Time allowed: 3 hours   **M.M.: 80**
Note: Attempt Q. No. 1 and one question from each of Units-I, II, III and IV.

1.   (i)   Write an example of record in C Language and explain its memory
              representation.
      (ii)   Explain memory representation of an n*n tridiagonal matrix.
      (iii)   Write algorithm to insert an element into and delete an element from
              stack.
      (iv)   Write the C syntax for memory allocation of a node of linked list.
      (v)   Draw a complete tree with nodes from one to ten and explain its memory
              represtation.
      (vi)   Construct AVL search tree with following numbers:
              77, 35, 45,. 25, 66, 22, 88
      (v)   Explain linked representation of the graph hexagon.
      (vi)   Write algorithm to search a node in the graph G

                                   UNIT-I
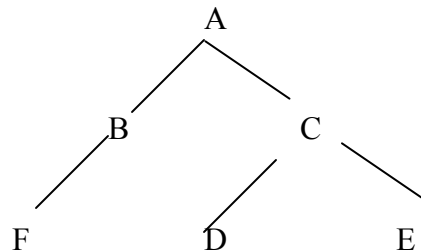2.   (a)   write a program in C to insert element at the kth position in the linear
              array.
      (b)   Write algorithm for Insertion sort and describe its complexity.
3.   (a)   Write algorithm to find a pattern P in the text T and describe its
              Complexity
      (b)   Explain different structures for storing strings in memory.

                                   UNIT-II
4.   (a)   Write algorithms to convert an Infix expression into postfix expression
              and evaluation of postfix expression.
      (b)   Write a program in C to insert an element into and delete an element from
              queue.
5.   (a)   Write algorithm to insert an element into a sorted linked list and explain it
              with suitable example.
      (b)   Write algorithm to insert an element into a sorted linked list and explain it
              with suitable example.
   UNIT-III
6.   Write algorithm for Heap sort and explain it for following numbers.
              58, 28, 12, 33, 22, 42, 50.
7.   (a)   Write algorithm for pre-order traversal of a binary tree and implement the
              algorithm to the following tree:

```
                         A
                        / \
                       /   \
                      B     C
                     /     / \
                    /     /   \
                   F     D     E
```

      (b)   Write algorithm to delete a node from binary search tree

8. Write algorithm to delete a node from a graph G. Implement the algorithm to delete the node B from the following graph:
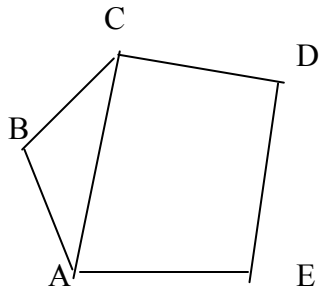
9. (a) Write algorithm to find in-degree and out-degree of each node in a directed graph G.

  (b) Using Radix Sort technique sort following numbers :
   659, 328, 106, 99, 215, 76, 505, 67