J-FB-22-00243

B.Tech. EXAMINATION, 2022

Semester III (CBCS)

DATA STRUCTURES (CSE, IT)

CS-301

Time : 3 Hours   *Maximum Marks : 60*

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt *Five* questions in all, selecting *one* question from each Sections A, B, C and D. Q. No. 9 is compulsory.

Section A

1. Discuss in detail about asymptotic notations with an example.   **10**

2. Write an algorithm to input an array of 10 elements and searching an element using any searching technique from an array list and also calculate the complexity for the operation.   **10**

Section B

3. Write a program to concatenate two circular linked lists.   **10**

4. Given an integer K, write a procedure which deletes the Kth element from the linked list.   **10**

Section C

5. What do you mean by heap tree ? Explain different types of heap trees. Also explain steps for insertion in a heap tree using a dummy data type.   **10**

6. Suppose the following eight numbers are inserted in order into an empty binary search tree :

    T :   60   43   54   33   88   45   70   50

Draw the tree T.   **10**

Section D

7. Write the algorithm for insertion sort and merge sort with examples and discuss their complexities.   **10**

8. Write an algorithm to traverse a graph using breadth first search.   **10**

(Compulsory Question)

9. (a) Write a pseudocode to represent an array as an abstract data type.

   (b) Define stacks and queues with an example.

   (c) What is the difference between a binary tree and an ordinary tree in which each vertex has at most two branches ?

   (d) Compare the worst case and average case complexity of linear search and binary search.

   $4 \times 5 = 20$