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BMS College of Engineering, Bangalore-560019

(Autonomous Institute, Affiliated to VTU, Belgaum)

December 2013 / January 2014 Semester End Main Examinations

Course: **DATA STRUCTURES** Duration: **3 Hours**

Course Code: **09CI3GCDSL** Max Marks: **100**

Date: 09.01.2014

Instructions: **Answer FIVE FULL questions, choosing one from each unit.**

UNIT -1

1. a) What is dynamic memory allocation? Give any four differences between malloc () and calloc () functions — 06 Marks

   b) Write a function to — 10 Marks
   - i) To insert a node at the specified position in the singly linked list
   - ii) To create a Doubly Linked List
   - iii) To count number of nodes in Circular Linked List

   c) Explain Circular Doubly Linked List with an example. What are the advantages of Circular Doubly Linked List over Circular Linked List? — 04 Marks

OR

2. a) Write a C program using structures and pointers to read N books information. The information must include Book number, Book name, Author, Price. Calculate total price of all books and print the same. — 06 Marks

   b) Write a function to — 10 Marks
   - i) Delete a given item from Doubly linked list.
   - ii) To delete 3rd node from Singly linked list.
   - iii) Insert a node at the end of Circular linked list.

   c) What is Doubly linked list? Give advantages and disadvantages of Doubly linked list. — 04 Marks

UNIT-2

3. a) How do you represent a polynomial with two variables in memory? Explain along with an example polynomial. — 04 Marks

   b) Write a C program to add two long integers using doubly linked lists. — 08 Marks

   c) Write a C program to create a file NUM_FILE with integer data. Read the contents of this file and write all odd numbers to a file called ODD_FILE and even numbers to a file called EVEN_FILE. — 08 Marks

OR

4. a) Write a C program to evaluate a polynomial with two variables using singly linked list — 08 Marks

   b) Write a C program to create a singly linked list with integer data, by inserting new nodes at the end of the list and perform following operations: — 08 Marks
   - (i) search for a node with data 'x'
   - (ii) reverse the contents of the list without creating extra node

   c) How errors are handled in files? Describe in brief. — 04 Marks

UNIT-3

5. a) Write an algorithm to convert given infix expression to equivalent postfix expression. Trace the algorithm for (A+B) *(C-D) — 12 Marks

   b) Write a C program to implement Tower of Hanoi problem. Trace the same for n=3. — 08 Marks

UNIT-4

6. a) Explain the different types of Queues with an example. — 10 Marks

   b) Write a C program to implement Queue operations using linked list. — 10 Marks

UNIT-5

7. a) For the following tree traversal construct the tree — 04 Marks
   Inorder: B C A E G D H F I J
   Preorder: A B C D E G F H I J

   b) Write C function to construct a binary search tree. While constructing the tree take care that duplicate values are not added. — 08 Marks

   c) Write C function for deleting a node in a binary search tree. — 08 Marks

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