Your Roll No. _____

Sl. No. of Ques. Paper	: 5716
Unique Paper Code	: 234201
Name of Paper	: (CSHT-203) Data Structures
Name of Course	: B.Sc. (Hons.) Computer Science
Semester	: II
Duration :	: 3 hours

F

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Question No. 1 is compulsory. Attempt any four questions from out of the remaining Q. Nos. 2 to 7.
Subparts of the questions should be answered together.

Q1 a) For a given sequence of data frequent insertions and deletions are to be done. Which data structure 5
you would prefer Linked List or Array? Justify.

b) Given the class declaration of singly linked list. Given the prototype of reverse function, write the 5
member function to reverse the linked list.
Class Slist
{
Node* head;
Public:
Slist reverse();
}

c) What is a Queue? For a given sequence of enqueue and dequeue operations on array 5
implementation of integer queues of size 4, show the status of queue after each of the following
operations:

Enqueue(4)
Dequeue()
Enqueue(5)
Enqueue(6)
Dequeue()
Enqueue(7)

d) What is an activation record? How activation record helps in implementing recursion? Explain it 5
with example.

e) Create the tree with the following sequence of data:
40, 15, 30, 14, 12, 56, 90, 45
Traverse the above tree preorder, postorder and inorder. 5

f) What is hashing? Explain the folding method with the help of a suitable example. 5

g) Give the formula and calculate the address of the element A[3][3] of the 2D array defined as int 5
A[5][5], if the elements are stored in
i) row major order

ii) column major order
The beginning address of the array is 300. Every element requires 4 bytes of storage.

Q2 a) Write a member function to reverse the order of elements in a stack using two additional stacks. 5
b) Show the content of the stack while evaluating the following postfix expression: 5
CAB+/DBC+-* where B=6,A=7,C=8

Q3 a) Write a member function to delete the middle element of the double linked list. 5
b) A function g(n) is defined recursively as: 5
g(n)=0 if n=0
g(n)=n+2 if n>3
g(n)=g(n+g(2*n)) if n<=3

Compute g(3).

Q4a) What are self organizing lists? Why are they required? Explain move to front method with the help 5
of an example.
b) Draw a hash table of size 10 with open addressing. Use the hash function h(k)= k mod 10 and 5
double hashing function h'(k)=h(k)+1 for collision resolution. Insert the keys 15,20,14,12,56, 32
into your table(in that order).

Q5 a) Write a member function to count the number of leaves in a binary tree. 5
b) Consider the following tree 5
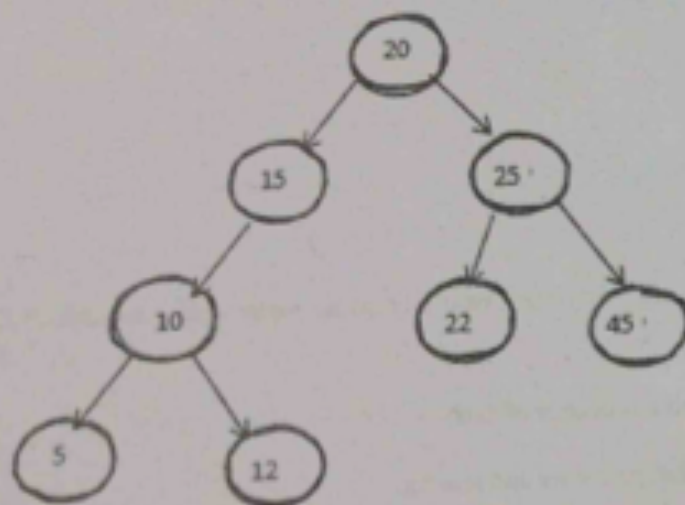
Q6 a) What is a B tree? How is it different from a B+ tree ?
b) Build a B tree of order 6 by inserting the following keys
12,3,4,15,16,17,2,18,19, 34

Q7 a) Define a class to implement a lower triangular matrix as a 1-D array. Write the member functions
to store and retrieve its elements.
b) Write a function to check whether two singly linked lists have the same contents or not?