



Third Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026  
**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.	10	L2	CO1
	b.	5	L2	CO1
	c.	5	L2	CO1
<b>OR</b>				
Q.2	a.	7	L2	CO1
	b.	7	L3	CO1
	c.	6	L3	CO1
<b>Module – 2</b>				
Q.3	a.	8	L2	CO2
	b.	6	L2	CO2
	c.	6	L2	CO2
<b>OR</b>				
Q.4	a.	4	L2	CO2
	b.	8	L3	CO2

	c.	Write a C function to add two polynomials show the Linked List representation of below two polynomials $p(x) = 3x^{14} + 2x^7 + 1$ $q(x) = 8x^{14} + 5x^5 + 3x^2 + 2$	8	L3	CO2
<b>Module – 3</b>					
Q.5	a.	Write a C-function for the following operation on doubly Linked List (DLL): (i) Addition of a DLL node. (ii) Concatenation of two DLL.	8	L3	CO3
	b.	Write a C-function for the following operations on circular Linked List (i) Inserting at the front of a List. (ii) Find the number of nodes in circular list.	8	L3	CO3
	c.	Represent the given Sparse matrix using linked list representation. $A = \begin{bmatrix} 2 & 0 & 0 & 0 \\ 4 & 0 & 0 & 3 \\ 0 & 0 & 0 & 0 \\ 7 & 0 & 1 & 1 \\ 0 & 0 & 6 & 0 \end{bmatrix}$	4	L3	CO3
<b>OR</b>					
Q.6	a.	Explain the different types binary tree representation with example.	8	L3	CO3
	b.	Define Threaded Binary tree. Discuss in threaded binary tree.	4	L3	CO3
	c.	Discuss Inorder, preorder, postorder and level order traversal with suitable recursive function for each.	8	L2	CO3
<b>Module – 4</b>					
Q.7	a.	Write a function to perform the following operations on Binary Search Tree (BST): (i) Inserting on element into BST. (ii) Recursive search of a BST.	8	L3	CO4
	b.	Discuss selection Trees with suitable example.	8	L2	CO4
	c.	Explain transforming a forest into a binary tree with an example.	4	L2	CO4
<b>OR</b>					
Q.8	a.	Define graph. Show the adjacency matrix and adjacency. List representation of the graph given below.	6	L3	CO4

Fig. Q8 (a)

	b.	Define the following Terminologies with examples : (i) Vertex (node) (ii) Self loop (iii) Weighted graph (iv) Parallel edges	7	L1	CO4
	c.	Explain in detail elementary graph operations.	7	L1	CO4
<b>Module – 5</b>					
Q.9	a.	What is collision? What are the methods to resolve collision? Explain linear probing with example.	8	L2	CO5
	b.	Explain in details about static and dynamic hashing.	6	L2	CO5
	c.	Discuss Leftist Trees with an example.	6	L2	CO5
<b>OR</b>					
Q.10	a.	Explain different types of HASH functions with example.	6	L2	CO5
	b.	Discuss different types of rotations with suitable examples.	6	L3	CO5
	c.	Define Red-Black Tree, Splay tree. Discuss the method to insert an element into Red-Black tree.	8	L2	CO5

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