Roll No.												

PRESIDENCY UNIVERSITY
BENGALURU

Presidency School of Computer Science and Engineering (PSCS)

Mid - Term Examinations - September 2024

Model Question Paper

Semester: III	**Date**:
Course Code: CSE2001	**Time**: 00:00am – 00:00pm
Course Name: Data Structures and Algorithms	**Max Marks**: 50
Program:B.Tech	**Weightage**: 25%

Instructions:

(i) Read all questions carefully and answer accordingly.

(ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.				**2Mx5Q=10M**
1	Explain the concept of an Abstract Data Type (ADT) with an example	**2 Marks**	**L2**	**CO1**
2	Define Recursion.	**2 Marks**	**L2**	**CO1**
3	Compare a standard queue with a circular queue.	**2 Marks**	**L2**	**CO1**
4	Interpret how to check overflow condition for Stack using arrays.	**2 Marks**	**L2**	**CO1**
5	Define one-dimensional array with an example.	**2 Marks**	**L2**	**CO1**

Part B

Answer ALL Questions. Each question carries 10 marks.					**4QX10M=40M**
6a	**i.**	Design a code snippet to insert a new element to an array in the given position	**4 Marks**	**L3**	**CO2**
	ii.	Use Code Snippet to demonstrate the following operation on Stack a. Push b. pop	**6 Marks**	**L3**	**CO2**
Or					

6b	**i.**	Use Code Snippet to demonstrate the following operation on Stack a. Enqueue b. DeQueue	**4 Marks**	**L3**	**CO2**
	ii.	Design a code snippet to Delete an element from an array in the given position	**6.Marks**	**L3**	**CO2**

7a	**i.**	Discuss the disadvantages of arrays.	**3 Marks**	**L2**	**CO2**
	ii.	Convert the following infix expression to a postfix expression using a stack data structure K + L - M*N + (O^P) * W/U/V * T + Q	**7 Marks**	**L3**	**CO2**
or					
7b	**i.**	Discuss the disadvantages of normal queue implementation using arrays	**3 Marks**	**L2**	**CO2**
	ii.	Evaluate the following postfix expression using stack a. 2 3 1 * + 9 – b. 100 200 + 2 / 5 * 7 +	**7 Marks**	**L3**	**CO2**

8a	**i.**	Implement the following operation in a Singly linked list a. Insert a new node in the beginning **b.** Deleting node from the end	**8 Marks**	**L3**	**CO3**
	ii.	**Predict the status of a single linked list** Node CP=head; Node A=new Node() head=A Node b=new Node() A.link=b Head=null;	**2 Marks**	**L3**	**CO3**
or					
8b	**i.**	Implement the following operation in the Circular Singly linked list a. Insert a new node at the end of the linked list **b.** Deleting node from the beginning	**8 Marks**	**L3**	**CO3**

	ii.	Calculate the number of nodes present in the linked list
		
		Node a=new Node(10)
		Node b=new Node(20)
		Node c=new Node(30)
		Node d=new Node(40)
		Head=a;
		A.link=b;
		b.link=c;
		c.link=d;
		b.link=null
			2 Marks	**L3**	**CO3**

9a	**i.**	Design a code snippet for the following operation c. Find nth Fibonacci number d. Find the factorial of a given number	**8 Marks**	**L3**	**CO3**
	ii.	Describe the following e. Base case f. Recessive case	**2 Marks**	**L2**	**CO3**
		or			
9b	**i.**	Design a recursive function to solve the Tower of Hanoi problem	**8 Marks**	**L3**	**CO3**
	ii.	Discuss the advantages of recursion.	**2 Marks**	**L2**	**CO3**