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

(An Autonomous Institution affiliated to VTU, Belagavi)

Third Semester, B.E. - Information Science and Engineering

Semester End Examination; Dec - 2017 / Jan - 2018

Data Structure

Time: 3 hrs *Max. Marks: 100*

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

UNIT - I

1 a. Explain ADT for varying length character string. 8

b. Write a C program to check whether given expression has equal number of opening and closing parenthesis using stack. 8

c. List and explain applications of stack. 4

2 a. Write a C program that performs basic operations of stack. 10

b. Solve the tower of Hanoi puzzle for 3 disks and also write the C program for the same. 10

UNIT - II

3 a. Explain different types of dynamic memory allocation techniques with its syntax. And also mention the advantages of dynamic memory allocation. 8

b. Write a C program to simulate queue using single linked list. 12

4 a. Write a C function to perform the following operations on singly linked list :

i) To search for key item in the list and delete it 10

ii) To display all the elements in the reverse order.

b. Write a C function to delete all duplicate nodes in DLL. 10

UNIT - III

5 a. Write a C program to add two polynomials using SLL. 10

b. Explain the advantages of circular queue and also write a C program to implement basic operations of circular queue. 10

6 a. Write a C program to perform the following on singly linked list :

i) Merging SLL 10

ii) Reversing SLL.

b. Explain the working principle of priority queue and implement priority queue using array. 10

UNIT - IV

7 a. Write an algorithm to construct Binary Search Tree and construct the BST for the given input 14, 15, 4, 9, 7, 18, 3, 5, 16, 4, 20, 17, 9, 14, and 5. 10

b. Explain the advantages of threaded binary tree and write the algorithm to implement in-order traversal of a right in threaded binary tree. 10

Contd…2

8 a. Create the expression tree for the following expression :
(A+B*C) $ ((A+B)*C) and perform pre-order and post-order traversal for the same. 10

b. Write a C program for in-order, pre-order and post-order traversals of binary tree. 10

UNIT - V

9 a. Write an algorithm to sort a given set of numbers using heap sort. Trace the same for the following set of values: 25, 57, 48, 37, 12, 92, 86, 33. 12

b. Write an algorithm for sentinel search. Explain the same with an example 8

10 a. Write an algorithm to sort a given set of numbers using merge sort trace the same for the following set of values : 25, 57, 48, 37, 12, 92, 86, 33. 10

b. Write an algorithm to search an element using probability search. Trace the algorithm by taking appropriate example. 10

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