



Printed Pages : 4

**ECS302**

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

**PAPER ID : 0110**

Roll No.

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**B.Tech****(SEM III) ODD SEMESTER THEORY EXAMINATION 2009-10  
DATA STRUCTURES USING C***Time : 3 Hours]**[Total Marks : 100***Note :** *Attempt all questions.***1** Attempt any **four** parts :**5×4=20**

- (a) Explain the different ways of analysing algorithm.
- (b) Write an efficient algorithm to find the  $k^{\text{th}}$  element in a sequence of  $n$  elements.
- (c) Write an algorithm which obtains the transpose of  $n \times n$  sequence matrix onto itself.
- (d) Write the traversing algorithm for a linear array.
- (e) Write an algorithm and a C function to reverse a single linked list.
- (f) What is double linked list ? What are the advantage and disadvantage of double linked list ?



2 Attempt any **four** parts :

5×4=20

- (a) Write deletion algorithm for a stack. What is its complexity ?
- (b) Write an efficient algorithm which converts in-fix expressions into post fix expression.
- (c) How can you reverse a string using stack ? Give one example and show how you can reverse a given string using stack.
- (d) Write a C program to implement a queue using linked list.
- (e) Give short notes one :
  - (i) Dequeue
  - (ii) Priority Queues.
- (f) What is recursion ? Write a C program to solve Tower of Hanoi problem.

3 Attempt any **two** parts :

2×10=20

- (a) (i) If the in-order traversal of a binary tree is B, I, D, A, C, G, E, H, F and its post - order traversal is I, D, B, G, C, H, F, E, A. Determine the binary tree.
- (ii) Write an algorithm to convert a forest in to a binary tree.

- (b) What is a binary search tree ? Write a C program to insert new nodes to a binary search tree and delete a given node from a binary search tree.
- (c) Write short notes **one** :
- (i) Height balance tree
  - (ii) Thread binary tree.

4 Attempt any **two** parts :

**2×10=20**

- (a) (i) Obtain the minimum number of entries that can be made in a B-tree of order  $m$  and of levels  $L$ .
- (ii) Use merge - sort algorithm to sort the following elements 15, 10, 5, 20, 25, 30, 40, 35.
- (b) How can you find shortest path between two nodes in a graph by Dijkstra's algorithm ? Explain by suitable diagram and algorithm.
- (c) What is a graph ? Differentiate between (i) undirected and directed graph (ii) Cycle and Hamiltonian cycle.

5 Attempt any **two** questions :

**2×10=20**

- (a) Write down the algorithm for bubble sort and explain how you can sort an unsorted array of integers by using quick - sort. Find out the time complexity of your algorithm.



- (b) Define hash function. State different types of hash function. Give their algorithm and explain them by suitable diagram.
- (c) Write shorts notes on :
- (i) B+ Tree
  - (ii) Garbage collection.
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