

Roll No. to be filled in your Answer Book

Roll No.

B. Tech

(Sem. III) UTU EXAMINATION, 2013-14

Data Structures

Time : Three Hours]

[Max. Marks : 100

Note: Attempt all Questions. Each question carries equal marks.

Q1. Attempt any **four** parts from the following (4*5=20)

- a. Write an algorithm of binary search.
- b. Sort the following letters 'PROGRAM' using bubble sort technique.
- c. Write down the advantages and disadvantages of array.
- d. What are the various applications of linked list?
- e. Write an algorithm to search an element in unsorted linked list.
- f. Write a program to calculate the factorial of a number using Recursion.

Q2. Attempt any **four** parts from the following (4*5=20)

- a. Define the followings.
 - i. AVL tree
 - ii. B- tree

- b. What do the terms LIFO and FIFO means? Explain with example.
- c. Define tower of Hanoi with example.
- d. What are queues and their applications? Write an algorithm to demonstrate insertion of a node in a queue?
- e. What is stack? Explain with algorithm.
- f. Explain the complexities of the following sorting algorithms: Insertion sort, Quick sort, two way Merge sort.

Q3. Attempt any **two** parts from the following (2*10=20)

- a. What are the various operations possible on doubly linked list? Explain with suitable example.
- b. What do you mean by array? Explain various types of array with example.
- c. Write an algorithm to insert an element in a given link list after a given node.

Q4. Attempt any **two** parts from the following (2*10=20)

- a. What do you mean by quick sort? Apply quick sort technique on the following list
44, 33, 11, 55, 77, 90, 40, 60, 99, 22, 88, 66.
- b. Name the various tree traversal algorithms. Create the binary expression tree from the following expression and traverse it using all possible tree traversal.

$$[a+(b-c)] * [(d-e)/(f+g-h)]$$

(2)

TCS-303

c. What is a heap? Explain various operations and its applications.

Q5. Attempt any **two** parts from the following (2*10=20)

- a. Has best data structure to check whether an arithmetic expression balanced parentheses is a stack? Justify your answer.
- b. Postorder traversal of a given binary search tree, T produces the following sequence of keys
10, 9, 23, 22, 27, 25, 15, 50, 95, 60, 40, 29
what are the result of an in-order and pre order traversal of the tree T?
- i. Given the following input (4322, 1334, 1471, 9679, 1989, 6171, 6173, 4199) and the hash function $x \bmod 10$, what is the final hash table?
- ii. Explain complexity and its time space tradeoff.

(3)

TCS-303 / 2680 / 3