

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

Third Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Data Structures and Applications

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

Module – 1				M	L	C
Q.1	a.	Define Data Structures. Explain the classification of data structures with a neat diagram.		8	L2	CO1
	b.	Write a C Functions to implement pop , push and display operations for stacks using arrays.		7	L2	CO2
	c.	Differentiate structures and unions.		5	L2	CO1
OR						
Q.2	a.	Write an algorithm to evaluate a postfix expression and apply the same for the given postfix expression. 6 2 / 3 – 4 2 * +.		7	L3	CO2
	b.	Explain the dynamic memory allocation function in detail.		8	L2	CO1
	c.	What is Sparse matrix? Give the triplet form of a given matrix and find its transpose $A = \begin{bmatrix} 0 & 0 & 3 & 0 & 4 \\ 0 & 0 & 5 & 7 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 2 & 6 & 0 & 0 \end{bmatrix}$		5	L3	CO1
Module – 2						
Q.3	a.	Define Queue. Discuss how to represent a queue using dynamic arrays.		8	L2	CO2
	b.	Write a C Function to implement insertion () , deletion () and display () operations on circular queue.		6	L3	CO2
	c.	Write a note on Multiple stacks and queues with suitable diagram.		6	L2	CO2
OR						
Q.4	a.	What is a linked list? Explain the different types of linked list with neat diagram.		6	L2	CO3
	b.	Write a C function for the following on singly linked list with example : i) Insert a node of the beginning ii) Delete a node at the front iii) Display.		8	L3	CO3
	c.	Write the C function to add two polynomials.		6	L2	CO3

Module – 3					
Q.5	a.	Discuss how binary trees are represented using : i) Assay ii) Linked list.	6	L2	CO4
	b.	Define Threaded binary tree. Discuss In – threaded binary tree.	6	L2	CO4
	c.	Write the C function for the following additional list operation : i) Inverting Singly linked list ii) Concatenating Singly linked list.	8	L3	CO3
OR					
Q.6	a.	Discuss Inorder , Preorder , Postorder and Level order traversal with suitable function for each.	8	L3	CO4
	b.	Define the threaded binary tree. Construct threaded binary tree for the following element : A, B, C, D, E, F, G, H, I.	6	L2	CO4
	c.	Write a C function for the following : i) Insert a node at the beginning of doubly linked list. ii) Deleting a node at the end of the doubly linked list.	6	L3	CO3
Module – 4					
Q.7	a.	Define Forest , Transform the forest into a binary tree and traverse using inorder , preorder and postorder traversal with an example.	8	L1	CO5
	b.	Define Binary search tree. Construct a binary search tree for the following elements : 100 , 85 , 45 , 55 , 120 , 20 , 70 , 90 , 115 , 65 , 130 , 145.	6	L2	CO5
	c.	Discuss Selection tree with an example.	6	L2	CO5
OR					
Q.8	a.	Define Graph. Explain adjacency matrix and adjacency list representation with an example.	8	L2	CO5
	b.	Define the following terminology with example : i) Digraph ii) Weighted graph iii) Self loop iv) Connected graph.	6	L2	CO5
	c.	Briefly explain about Elementary graph operations.	6	L3	CO5
Module – 5					
Q.9	a.	Explain in detail about Static and Dynamic Hashing.	6	L2	CO5
	b.	What is Collision? What are the methods to resolve collision?	7	L2	CO5
	c.	Explain Priority queue with the help of an examples.	7	L2	CO5
OR					
Q.10	a.	Define Hashing. Explain different hashing functions with suitable examples.	12	L2	CO5
	b.	Write short note on : i) Leftist trees ii) Optimal binary search tree.	8	L3	CO5
