



PRESIDENCY UNIVERSITY

BENGALURU

Roll No.														
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End - Term Examinations – May/June 2026

Date: 18- 05-2026

Time: 09:30am – 12:30pm

School: SOIS	Program: BCA	
Course Code : CSA2500	Course Name: Data Structures	
Semester: II	Max Marks: 100	Weightage: 50%

CO - Levels	C01	C02	C03	C04	C05	C06
Marks	24	12	12	14	12	26

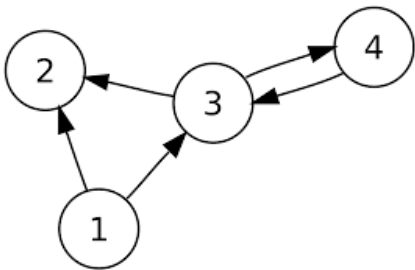
Instructions:

- Read all questions carefully and answer accordingly.
- Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1.	Discuss two applications of Queue.	2 Marks	L2	C01
2.	Determine the state of the stack after performing one push and one pop operation on an initially empty stack.	2 Marks	L3	C01
3.	Discuss the structure of a node in a doubly linked list.	2 Marks	L2	C02
4.	Explain recursion along with the suitable example.	2 Marks	L2	C03
5.	Differentiate between singly and doubly Linked List.	2 Marks	L2	C04
6.	Discuss any two properties of a tree.	2 Marks	L2	C04
7.	Write the adjacency matrix for following graph. 	2 Marks	L2	C05

8.	Explain the working principle of insertion sort.	2 Marks	L2	C06
9.	Explain time complexity along with the suitable example.	2 Marks	L2	C06
10.	Explain the necessary condition required to apply binary search on a dataset.	2 Marks	L2	C06

Part B

Answer the Questions.

Total Marks 80M

11.	a.	Discuss an algorithm to enqueue and deque an element from the queue.	10 Marks	L2	C01
	b.	Explain different types of arrays and how arrays are initialized and accessed.	10 Marks	L2	C01

Or

12.	a.	Explain the types of queues with diagrams and applications.	10 Marks	L2	C01
	b.	Discuss an algorithm to push and pop an element from the stack.	10 Marks	L2	C01

13.	a.	Develop algorithm to perform insertion at the middle operation in a singly linked list and illustrate it with example.	10 Marks	L3	C02
	b.	Develop algorithm to perform deletion from the end operation in a singly linked list and illustrate it with example.	10 Marks	L3	C02

Or

14.	a.	Develop a recursive algorithm to find the factorial of a number and demonstrate its execution.	10 Marks	L3	C03
	b.	Develop a recursive algorithm to solve the Tower of Hanoi problem and demonstrate its execution for 3 disks.	10 Marks	L3	C03

15.	a.	Construct a Binary Search Tree (BST) for the following keys: {60, 30, 80, 20, 40, 70, 90, 10, 25}. After constructing the BST, perform the following traversals: In-order traversal, Pre-order traversal and Post-order traversal.	10 Marks	L3	C04
	b.	Write an algorithm for preorder tree traversal, post order tree traversal and in-order tree traversal along with suitable example.	10 Marks	L3	C04

Or

16.	a.	Consider a graph with vertices {P, Q, R, S, T} and edges {(P,Q), (P,S), (Q,R), (R,T), (S,T)}. Represent the graph using: Adjacency Matrix and Adjacency List.	10 Marks	L3	C05
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	b.	Construct any graph with at least six vertices and represent it using an Adjacency Matrix and Adjacency List.	10 Marks	L3	C05
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17.	a.	Write an algorithm to perform selection sort and apply it to sort the elements 18, 64, 29, 47, 11, 83, 52, and 36.	10 Marks	L3	C06
	b.	Compute the time complexity of linear search and binary search. Illustrate how it works for best and worst cases using an example.	10 Marks	L3	C06

Or

18.	a.	Write the insertion sort algorithm and demonstrate its working by sorting the elements: 22, 68, 39, 14, 57, 91, 33, and 46.	10 Marks	L3	C06
	b.	Write an algorithm binary search and demonstrate its working to search for the element 27 in the sorted array 12, 18, 27, 34, 45, 56, 63, and 71.	10 Marks	L3	C06