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

(An Autonomous Institution affiliated to VTU, Belagavi)

Third Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; Dec - 2017 / Jan - 2018

Data Structures with C

Time: 3 hrs *Max. Marks: 100*

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

UNIT - I

1. a. Explain malloc, calloc and free functions with an example. 10

   b. Differentiate structure and union. Explain different ways of structure declaration. 10

2. a. Write the algorithm to swap two numbers and to find the smallest number in a list. 10

   b. How polynomials are represented? Explain the abstract data types of polynomials. 10

UNIT - II

3. a. Explain Infix, Postfix and Prefix expressions with an example. 10

   b. Obtain the prefix expression for :

      i) ((A+(B-C)*D)^E+F) 10

      ii) X^Y^Z-M+N+P/Q.

4. a. What is Queue? Illustrate abstract data type functions of Queue and its operations. 10

   b. Write a C-Program to illustrate circular Queue by passing parameters. 10

UNIT - III

5. a. Explain the various operations performed on singly linked lists. 10

   b. With a C-Program, explain implementation of stacks using singly linked lists. 10

6. a. What is header node? Explain the following function with an example :

      i) Insert a node at the front end

      ii) Insert a node at the rear end 10

      iii) Delete a node at the front end.

   b. Differentiate singly linked list and doubly linked list. State the advantages and disadvantages of doubly linked lists. 10

UNIT - IV

7. a. What is a TREE? With figure, explain various terminologies associated with tree. 10

   b. With example, explain In-order, Preorder and Post-order binary tree traversals. 10

8. a. What is a HEAP? Explain Ascending and Descending heap. 10

   b. Define the following :

      Strictly binary tree, Skewed tree, Complete binary tree and Binary search tree. 10

Contd..... 2

UNIT - V

9 a. What is an AVL tree? Write an algorithm to create an AVL tree. 10

b. What is a Red-Black tree? Write the procedure to insert a node into a Red-Black tree. 10

10 a. What is a splay tree? What are the different types of splay rotation that can be performed on binary search tree? 10

b. Obtain the optimal binary search tree for the following items and associated priority 10

Keys	A	B	C	D
Probability	0.1	0.2	0.4	0.3

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