U.S.N.

BMS College of Engineering, Bangalore-560019

(Autonomous Institute, Affiliated to VTU, Belgaum)

January 2017 Semester End Make Up Examinations

Course: Data Structures Duration: **3 hrs**
Course Code: 15CS3DCDST Max Marks: **100**

Date: 12.01.2017

Instructions: **1.Answer any five full questions choosing one from each unit.**
2. Assume missing data (if any) suitably

UNIT 1

1	**a)**	Write the algorithm for converting infix expression to postfix expression. Further, trace the above algorithm clearly indicating the contents of the stack for the expression: (A+(B-C)*D)	**08**
	b)	Explain the advantages of Circular queue over Linear queue. Write a C-implementation of circular queue using array and develop routines to perform following operation on circular queue. i) Insertion ii) Deletion iii) Display	**08**
	c)	Define Recursion. Write the recursive function for computing n^{th} term of a fibonacci sequence.	**04**

UNIT 2

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2	**a)**	Differentiate between malloc() and calloc().	**04**
	b)	Write a program to insert a given value into an sorted singly linked list.	**06**
	c)	Write a C-functions to implement Circular Singly Linked List,which should support following operations. i) Insert front ii) Insert rear iii) Delete front iv) Delete rear iv) Display	**10**

OR

3	**a)**	List the advantages of Doubly linked list over Singly linked list. Write a C function to delete a node whose information field is specified from Doubly linked list.	**07**
	b)	Write a C-program to concatenate two singly linked list	**07**
	c)	Differentiate between Static and dynamic memory allocation technique.	**06**

UNIT 3

4	**a)**	Write Pre-order, In-order and Post-order traversal for the tree shown below.	**06**
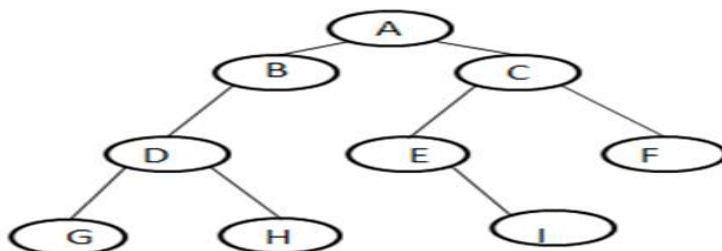
	b)	Write a C-function to implement the deletion of node in a Binary Search Tree with appropriate explanation.	**07**
	c)	Define Expression Tree. Construct an Expression tree showing each step for the given postfix expression ab+cde+**.	**07**

UNIT 4

5 **a)** Describe the use of Threaded Binary Tree and explain the types of Threaded Binary tree. **07**

    b) Construct an AVL Tree by inserting the following elements in the given order **07**
63,9,19,27,18,108,99,81

    c) Define Red-Black trees. Explain the properties and applications of Red-Black trees. **06**

OR

6 **a)** Explain the structure of Binomial and Fibonacci Heaps with an example. **05**

    b) Define B-Tree. Explain with an example to search an element in a B-Tree. **07**

    c) Explain the Huffman's Tree technique. Construct the Huffman tree for the following data **08**

A	B	C	D	E	F	G	H	I	J
7	9	11	14	18	21	27	29	35	40

UNIT 5

7 **a)** Write an algorithm for Sorting by Counting technique. Apply the same for the following **07**
sequence of integers to sort in ascending order (57, 28, 13, 65, 76).

    b) Write a C program to search for an element in an array using Binary search technique. **06**

    c) Define Hashing. Explain the concept of Separate Chaining with an example. **07**

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