

# CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

18RA33

## Third Semester B.Tech. Degree Examination, Feb./Mar. 2022 Data Structure with C

Time: 3 hrs.

Max. Marks: 100

**Note:** Answer any FIVE full questions, choosing ONE full question from each module.

### Module-1

- 1 a. What is Data Structure? What are the various types of Data Structures? Explain. (06 Marks)
- b. Explain Dynamic Memory Allocation functions in detail. (06 Marks)
- c. List and explain the different Operations that can be carried on arrays. (08 Marks)

OR

- 2 a. Define Strings. List and explain any 3 operations with example. Write a C program to concatenate two strings. (10 Marks)
- b. Write the Knuth Morris Pratt pattern matching algorithm and apply the same to search the pattern 'ABCDABD' in the text 'ABC ABCDAB ABCDABCDABDE'. (10 Marks)

### Module-2

- 3 a. Write an algorithm to convert a parenthesized infix expression to postfix. Apply the algorithm and show the contents of stack during conversion of expression  $a * (b + c) * d$ . (06 Marks)
- b. Define Recursion. Write Recursion function to solve Tower of Hanoi problem with n disks. (06 Marks)
- c. Define Stack. Implement stack using array. Write C functions to push an element on to stack, pop an element from stack and display the elements of stack. (08 Marks)

OR

- 4 a. Define Queue. Write a C program to simulate working of circular queue of characters using arrays. Provide C functions for following operations :  
i) Insert ii) Delete iii) Display. (10 Marks)
- b. Write an algorithm to evaluate a postfix expression using stack and apply the same for postfix expression  $562 + * 44/-$ . (10 Marks)

### Module-3

- 5 a. What is Linked List? Write C functions to insert node and delete a node at end of singly linked list. (10 Marks)
- b. Write and explain how do you implement operations of stack using singly linked list with C functions. (10 Marks)

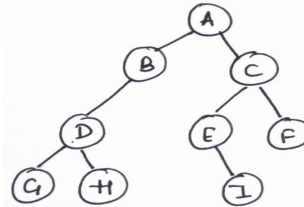
OR

- 6 a. State the advantage of Doubly Linked List over singly linked list. Implement insertion and deletion of a node at front of DLL using C function. (10 Marks)
- b. Develop a C program to concatenate two Doubly Linked Lists. (10 Marks)

**Module-4**

- 7 a. What is Binary tree? Write C routines to traverse a Binary tree using  
 i) Pre – order      ii) Inorder      iii) Post - order.  
 Give Pre-order , Post – order and Inorder traversal sequence of the given tree. Fig. Q7(a)(i)  
 (10 Marks)

Fig. Q7(a)(i)



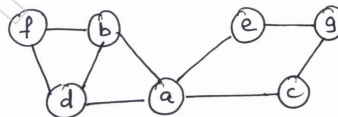
- b. Explain Expression trees. Represent the infix expression  $((6 + (3-2) * 5) \wedge 2 + 3)$  as expression tree and traverse it in preorder and postorder.  
 (10 Marks)

**OR**

- 8 a. Define Threaded Binary Trees. Explain various types of threaded Binary trees with example. Also list its advantages and disadvantages. (10 Marks)  
 b. Explain the construction of Binary search tree for 40, 60, 50, 33, 55, 11. Implement BST using linked list. Write C function to search an item in BST using iteration. (10 Marks)

**Module-5**

- 9 a. Explain BFS and DFS graph traversal techniques. Apply both graph traversal techniques for the graph given below : Considering 'a' as source vertex. (12 Marks)



- b. Write C function for insertion sort. Sort the elements 25, 75, 40, 10, 20 using insertion sort.  
 (08 Marks)

**OR**

- 10 a. What is Hashing? Explain types of Hash functions, Static and Dynamic Hashing Techniques. (10 Marks)  
 b. Briefly explain basic operations that can be performed on a file. Compare and contrast sequential and indexed sequential file organization. (10 Marks)

\* \* \* \* \*