Roll No. 2 3 9 9 0 0 1

Mid-Semester Examination 2023

Name of the Program: **B.Tech. (CSE)** *Semester*: **III**

Name of the Course: **Data Structure with 'C' Language** *Course Code*: **TCS 302**

Time: 1:30 Hours **MM: 50**

Note:

Note: (i) This question paper contains five questions with alternative.
(ii) All questions are compulsory.
(iii)Each question carries two parts a or b. Attempt either parts a or b of eachquestion.
(iv) Total marks assigned to each question are ten.

Q.1	**(10 Marks)**	**CO1, CO2**
a)	Assume that we have a singly linked list with a pointer P, at first node. Write a C function to input a number and search it in the linked list if number is found, update the linked list by deleting that node otherwise print number not found.	
	OR	
b)	Explain tower of Hanoi problem. Draw recursive tree for 3 discs movement.	
Q.2	**(10 Marks)**	**CO1, CO2**
a)	Assume that you have a double linked list, first node of the list is pointed by pointer Q, write a C function to insert a node after the K^{th} node of the list.	
	OR	
b)	Convert the following infix expression into postfix expression using stack (show all steps). A+B*(C/D-E)+F^G	
Q.3	**(10 Marks)**	**CO1, CO2**
a)	Given a single circular linked list, where first node is pointed by pointer R, write a C function to insert a new node at the end of the list.	
	OR	
b)	Design push () and pop () method to print the reverse of a string input using stack	
Q.4	**(10 Marks)**	**CO2**
a)	What are the applications of Queue in Data structures and algorithm. Define any five applications. Also, write a function to enqueue 'n' elements in a simple queue.	
	OR	
b)	Assume that we have a single linked list with a pointer P at first node. Write C function to print all the nodes having multiples of k in the linked list.	
Q.5	**(10 Marks)**	**CO2**
a)	Assume that you have two singly linked lists. First node of the first linked list is pointed by Ptr1 and First node of second linked list is pointed by pointer Ptr2. Write a C function to create a new linked list pointed by Ptr3 which is the union of both the linked list. Print the list pointed by Ptr3. Input: Ptr1-> 1 -> 2 -> 3 -> 4 -> 5 Ptr2-> 9 -> 5 -> 3 -> 6 Output: Ptr3-> 1 -> 2 -> 3-> 4 -> 5 ->9 ->6	
	OR	
b)	Write a C function to find the smallest element in a doubly linked list. Display the result	