation is done using linked list ? 10

5. (a) What are priority queues ? Explain how it is represented in memory. 10

(b) Explain the following with examples : 10

(i) Complete binary tree

(ii) Extended binary tree

(iii) Binary search tree

6. (a) Describe AVL tree. Construct the AVL tree of the following data : 10

A D G E F B C T S W

(b) What is binary search technique ? Write an algorithm for binary search. 10

7. (a) Explain insertion sort technique by giving suitable examples. 10

(b) What is hashing ? Explain collision resolution techniques. 10

8. Write short notes on any *four* of the following : 20

(i) Spanning tree

(ii) Graph search techniques

(iii) Representation of graph in memory

(iv) B-trees

(v) Doubly linked list