

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Electronics & Comp. Engg.) (2011 Onwards) (Sem.-4)

**DATA STRUCTURES**

Subject Code : BTCS-304

Paper ID : [A2022]

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.

**SECTION-A**

**1. Answer briefly :**

- a. Which data structure is used to perform recursion? Explain.
- b. When is a binary search best applied?
- c. What is sorting? List any four sorting techniques.
- d. What are Dynamic Data Structures?
- e. Differentiate between LIFO and FIFO.
- f. What are doubly linked lists?
- g. Convert the expression  $((A + B) * C - (D - E) ^ (F + G))$  to equivalent Prefix notation.
- h. Explain whether Linked List is linear or Non-linear data structure.
- i. Write an algorithm/program to find Factorial of a number using recursion.
- j. What are Sparse Matrices?

### SECTION-B

2. What is an array? Write an algorithm to insert an element in an array.
3. What is complexity of an algorithm? How is it measured? Discuss Time space trade off with an example.
4. Explain Depth First Search algorithm in a graph with the help of an example.
5. What is meant by collision resolution in Hashing? Explain any one strategy for dealing with it.
6. Explain the concept of Memory Leak and Dangling Pointers.

### SECTION-C

7. Sort the following data using Quick Sort : (10)  
10 23 64 21 74 95 02 59 50 86 58
8. Explain and write an algorithm to perform the following operation on a singly linked list.
  - a. Insert new node at the beginning of list. (3)
  - b. Insert new node at Middle. (3)
  - c. Delete a node in the middle of the list. (4)
9. Illustrate the following operations of Binary tree with algorithms : (10)
  - a. Insertion
  - b. Deletion
  - c. Searching