B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

December 2019 / January 2020 Semester End Main Examinations

Programme**: B.E.**
Branch **: Computer Science & Engineering**
Course Code: **19CS3PCDST**
Course: **Data Structures**

Semester : **3**
Duration: **3 hrs.**
Max Marks: **100**
Date: **27.12.2019**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.

UNIT - I

1	a)	Define Data structures. Give its classification. What are the basic operations that can be performed on data structure?	**08**
	b)	List and explain any 4 functions supported in C for dynamic memory allocation with examples.	**08**
	c)	Write the algorithm for Tower of Hanoi using recursion.	**04**

UNIT - II

2	a)	What is Circular queue? Write a 'C' function to implement circular queue using array.	**10**
	b)	What are the advantages of Circular queue over linear queue? Write a 'C' routine for inserting and deleting an element from linear queue.	**10**

UNIT - III

3	a)	Write a C function to perform the following operations on a singly linked list: i) To delete a node whose info field is specified ii) To insert a node to the right of specified node.	**06**
	b)	List the difference between singly and doubly linked lists.	**04**
	c)	Explain the applications of linked list and write a C function to merge two lists using singly linked list.	**10**

OR

4	a)	Write a C function for singly linked lists with integer data, to search an element in the list that is unsorted and also a list that is sorted.	**10**
	b)	Give two singly linked lists. LIST-1 and LIST-2. Write an algorithm to form a new list LIST-3 using concatenation of the lists LIST-1 and LIST-2.	**10**

UNIT - IV

5	a)	Write a C function for the following operations on Doubly linked list (DLL). (i) Concatenation of two DLL. (ii) Search the DLL for the given key element.	**10**
	b)	Write a C implementation of stack using circular doubly linked list.	**10**

OR

6   a) Write a C function to perform the following operations on doubly linked list: **10**
        (i) Inserting a node at the beginning.
        (ii) Deleting a node at the rear end.
        (iii) Inserting an item at the specified position.
    b) Write a C function to add 2 polynomials represented as circular list with header   **10**
        nodes.

UNIT - V

7   a) What is a tree? With suitable example define: **08**
        (i) Binary tree (ii) level of a binary tree (iii) complete binary tree
    b) Define Binary Search Tree (BST). Construct BST for the elements step-by-   **08**
        step,100,85,45,55,110,20,70,65,113,145,132,96
    c) Write an algorithm for inserting an element into the BST.   **04**

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