

1. (a) Write a C Program for single linked list containing any data type and then the generic code to obtain the following: (i) Number of data in the list. (ii) Select an element with maximum key value.
(b) Write down the advantage and disadvantages of arrays over lined list data structure.
[(5+5)+4]
2. (a) Write a C program that resolve a given postfix expression using stack data structure.
(b) What are the limitations of linear queues?
(c) How does circular queue help to overcome the disadvantages of linear queue?
[8+3+3]
3. (a) Write a C program to implement a priority queue using linked list data structure.
(b) A deque is a generalization of both stack and queue. Show how a deque can be implemented using two stacks. That means two stacks are with you, using stack operations only you have to implement the operations of deque. Show all steps using suitable diagram.
[7+7]
4. Suppose a binary tree is implemented with liked structure. Write a recursive procedure which finds (i) the number of nodes, (ii) the number of edges and (iii) the height of the tree.
[4+4+6]
5. (a) Explain the expression tree with a suitable example.
(b) Constrict a binary tree with following expressions:
Postfix expression:

/	-	/	1	X	+	Y	/	X	Z	*	Z	X
---	---	---	---	---	---	---	---	---	---	---	---	---

Infix expression:

1	/	X	-	Y	+	X	/	Z	/	Z	*	X
---	---	---	---	---	---	---	---	---	---	---	---	---

(c) What are the advantages of threaded binary tree?
[4+6+4]
6. (a) Write down the advantages of AVL tree over binary search tree.
(b) Construct the height balanced tree by repeated insertions of data given below in their order of occurrence.
=>>Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec.<<=
Draw all intermediate steps of construction.
(c) Write down the difference between the binary search tree and B-tree of order 2.
[4+6+4]
7. (a) Explain B+ tree with a suitable example.
(b) Caculate the time complexity of the following program.

```
main() {
    int i,j,n=10;
    for( i=0; i<n; i++ )
        for( j=i; j<n; j++)
            printf("#");
}
```

(c) Write down different collision resolving techniques for hashing.
[4+4+6]
8. Write short notes on any two of the given topics: [7+7]
 - a. Quick sort
 - b. Heap sort
 - c. Binary search