Code No. : A.C-293

Annual Examination, 2020

B.C.A. Part II

THEORETICAL FOUNDATION OF COMPUTER SCIENCE

Paper III

[Data Structure]

Time : Three Hours]   [Maximum Marks : 50

Note : *Section 'A', containing 10 very short answer type questions, is compulsory. Section 'B' consists of short answer type questions and Section 'C' consists of long answer type questions. Section 'A' has to be solved first.*

Section 'A'

Answer the following very short answer type questions in one or two sentences.   **1×10=10**

1. What is Non-linear Data structure ?

2. List various data structure operations.

3. What is searching ?

4. Define multidimensional Array.

5. Define overflow condition.

6. What is Recursion ?

7. Define Binary Tree.

8. What is Degree of a node in a tree ?

9. Define Merge Sort.

10. What is time complexity ?

Section 'B'

Answer the following short answer type questions with word limit 150–200. **3×5=15**

1. Explain the various features of an efficient algorithm.

Or

Differentiate between static and dynamic data structure.

2. What is array ? Write an algorithm to traverse in one dimensional array.

Or

What are the types of searching techniques ?

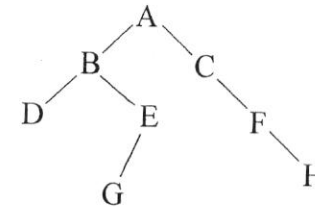3. Convert the following infix expression into prefix notation :

$$(A + B) * C/D + E * (F + G/I * J).$$

[2]

Or

What is Binary tree ? Apply tree traversal technique to find result in preorder, inorder and postorder traverse of the following tree :

5. Write steps to arrange 56, 30, 78, 20, 77, 46, 89, 28 in ascending order through selection sort.

Or

Write the algorithm for insertion sorting.

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Or

Write the difference between stack and queue.

4. What are the various Binary tree traversal techniques with example.

Or

Explain complete Binary tree and threaded binary tree.

5. Define sorting. How selection sort works ?

Or

Compare Selection sort and Insertion sort with suitable example.

Section 'C'

Answer the following long answer type questions with word limit 300–350.   **5×5=25**

1. What is Linear data structure ? Explain various types of linear data structure with example.

Or

What is the relation between time and space complexity of an Algorithm ? How to find complexity of an algorithm ?

2. Explain Bubble sorting. Write the algorithm for Bubble sort.

Or

What is Binary Searching ? Write the algorithm for Binary search.

3. Explain various types of linked list. Write an algorithm to delete an element from linked list.

Or

What is queue ? Explain insertion and deletion operation on the circular queue with example.

4. Define Binary search tree. Construct a binary search tree with the following data :

82, 10, 7, 3, 14, 29, 55, 19, 11, 38, 43.