

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***MCA DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025***First Semester**Master of Computer Applications***PMCVA101 - Data Structures and Algorithms***Regulations - 2024**Duration : 3 Hrs**Maximum : 100 Marks****PART - A (ANSWER ALL QUESTIONS) (Marks 10*2=20)***

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Define ADT. Give any two examples.	L1	1	2
2.	Outline the fundamentals of algorithm analysis.	L2	1	2
3.	List the key operations of the Stack Abstract Data Type (ADT).	L1	2	2
4.	Define Queue Abstract Data Type (ADT).	L3	2	2
5.	Define Data abstraction.	L1	3	2
6.	List some ways linked lists are used in computer science, especially for adding polynomials.	L3	3	2
7.	Compare the algorithms and efficiency of linear search and binary search.	L2	4	2
8.	Write the key sorting algorithms: insertion sort, bubble sort, and selection sort.	L1	4	2
9.	What are the different representations of trees.	L2	5	2
10.	Outline the various methods of graph representation.	L2	5	2

PART - B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Analyze the concept of Abstract Data Types (ADTs) and evaluate their role in providing a framework for understanding data structures, including arrays and structures, in the context of algorithmic problem solving.	L4	1	16
	Or			
	b Explain asymptotic notations and their properties, and how recurrence relations are used to analyze the performance of algorithms in terms of time and space complexity.	L4	1	16
12.	a Explain the process of infix to postfix conversion. Why this conversion is important in evaluating expressions, and what methods can be used to achieve it?	L4	2	16
	Or			
	b Evaluate the Queue Abstract Data Type (ADT) and analyze the operations associated with it. Discuss how these operations facilitate the implementation of queue-based data structures and their practical applications in managing data flow, resource allocation and task scheduling in various computing environments.	L4	2	16

13.	a	What is the List Abstract Data Type (ADT), and how can it be implemented using both array-based and linked list approaches? Discuss the advantages and disadvantages of each implementation method.	L3	3	16
		Or			
	b	Explain the process of polynomial addition using linked lists. How do linked lists represent polynomials, and what algorithms are used to perform the addition of two polynomials represented in this manner?	L3	3	16
14.	a	Assess the linear search and binary search algorithms, analyzing their processes and comparing their efficiencies in terms of time complexity. Discuss the practical applications of each algorithm in real-world scenarios, considering factors that influence their effectiveness in different contexts.	L3	4	16
		Or			
	b	Explain the concept of hashing in data structures. What are hash functions, and how do they contribute to efficient data retrieval? Discuss the differences between separate chaining and open addressing as methods for handling collisions in hashing.	L3	4	16
15.	a	Describe a binary tree and explain its structure. What are the various methods of traversing a binary tree, and how do these traversal methods (preorder, inorder, postorder) differ in terms of their applications?	L3	5	16
		Or			
	b	Describe the characteristics and properties of binary search trees (BST). How do BSTs facilitate efficient search, insertion, and deletion operations compared to other tree structures?	L3	5	16