



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Electronics and Communication Engineering

Semester End Examination; May / June - 2019

Data Structures

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. Explain Big-O Notation and Explain the Standard Measures of Efficiency. 10
- b. Write a recursive Euclidean Algorithm for Greatest Common Divisor. 6
- c. Convert the following prefix expression to postfix expression : 4
- i) $*+AB-CD$ ii) $*-A/BC-/AKL$
- 2 a. What is an Abstract Data Type? With a neat diagram, explain the model for an Abstract Data Type. 10
- b. Write a recursive C program to generate Fibonacci Series. 10

UNIT - II

- 3 a. What are stacks? Explain with an algorithm the basic stack operations. 10
- b. Write a C program to categorize the following list of numbers into four different groups : 10
- 3 22 12 6 10 34 65 29 9 30 81 4 5 19 20 57 44 99
- Group 1: less than 10
 - Group 2: between 10 and 19
 - Group 3: between 20 and 29
 - Group 4: 30 and greater
- 4 a. Write a C program to reverses a list of integers read from the keyboard by pushing them into a stack and retrieving them one by one. 10
- b. Design a Queue Linked List Algorithm for the following operations : 10
- i) Create Queue ii) Enqueue iii) Dequeue

UNIT - III

- 5 a. Write an algorithm to perform Binary Tree traversal. 10
- b. Design a Binary Search Tree (BST) Algorithm to perform the following operations : 10
- i) Search BST ii) Add Node to BST
- 6 a. What is Singly Linked List? Write a C program to perform the following operations on a Singly Linked List : 12
- i) Insert at Rear ii) Delete from front iii) Display list elements
- b. A binary tree has 10 nodes. The postorder and inorder traversals of the tree are shown below. Draw the tree. 8
- Postorder: 8, 4, 5, 2, 6, 7, 3, 1; Inorder: 4, 8, 2, 5, 1, 6, 3, 7

UNIT - IV

- 7 a. With an example, explain Graph Breadth First traversal. 10
b. Write an algorithm to determine Minimum Spanning Tree of a Graph. 10
8 a. With an example, Explain Graph Depth First traversal. 10
b. Write an algorithm to determine Shortest path of a Graph. 10

UNIT - V

- 9 a. Write an algorithm to sort the elements using Insertion Sort and determine its sort efficiency. 10
b. Explain any TWO collision resolution method with respect to Open Addressing. 10
10 a. Write an algorithm to sort the elements using Quick Sort and determine its sort efficiency. 10
b. Explain three useful variations on the sequential search algorithm. 10

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