VCD/26/10/23 SYCS SEM III Data Structure $2\frac{1}{2}$Hrs 75Marks

N.B
1) All questions are compulsory.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.

Q.1 Attempt any three. [20 Marks]

1. What is Linked List? Explain different ADT of Linked List.
2. How to insert new node at the beginning of Linked List?
3. How to use Stack for balanced delimiter? Explain with suitable example.
4. Give an algorithm for reversing a queue Q. To access the queue, we are only allowed to use the methods of queue ADT.
5. What is data structures? Explain classification of data structures.
6. Consider following infix expression and convert it into prefix and postfix notation.
   K + L – M * N + (O / P) * W / U / V * T + Q

Q.2 Attempt any three. [20 Marks]

1. Write short note on Balanced BST.
2. What is Doubly Linked List? State its advantages and disadvantages.
3. Consider following elements and draw min Heap.
   70 80 50 45 95 25 30 100 90 85 15 10
4. Consider following tree and find out inorder, preorder, postorder traversals.

5. Consider following string ABCADFABAEF and find the code using Huffman algorithm.

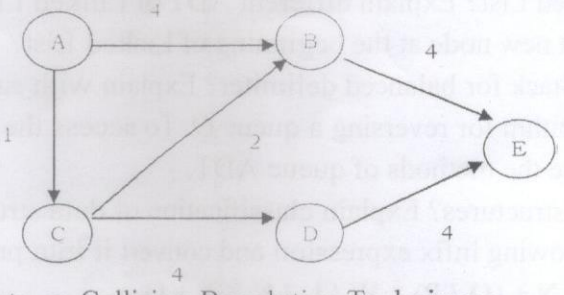
Symbol	A	B	C	D	E	F
Frequency	4	2	1	1	1	2

6. What are different advantages and disadvantages of Priority Queue?

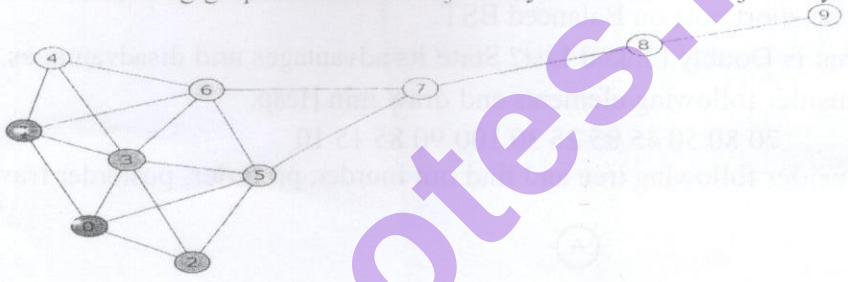
Q.3 Attempt any three. [20 Marks]

1. Consider above graph and find traversal using DFS.
2. A hash table of length 10 uses open addressing with hash function h(k)=k mod 10, and linear probing. After inserting 6 values into an empty hash table, the table is as shown below. Find the sequence in which key values could have been inserted in the table?

3. Find out the shortest path of given graph using Dijkstra's Algorithm.



4. Write a short note on Collision Resolution Techniques.
5. What is Graph? What are different types of Graphs?
6. Consider following graph and draw Adjacency matrix and Adjacency list.



Q.4 Attempt any five. **[15 Marks]**

1. Define Heap.
2. Write an algorithm to traverse Singly Linked List.
3. What is Deque?
4. Define Hashing.
5. What are different applications of Graph?
6. Define skew tree with suitable example.