Duration: 3hrs **[Max Marks:80]**

N.B. : (1) Question No 1 is Compulsory.
     (2) Attempt any three questions out of the remaining five.
     (3) All questions carry equal marks.
     (4) Assume suitable data, if required, and state it clearly.

1   Attempt any FOUR   [20]

  a   Explain linear and nonlinear data structures.

  b   Evaluate the given postfix expression using stack

$$2\ 3\ 4 + * 5 *$$

  c   What are the advantages of a linked list over arrays?

  d   Explain different graph traversal techniques.

  e   Given an array int a[]={69,78,63,98,67,70,52,55,96}. Calculate the address of
a[6] if the base address of an array is 2100.

2 a   Write a C program to implement queue using Arrays.   [10]

  b   Given the postorder and inorder traversal of a binary tree, construct the original   [10]
tree.

Postorder: D E F B G L J K H C A

Inorder: D B F E A G C L J H,K

3 a   What is hashing? What properties should a hash function demonstrate?   [10]

  b   Write a program to implement a stack using linked list.   [10]

4 a   Consider the following sorted array DATA with 13 elements: 11, 22, 30, 33, 40,   [10]
44, 55, 60, 66, 77, 80, 88, 99 Illustrate the working of binary search technique
while searching an element (i) 40 (ii) 85.

  b   What is a Binary search tree? Construct a Binary search tree for the following   [10]
elements. 13, 3, 4, 12, 14, 10, 5, 1, 8, 2, 7, 9, 11, 6, 18

5 a   Explain insertion sort using an example. Write an algorithm for it and comment   [10]
on its complexity

  b   Write short notes on BFS and DFS algorithms.   [10]

6 a Write a C program to implement a singly linked list. The program should be able [10] to perform the following operations:

    1. insert a node in the end

    2. delete the last node

    3. display the nodes.

  b Given the frequency for the following symbols, compute the Huffman code for [10] each symbol.

Symbol	A	B	C	D	E	F
Frequency	9	12	5	45	16	13