**(3 Hours)**   **Total Marks: 80**

N.B: **(1) Question No. 1 is compulsory.**
  (2) Attempt any three questions out of the remaining five questions.
  (3) Figures to the right indicate full marks.
  (4) Make suitable assumptions wherever necessary.

Q.1	(a)	Differentiate between linear and non-linear data structures.	[05]
	(b)	Evaluate postfix expression "78+45-*" using stack. Show stack contents at each step.	[05]
	(c)	Explain the various ways to represent graph in the memory with example.	[05]
	(d)	Write a C function to insert and delete an item in linear queue as linked list.	[05]
Q.2	(a)	Construct Huffman tree for the letters in the string "structures" and find the Huffman codes for each symbol in the string.	[10]
	(b)	Write C program for infix to postfix conversion.	[10]
Q.3	(a)	Write a C program to perform following operations on a doubly linked list: i) insert a node from the end of the list, ii) delete first node, iii) display the list.	[10]
	(b)	Write a C functions to insert and delete elements with respect to binary search tree.	[10]
Q.4	(a)	Construct an AVL tree by inserting the following elements in the given order: 74, 23, 120, 65, 11, 31, 42, 55, 98, 7.	[10]
	(b)	Explain the double ended queue. Explain its types.	[05]
	(c)	Define topological sorting. Explain the same with suitable example.	[05]
Q.5	(a)	Given the values {91, 82, 43, 37, 69, 24, 61}, a hash table of size 7 and a hash function h(k) = k mod 7, show the resulting table after inserting the values in the given order with Linear probing.	[10]
	(b)	Write an algorithm to check the well-formedness of parenthesis in an algebraic expression using the Stack data structure.	[10]
Q.6	(a)	Insert the given elements in the following B-tree of order-3: 75, 59, 86, 64, 53, 40, 29, 4.	[10]
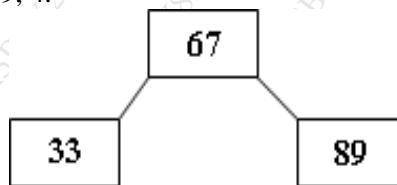
Show the B tree at each step of insertion.

	(b)	Write a function in C for BFS traversal of graph. Explain DFS graph traversal with suitable example.	[10]

****

55249