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RV COLLEGE OF ENGINEERING®

(An Autonomous Institution affiliated to VTU)

III Semester B. E. Examinations Nov/Dec-19

Computer Science and Engineering

DATA STRUCTURES USING C

Time: 03 Hours ***Maximum Marks: 100***

Instructions to candidates:

1. Answer all questions from Part A. Part A questions should be answered in first three pages of the answer book only.
2. Answer FIVE full questions from Part B. In Part B question number 2, 7 and 8 are compulsory. Answer any one full question from 3 and 4 & one full question from 5 and 6

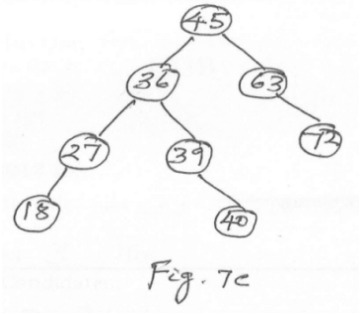
PART-A

1	1.1	Convert the following infix expression to postfix expression: $A + B * (C - (D/E\text{^}F) * G) * H.$	02
	1.2	What is dangling pointer problem in C? How can it be avoided?	01
	1.3	Given pointer to node 'x' in a singly linked list, delete the node 'x' from the given linked list (pointer to starting node is not given).	02

	1.4	What does the following function do for a given linked list with first node as head
		$void\ fun1(struct\ node\ *head)$
		{
		$if(head == NULL)$
		$return;$
		$fun1(head->next);$
		$printf("\%d", head->data);$
		}
			02

	1.5	A circular queue of size 5 has three elements 20, 40 and 60 where front= 0 and rear= 2. Show the value of front and rear after each of these operations. a) insert 50. b) insert 10. c) insert 30. d) delete an item.	02
	1.6	State the condition to check whether the Circular Queue is full.	02
	1.7	On constructing a binary scorch tree for the elements 17,85,100,24,7,2,5,12 and 99. Identify the left and the right child for node 7.	02
	1.8	Construct a splay tree for the elements 12,18,17,2,15	02
	1.9	Identify the ideal data structure for the following: a) to implement a dictionary b) to implement token system in a bank.	02
	1.10	Write a non-recursive algorithm or function to perform the preorder traversal on a binary tree.	02
	1.11	In the delete operation on a heap_____ node is always deleted	01

PART-B

2	a	Discuss on algorithm to evaluate a given postfix expression and trace the same for $234 * 6/+$	08
	b	Write a C program to check whether the given string is a palindrome or not using stack operations.	08
3	a	Discuss the Enqueue operation on a linear queue.	02
	b	Discuss the Josephus problem. Implement the same using the appropriate data structure.	08
		Bring out the difference between: i) malloc and calloc. ii) Enqueue and dequeue.	06
		OR	
4	a	Write a C program to find the sum of an array using dynamic memory allocation.	04
	b	Bring out difference between linear queue and circular queue and their applications.	04
	c	Write a C program to implement a queue using stacks.	08
5	a	Write a C function to delete a node based on position in a singly linked list.	06
	b	Discuss the implementation of a stack using a singly linked list with header node.	08
	c	What is a header node? What are the advantages of using header node?	02
		OR	
6	a	Write a C program to check whether the given double linked list with header node is a palindrome	10
	b	Write a C function to delete alternate nodes in a doubly linked list.	06
7	a	Perform The following: i) Construct an AVL tree by inserting the following elements in the given order: $63, 9, 19, 27, 18, 108, 99, 81$ ii) Consider the AVL tree given in Fig.7c and delete 72 from it.  Fig. 7c	08
	b	Write a C function to perform deletion of a node in Binary search tree.	08
8	a	Define Hashing. Explain any one method to resolve collision. Given the values: { 10,11,12,13,14,15,22,33,44,55,66,16,99,0} and a hash function $h(x) = x mod 7$, show the resulting tables after inserting the values in the given order using separate chaining strategy.	08
	b	What is the difference between a binary search tree and a heap? For a given sequence of numbers construct max heap and a BST 34,23,67,45,12,54,87,43,98,75,84,93,31	08