Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 60001

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2025
Third Semester
Computer Science and Engineering
U23IT302 - DATA STRUCTURES
(Common to ECE)
(Regulation 2023)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Write the pseudo code to insert an element at the end of the singly linked list.	2	K2	CO1
2.	Mention a few real-time applications of linked list.	2	K1	CO1
3.	Explain the usage of stack in recursive algorithm implementation.	2	K2	CO2
4.	What are the postfix and prefix forms of the expression A+B*(C-D)/(P-R)?	2	K2	CO2
5.	Explain why it is said that the searching a node in a binary search tree is efficient than that of a simple binary tree.	2	K2	CO3
6.	List out the steps involved in deleting a node from a binary search tree.	2	K1	CO3
7.	State the applications of graph and its benefits over tree data structures.	2	K1	CO4
8.	What is the minimum number of spanning trees possible for a complete graph with n vertices?	2	K1	CO4
9.	Apply Insertion sort and sort the following elements 3, 5, 8, 6, 9, 1, 4.	2	K2	CO5

10.		Identify and brief the methods for avoiding collision.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Explain and write the routine for insertion, deletion and finding an element in singly linked list.	13	K1	CO1
		(OR)			
	b)	Write a C program for polynomial addition and multiplication using linked list.	13	K1	CO1
12.	a)	i. Explain how stack is used to convert the following infix to postfix form a+b*c+(d*e+f)*g.	7	K2	CO2
		ii. Write a program for linked list implementation of stack.	6		
		(OR)			
	b)	Explain the array-based implementation of a queue in detail. Write the algorithms for insertion (enqueue) and deletion (dequeue) operations. Illustrate the process with a suitable example and discuss the limitations of this implementation.	13	K2	CO2
13.	a)	Write an algorithm for preorder, inorder and post order traversals of a binary tree.	13	K3	CO3
		(OR)			
	b)	Explain the following routines in AVL tree with example. i. Insertion ii. Deletion iii. Single rotation and iv. Double rotation	13	K3	CO3
14.	a)	Present the pseudo code of different graph traversal methods and demonstrate with an example.	13	K3	CO4
		(OR)			
	b)	Write the Pseudo code for Dijkstra's shortest path algorithm. Give suitable example to trace the algorithm.	13	K3	CO4
15.	a)	Explain in detail the working of quick sort algorithm. Sort the following elements 12, 56, 32, 78, 6, 4, 99, 67, 11, 44, 52 using quick sort algorithm.	13	K2	CO5
		(OR)			
	b)	Define hashing. Explain any two methods of hashing. Define collision resolution in hashing. Describe the various methods used to resolve collisions, explaining each method with suitable examples.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Given input { 4371, 1323, 6173, 4199, 4344, 9679, 1989 } and a hash function h(x)=x mod 10. Show the resultant hash table for the following: i. Separate chaining hash table. ii. Open addressing hash table using linear probing. iii. Open addressing hash table using quadratic probing. iv. Open addressing hash table with second hash function h2(x)=7-{x mod 7}	15	K3	CO5
		(OR)			
	b)	Explain Prim's and Kruskal's algorithm. Find the minimum spanning tree for the following using any one of the algorithm.	15	K3	CO4