Roll No.											

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 16 – 12- 2025 **Time:** 09:30am – 12:30pm

School: SOCSE	**Program**: B. Tech	
Course Code : CSE2253	**Course Name:** Data Structure	
Semester: III	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	CO1	CO2	CO3	CO4
Marks	**26**	**24**	**64**	**66**

Instructions:

(i) Read all questions carefully and answer accordingly.

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

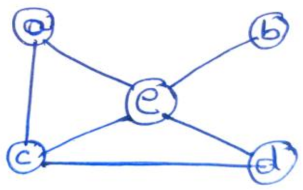
Part A

Answer ALL the Questions. Each question carries 2marks. **10Q x 2M=20M**

1.	Give the general syntax for declaring a structure variable.	**2 Marks**	**L1**	**CO1**

2.	Write the output of this code snippet
	void main( )
	{
	int i;
	for(i = 10; i > 0; i -= 3)
	printf("%d ", i);
	}
		2 Marks	**L3**	**CO1**

3.	List the different types of linear and non-linear data structures	**2 Marks**	**L1**	**CO1**
4.	List any two applications of queue and two applications of linked list	**2 Marks**	**L1**	**CO2**
5.	In a circular queue implemented using an array of size MAX, write the condition to check if the circular queue is full	**2 Marks**	**L2**	**CO2**

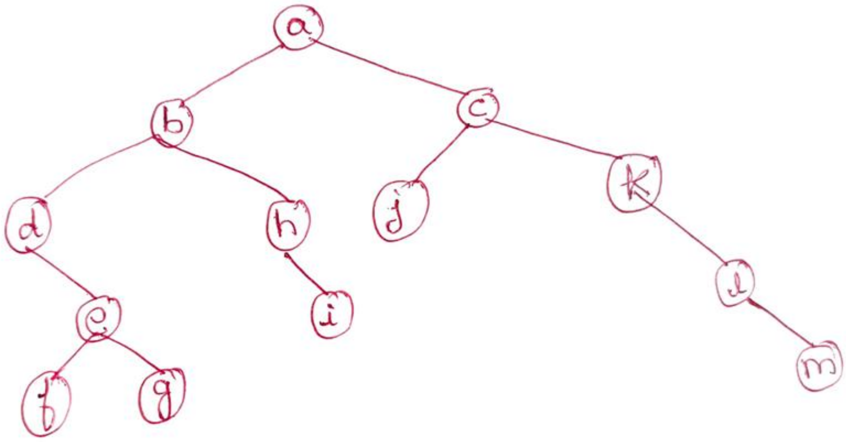
6.	Write the structure of a node used in doubly linked list using C	**2 Marks**	**L2**	**CO3**
7.	List any two applications of circular linked list.	**2 Marks**	**L1**	**CO3**
8.	Write the adjacency matrix for the given graph 	**2 Marks**	**L3**	**CO4**
9.	If a complete binary tree contains n levels, derive the formula for the total number of nodes.	**2 Marks**	**L2**	**CO4**
10.	Define collision in hashing and list any two collision resolution techniques	**2 Marks**	**L3**	**CO4**

Part B

Answer the Questions. **Total Marks 80M**

11.		Define tower of Hanoi problem. Write a C program to solve the Tower of Hanoi problem using recursion.	**10 Marks**	**L3**	**CO1**
		Or			
12.		List the disadvantages of static memory allocation and explain how each of them can be overcome by dynamic memory allocation. Also describe the different types of dynamic memory allocation functions in C along with their general syntax.	**10 Marks**	**L3**	**CO1**
13.	**a.**	Convert the given infix expression into postfix and prefix expressions. (a + b ^ c ^ d) * (e + f / d)	**10 Marks**	**L3**	**CO2**
		Or			
14.	**a.**	List the disadvantages of a linear queue and explain how they can be overcome by a circular queue. Also write only the functions for enqueue and dequeue using C	**10 Marks**	**L2**	**CO2**
15.	**a.**	Discuss the advantages and limitations of Singly Linked Lists over arrays. Write a function for inserting a new node at a specific position using C.	**10 Marks**	**L2**	**CO3**
		Or			
16.	**a.**	List the various operations performed on a doubly linked list, and write C functions for: a) inserting a node at the front, and b) displaying the contents of a doubly linked list in reverse order.	**10 Marks**	**L3**	**CO3**

17.	**a.**	Define the following with an example. a) binary tree b) complete binary tree c) almost complete binary tree d) binary search tree	**10 Marks**	**L2**	**CO4**
		Or			
18.	**a.**	Define the following with an example. a) Graph b) weighted graph c) cyclic graph d) directed graph	**10 Marks**	**L2**	**CO4**

19.	**a.**	Define AVL trees. Explain the four different types of rotations used while constructing the AVL trees with an example. Apply the same to construct the AVL tree for the following list of numbers. 10, 15, 9, 12, 13, 79, 45, 36, 22	**20 Marks**	**L3**	**CO4**
		Or			
20.	**a.**	Define tree traversal. Explain its importance. List the types of tree traversal. Apply all types of tree traversal methods to the following binary tree. 	**20 Marks**	**L3**	**CO4**

21.		Define hashing. Using a hash table of size 6 and the hash function h(key) = key % 6, apply Separate Chaining to insert the following keys: 10, 25, 16, 5, 12, 15, 32, 19. List the disadvantages of Separate Chaining if any. Explain how these disadvantages can be overcome by applying any one Open Addressing technique. Demonstrate the insertion of the same set of keys using Linear Probing.	**20 Marks**	**L3**	**CO3**
		Or			
22.		Write a complete C program for the following operations on a stack using array: a) PUSH b) POP c) Display d) Menu driven main function	**20 Marks**	**L3**	**CO3**