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RV COLLEGE OF ENGINEERING®
(An Autonomous Institution affiliated to VTU)
III Semester B. E. Fast Track Examinations Oct-2020
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	State the memory region used in dynamic memory allocation	01
	1.2	What type of data structure is a linked list	01
	1.3	A priority queue can be efficiently implemented using which data structure?	01
	1.4	What is dangling pointer problem in C?	01
	1.5	Define an AVL tree?	01
	1.6	Given a binary search tree (BST), how to print its values in ascending order	01
	1.7	Apply postfix expression evaluating algorithm to evaluate the following expression : 6 2 3 + − 3 8 2 / + ∗	02
	1.8	Write the output. Start pointer points to the first node of the following list: $1 \rightarrow 2 \rightarrow 3 \rightarrow 4 \rightarrow 5 \rightarrow 6$ $void\ rvce\ (stnset\ node\ *\ start)$ $\{$ $\quad if(start\ ==\ NULL)\ return;$ $\quad\quad printf(``\%d", start \rightarrow info)$   $\quad if(start \rightarrow next! = NULL)$   $\quad\quad rvce(start \rightarrow next \rightarrow next);$   $\quad printf(``\%d", start \rightarrow info);$ $\}$	02
	1.9	List the different open addressing hashing techniques	02
	1.10	On constructing a binary search tree for the given set of elements, list all the leaf nodes: 42 102 27 47 27 77 12 82 152	02
	1.11	Construct a splay for the following elements : 2 1 4 5 9 3	02
	1.12	After constructing a max heap for the given elements using top-down approach, what will be the left and right child of root? 45 36 54 27 63 72 61 18	02
	1.13	Design a recursive function to print the elements of a singly linked list in a reverse order, without actually reversing the list.	02

PART-B

2	a	Write a C function to convert an infix expression to postfix.	08
	b	Define tower of Hanoi problem. Give a recursive solution for the same.	04
	c	Discuss how to check whether a given string is palindrome or not using stack.	04
3	a	Write a C program to implement a message queing system using circular queue.	08
	b	Differentiate between malloc and calloc function.	04
	c	Discuss how to implement a queue using stacks.	04

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OR

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4	a	Write a C program to implement a linear queue of integers.	08
	b	Discuss the dequeue operation on a circular queue.	04
	c	Write a C program to find the sum of n elements using dynamic memory allocation.	04
5	a	Implement a dynamic stack using singly linked list.	08
	b	Write a C function to reverse a doubly linked list using recursion.	04
	c	Write a C function to create an ordered singly linked list.	04

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OR

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6	a	Implement a dynamic queue using singly linked list.	08
	b	Write a C function to multiply two polynomials using singly linked list.	04
	c	Write a C function to insert a node based on position onto a doubly linked list with header node.	04
7	a	Construct a binary tree for the following expression & perform the preorder, inorder and postorder traversal for the same: $$4 + 3 * 7 - 5(3 + 4) + 6$$	08
	b	Write a C function to count the number of leaf nodes in a binary tree.	04
	c	Construct an AVL tree for the characters of the word $COMPUTER$.	04
8	a	Discuss with functions, the procedure to constrict a max heap and to perform extractmax operation.	08
	b	Define Hashing. Explain any one method to resolve collision. Given a hash function $h(x) = x \bmod 7$ and the values: $\{10, 22, 43, 55, 27, 8, 66, 17, 41\}$, Show the resulting table using separate chaining strategy.	08