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BMS College of Engineering, Bengaluru-560019

(Autonomous Institute, Affiliated to VTU, Belgaum)

December 2015 Semester End Main Examinations

Course:Data Structures with C **Duration: 3 Hours**
Course Code:15IS3DCDSC **Max Marks: 100**
Date:15.12.2015

Instruction:Answer any five full questions choosing one from each unit.

UNIT-I

1. a) Provide an example for structure within a structure.“ Only one field of the union is active at any given time”, explain with an example. **06**
   b) How does the fast transpose of a sparse matrix work? Provide proper analysis of fast transpose. **06**
   c) Develop ‘C’ function for sparse matrix multiplication. **08**

UNIT-II

2. a) Implement push and pop operations of a stack using dynamically allocated array representation. Also include a check for the underflow and overflow conditions. **10**
   b) Demonstrate the evaluation of the postfix expression 1 2 - 3 2 ^ 3 * 6 / + along with the stack trace. **05**
   c) Develop a recursive ‘C’routine to find the sum of digits of a given number. Show the recursion tree for sample input. **05**

UNIT-III

3. a) Develop a C program to perform the following operations on a queue implemented using linked list **10**
      i) Insert
      ii) Delete
      iii) Display
   b) Distinguish between linked lists and arrays. Mention their relative advantages and disadvantages. **05**
   c) Implement a C routine to reverse the given singly linked list so that the last element becomes the first and vice versa. **05**

OR

4. a) Explain with a C program, the implementation of a circular queue using arrays. **10**

   b) Implement the following operations on a singly linked list **10**

   i) free all the nodes.

   ii) Insert a value to the left of K^{th} position.

   iii) Identify the node with the maximum value.

UNIT-IV

5. a) Illustrate linked representation for a doubly linked circular list. Write 'C' functions for **10**

   i) Insertion at K^{th} position.

   ii) Deletion from front end.

   b) Define a binary tree. Explain linked representation of the same. **04**

   c) Build a 'C' function for inorder traversal of a binary tree, and provide the trace. **06**

UNIT-V

6. a) Construct the expression tree for the following expression and perform in-order and post-order for the same. **08**

   (A+(B-C))*((D-E) / (F+G-H))

   b) Develop a program to implement insert operation on Binary search trees. **08**

   c) Differentiate between tree and a graph, explain with an example. **04**

OR

7. a) Implement a C routine to construct a threaded binary tree. **08**

   b) In order to get the information stored in a Binary Search Tree in the descending order, in what order should we traverse? Design and implement C routine for the same. **06**

   c) Explain the various representation of disjoint sets. **06**

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