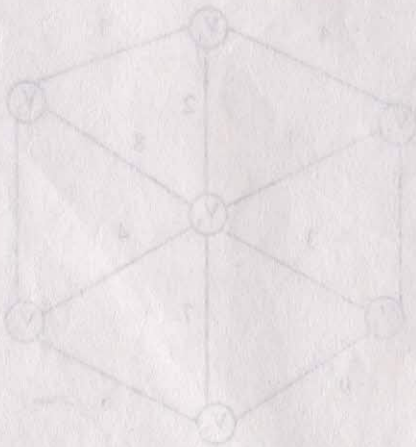


5. Attempt any **two** parts of the following : (10×2=20)

- (a) What is AVL tree ? Explain the balancing methods of AVL trees with an example.
- (b) Explain quick sort method and determine its complexities.
- (c) Define Hash function. Explain Collision resolution strategies.



(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) THEORY EXAMINATION 2011-12

**DATA STRUCTURES USING C**

Time : 3 Hours

Total Marks : 100

Note :- Attempt all questions.

1. Attempt any **four** parts of the following : (5×4=20)

- (a) Write an interactive program in C which transpose the given matrix.
- (b) Explain the memory representation of a Lower triangular matrix. Determine the address formula of any element  $a_{ij}$ ,  $1 \leq i \leq n$  in the lower triangular matrix if the elements are stored in row major order.
- (c) Write an algorithm to count the number of nodes between given two nodes in a Linked List.
- (d) Write a C function for inserting a new node at the end of a doubly linked list.
- (e) What is asymptotic notation ? Explain the big 'O' notation.
- (f) Write a program in C which reverse the order elements in a given string and check whether the string is palindrome or not.

2. Attempt any **two** parts of the following : (10×2=20)

- (a) (i) Why circular queues are better than simple queue ?  
Write an algorithm to insert and delete an item from the circular link list.
- (ii) What do you mean by priority queues ? Describe its applications.
- (b) (i) What is recursion ? Explain.
- (ii) Convert following expression into infix notations :  
 $a + (b + c * d + e) + f/g$
- (c) (i) Write an algorithm that reverse all the elements in a queue.
- (ii) Write an algorithm to insert an item X just after the  $i^{\text{th}}$  element in a queue.

3. Attempt any **two** parts of the following : (10×2=20)

- (a) Define binary tree. Explain the Linear sequential representation of binary tree. Write the advantages and disadvantages of sequential representation of binary trees.
- (b) (i) Determine the height of a complete binary tree with  $n$  number of nodes.
- (ii) For any non empty binary tree  $T$ , if  $n_0$  is the number of leaf nodes (degree= 0) and  $n_2$  is the number of internal nodes (degree = 2), then prove that :

$$n_0 = n_2 + 1$$

(c) Write algorithms for in order and postorder traversal of a binary tree.

4. Attempt any **two** parts of the following : (10×2=20)

- (a) What is a graph ? Define simple graph, directed graph, cyclic and acyclic graphs. Explain the linked representation of graphs.
- (b) (i) What is path matrix ? How path matrix can be determined ? Explain the method.
- (ii) Write BFS graph traversal algorithm and explain.
- (c) (i) Write Kruskal's algorithm to find minimum spanning tree.
- (ii) Find the minimum spanning tree using Prim's algorithm for the given graph :

