

1078

B.E. (Computer Science and Engineering)**Third Semester****CS-301: Data Structures**

Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

1. (a) Why Stack Overflow error occurs in recursion?
 (b) What are the advantages of Linked List over arrays?
 (c) Define dangling pointers.
 (d) What is the difference between Linear and non-linear data structure?
 (e) List the applications of Queue.
 (f) Explain why binary search should not be performed on a linked list.
 (g) What is threaded binary tree?
 (h) Define priority queue.
 (i) What is depth-first traversal?
 (j) What are non-recursive procedures? (10X1)

UNIT I

2. Suppose a sequence of numbers is given like:
 5, 10, 12, 18, 56, 68, 52, 85, 95
 a) What are the various steps in which the number 52 will be found by the Binary search?
 b) In how many steps the number 52 will be found in the linear search?
 c) In how many steps it will be found in the binary search that the number 83 does not exist in this array.
 Explain the algorithm involved in each of the problems a, b, c. (3,3,4)
3. a) Consider the following numbers are stored in an array A:
 32, 51, 27, 85, 66, 23, 13, 57
 Apply Bubble sort algorithm to the array A and show each pass separately.
 b) Write an algorithm to insert new node at the end of a Doubly Linked List. (5,5)
4. What is tail recursion? Give an example of tail call elimination? Can a non-tail recursive function be written as tail-recursive to optimize it? (10)

UNIT II

5. a) Insert the following numbers, in the order given into an AVL tree. For the AVL tree, indicate at which points rotations occur to restore the balance of the tree.
 94, 33, 50, 76, 96, 67, 56, 65, 83, 34 (10)

6. a) What is a hash table? Discuss the concept of collision resolution in hash table with the help of suitable example.
b) Construct a Binary Search Tree from following pre-order traversal:
{10, 5, 1, 7, 40, 50}
Write all the steps involved. (5,5)
7. Write short note on following file organizations:
a) Inverted File
b) Sequential File (5,5)
