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Sep-21-00039

B. Tech. EXAMINATION, 2021

Semester III (CBCS)

DATA STRUCTURES (CSE, IT)

CS-301

Time : 2 *Hours* *Maximum Marks :* 60

The candidates shall limit their answers precisely within 20 pages only (A4 size sheets/assignment sheets), no extra sheet allowed. The candidates should write only on one side of the page and the back side of the page should remain blank. Only blue ball pen is admissible.

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

Section A

1. What do you mean by data structure ? Explain the need for data structure. Explain different types of data and differentiate between them. **15**

2. Write a program for matrix multiplication of 2*3 and 3*4. Also find the complexity of the program. **15**

Section B

3. What is a priority queue ? Explain its applications. **15**

4. Define two stacks of varying length in a single array. Write function to push and pop elements from this array. **15**

Section C

5. What do you mean by threaded binary tree ? Explain its usage. Define node of a threaded binary tree. **15**

6. Explain Dijkstra's algorithm for finding shortest path. Also find the complexity of the algorithm. **15**

Section D

7. Write a algorithm for radix sort for the following data inputs : **15**

170, 45, 75, 90, 802, 24, 2, 66

8. What do you mean by hashing ? Explain different collision resolution techniques in hashing. **15**

(Compulsory Question)

9. (a) Which data structure is used to perform recursion and why ? **4**

(b) Write an algorithm for searching a data in a singly linked list. **4**

(c) Write the worst case and average case complexity of selection sort and insertion sort. **4**

(d) Arrange the given array using bubble sort : {13, 5, 11, 1}. **3**