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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.

   4×5=20