Roll No. Total Pages : 04

MAR-21-210039

B. Tech. EXAMINATION, March 2021

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. Explain the following terms with illustrative examples : 10

   (i) Complexity of Algorithms

   (ii) Sparse Matrices.

2. (a) What do you understand by the term "Data Structure" ? Identify the factors that influence the choice of the right data structures. 5

   (b) Define Arrays of Structures using a suitable programming example. 5

Section B

3. Given a linked list, illustrate with supportive examples and pseudocode, how to insert a node at the beginning of the linked list, insert a node at the intermediate position in a linked list and delete a node with a given value from the linked list. 10

4. (a) With the help of a suitable example, explain the One-Way List representation of a Priority Queue. 5

   (b) What is the purpose of using the Stack data structure ? Demonstrate the procedures for inserting and deleting an element from a Stack with illustrative examples. 5

Section C

5. (a) For the given data, step by step draw a Binary Search Tree :

70, 85, 40, 65, 80, 91, 32, 13. 5

(b) Illustrate with an example, the concept of Heap Tree and its Types. 5

6. What are the standard ways in which a Graph can be traversed ? Explain them in detail with supportive examples. 10

Section D

7. Write an algorithm for Selection Sort. Explain your algorithm. Further, step by step apply Selection Sort on the following data :

77, 23, 34, 11, 87, 23, 64, 51. 10

8. (a) What is Hashing ? How Hash are clashes resolved ? Explain with an illustrative example. 5

(b) Explain the Binary search algorithm in detail. Also, compare it with the Linear search algorithm. 5

(Compulsory Question)

9. (a) Differentiate between Primitive and Derived data types with supportive examples.

(b) Write a short note on Header Linked List. Explain with the help of a supportive diagram.

(c) What is Circular Queue ? Explain in detail with a suitable diagram.

(d) Write a short note on Minimum Spanning Tree.

(e) Explain the Radix Sort algorithm. 4×5=20