

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

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- (b) How the conversion of infix expression to prefix on 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