

National Institute of Technology, Delhi

Name of the Examination: **B. Tech.**

Branch

: **Computer Science & Engg.**

Semester

: **II**

Title of the Course

: **DATA STRUCTURES**

Course Code

: **CSB 102**

Time: 3 Hours

Maximum Marks: 50

Section A : Attempt <u>ALL</u> Questions		Marks
1.	Differentiate between primitive and non primitive data structure.	1
2.	Describe in detail the graph traversal techniques with example.	5
3.	What do you mean by hashing? What are the different methods of hashing? Explain in brief each method	1+1+3
4.	What is collision resolution? Explain any two methods of collision resolution with example.	1+2+2

Section B : Attempt <u>ALL</u> Questions		
1.	Evaluate the following Expression : $6, 2, 3, \wedge, +, 7, 2, /, 5, *, -, 3, +$	2
2.	Write a function to return Nth node from the end of the linked list?	3
3.	Consider the following queue of characters , where Queue is a circular array which is allocated Six memory cells : FRONT = 2 REAR = 4 Queue : _ A , C, D , E _ Find out the position of FRONT and REAR with Explanation a) Insert F b) Two letters are deleted c) ADD K,L,M d) Two letters are deleted e) Insert R f) Two Letters are deleted g) Insert S h) Two Letters are deleted i) One Letter is deleted	6
4.	Write a algorithm to insert a number in the linked list at the following positions: a) In the beginning at the list . b) Before a specified element b) After a specified element. d) End of the list.	6

Section C : Attempt ALL Questions

1.	Consider an undirected random graph of eight vertices. The probability that there is an edge between a pair of vertices is $1/2$. What is the expected number of unordered cycles of length three? And justify your answer.	3
2.	The following numbers are inserted into an empty binary search tree in the given order: 10, 1, 3, 5, 15, 12, 16. What is the height of the binary search tree (the height is the maximum distance of a leaf node from the root)?	2
3.	What is the maximum height of any AVL-tree with 7 nodes? Assume that the height of a tree with a single node is 0.	2
4.	Construct a AVL tree for given values 40,42,47, 56 ,51, 63, 0, 5, 2, 6,1 and also count the number of total rotation.	3
5.	Write a program to delete all the leaf nodes with value equal to k in a given binary tree.	3
6.	Consider n elements that are equally distributed in k stacks. In each stack, elements of it are arranged in ascending order (min is at the top in each of the stack and then increasing downwards). Given a queue of size n in which we have to put all n elements in increasing order. Write the algorithm for given problem and what will be the time complexity of the best known algorithm?	4