Roll No. ..... Total Pages : 03

BT-3/D-19 33159

DATA STRUCTURES

PC-IT-205A

Time : Three Hours] [Maximum Marks : 75

Note : All questions in Part-A and Part-B compulsory. Attempt any *four* questions from Part-C selecting at least one from each unit.

PART-A

1. (i) Define Data Structure ?
   (ii) Enlist various applications of Stacks.
   (iii) Provide examples of Circular List.
   (iv) State the major limitations of Binary Search Tree.
   (v) What is a Minimum Spanning Tree ? 5×3=15

PART-B (20 MARKS)

Unit-I

2. Comment on the need of studying the sparse matrices. 5

Unit-II

3. How priority queues are stored in computer memory ? Comment on the various applications of priority queues. 5

Unit-III

4. Distinguish between arrays and linked lists. Also provide suitable examples for each. 5

Unit-IV

5. Analyze and write the algorithm for binary tree traversal using any *one* technique. 5

PART-C

Unit-I

6. Suppose you are given with data which is almost sorted. You have to sort the data. Which technique is the best and which is worst to sort the data in this case and why ? Also write and explain the algorithm to sort the data using the technique you think is the best. 10

7. Suppose you are having a one-dimensional array. How can you insert an element in an array (i) at the beginning (ii) in the last (iii) at any other position ? Write algorithm for performing these and explain using suitable examples. 10

Unit-II

8. How can you convert an infix expression to prefix expression and evaluate the prefix expression ? Write algorithms and explain using suitable examples. 10

9. Analyze and write the algorithms for inserting and deleting an element in a queue and explain using suitable examples. 10

Unit-III

10. Distinguish between singly and double linked lists. How can you insert and delete and element in a doubly linked list after a given node ? Explain by writing algorithms. 10

11. Write and explain the algorithms for inserting and deleting an element in a stack using linked list. 10

Unit-IV

12. Define AVL tree. How can you search, insert and delete an element from an AVL tree ? Explain using suitable examples for each possible case. 10

13. Discuss the various ways to traverse a graph. Explain any *one* technique by writing its algorithm and using suitable examples. 10