Printed Pages : 3 TCS-302

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1065 Roll No.

# B. Tech.

## (SEM. III) EXAMINATION, 2007-08

## DATA STRUCTURE USING 'C'

*Time : 3 Hours]* *[Total Marks : 100*

**Note :** *Attempt* ***all*** *questions.*

1 Attempt any **four** parts of the following : 5×4

(a) Show the detailed contents of the stack for given postfix expression to evaluate

**6 2 3 + – 3 8 2 / + * 2 $ 3 +**

(b) Define stack as a data structure and discuss its applications.

(c) Write a C function to convert a valid paranthesized infix expression to postfix form.

(d) Write a recursive 'C' function for solving towers of Hanoi problem.

(e) Write a C function for string matching.

(f) What do you understand by best, worst and average case analysis of an algorithm ? Give proper notations for these complexity measures.

2 Attempt any **four** parts of the following : 5×4

(a) Differentiate between linear and non-linear data structure.

(b) Define priority queue. Write a 'C' function for insertion of an element in a priority queue.

(c) Write a 'C' function for insertion operation in a circular linked list.

(d) What is a singly linked list ? Explain with an example how a singly linked list can be used for sorting a set of N numbers.

(e) What are advantages and disadvantages of doubly linked list ? Also give its applications.

(f) Write a 'C' function for addition of two polynomials using linked list representation of polynomials.

3 Attempt any **two** parts of the following : 10×2

(a) (i) Write an iterative 'C' function for inorder traversal of a binary tree.

(ii) Write the applications of tree data structures.

(b) (i) Write an algorithm to count the leaf nodes in a binary tree.

(ii) Write short notes on height balanced trees and weight balanced trees.

(c) (i) What is a threaded binary tree ? Explain inorder threading.

(ii) Explain Hash table implementation in detail.

4 Attempt any **two** parts of the following : **10×2**

(a) (i) Write a non-recursive algorithm for quick sort.

(ii) Derive the time complexity of Merge sort in average case.

(b) (i) Write a 'C' function for insertion sort. Give the worst case time complexity for insertion sort.

(ii) Explain two way merge sort.

(c) (i) Derive complexity of search operation in an AVL tree.

(ii) Write a short note on B tree.

5 Attempt any **two** parts of the following : **10×2**

(a) (i) Prove the correctness of Kruskal's algorithm for minimum spanning tree.

(ii) Define Graph, multigraph and weighted matrix.

(b) (i) Write a short note on DFS traversal of a graph.

(ii) Explain the Dijkstra's algorithm for shortest path in a graph with suitable example.

(c) (i) Write a 'C' function for traversing a multiway search tree.

(ii) Write about deletion of a node in a B tree.