

Reg.No.:

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

Question Paper Code: 50033

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. 2026

Fourth Semester

Electrical and Electronics Engineering

U19CS417 – DATA STRUCTURES

(Regulation 2019)

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.	Differentiate between array implementation and linked list implementation of a List ADT.	2	K2	CO1
2.	Illustrate how insertion is performed in a doubly linked list with a simple diagram.	2	K2	CO1
3.	Write the infix expression for the given postfix expression AB+CD-*.	2	K2	CO2
4.	Differentiate between a linear queue and a circular queue.	2	K1	CO2
5.	Write the preorder traversal for the given expression tree of (A+B)*C.	2	K2	CO3
6.	Explain the significance of balance factor in AVL trees.	2	K2	CO3
7.	What is the difference between adjacency matrix and adjacency list representation of graphs?	2	K2	CO4
8.	Name any two shortest path algorithms and their use cases.	2	K1	CO4
9.	Compare Quick Sort and Merge Sort	2	K2	CO5
10.	Differentiate between separate chaining and open addressing in hashing.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Illustrate the structure of a singly linked list and explain its insertion and deletion operations with algorithms.	13	K2	CO1

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| b) | Compare and contrast singly linked lists, doubly linked lists, and circular linked lists based on insertion, deletion, and traversal. | 13 | K3 | CO1 |
| 12. a) | Explain Stack ADT in detail. Write algorithms for Push, Pop, and Peek operations. Also, illustrate with an example how stack can be used to reverse a string. | 13 | K3 | CO2 |

(OR)

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| b) | Analyze the differences between linear queues, circular queues, and DeQueues with respect to memory utilization and efficiency. | 13 | K2 | CO2 |
| 13. a) | Compare and contrast binary trees and binary search trees (BST) in terms of structure, operations, and applications. | 13 | K2 | CO3 |

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|--------|--|----|----|-----|
| b) | Explain AVL Trees in detail. With diagrams, illustrate how insertion is handled in AVL trees when imbalance occurs (LL, RR, LR, RL rotations). | 13 | K3 | CO3 |
| 14. a) | Illustrate the different types of graphs (directed, undirected, weighted, unweighted, cyclic, acyclic) with suitable diagrams. | 13 | K2 | CO4 |

(OR)

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| b) | Describe Depth-First Search (DFS) traversal with an example graph, and compare it with BFS. | 13 | K2 | CO4 |
| 15. a) | Explain insertion sort and shell sort in detail. Show step-by-step how the elements [42, 20, 17, 13, 28] are sorted using insertion sort. | 13 | K3 | CO5 |

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| b) | Explain different hash functions with examples. Discuss the advantages and disadvantages of hashing compared to searching. | 13 | K2 | CO5 |
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PART – C

(1 x 15 = 15 Marks)

- | Q.No. | Questions | Marks | KL | CO |
|--------|---|-------|----|-----|
| 16. a) | Describe the process of evaluating an arithmetic expression using stack with suitable examples. Convert the infix expression $(A+B)*(C-D)/E$ into postfix and evaluate it for $A=2, B=3, C=5, D=1, E=4$. | 15 | K4 | CO2 |

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| b) | Illustrate the working of Bubble Sort, Selection Sort, and Insertion Sort with step-by-step examples and analyze their performance. | 15 | K3 | CO5 |
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