

Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

Second Semester

Artificial Intelligence and Data Science

AD3251 / UADT24201 – Data Structures Design

Regulations – 2021 & 2024

Duration : 3 Hrs

Maximum : 100 Marks

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	Questions	BLT	CO	Marks
1.	Define Data Structures and how the data types are classified at the higher level.	L1	1	2
2.	What is Recursion in data structures?	L1	1	2
3.	Find the Abstract Data Type (ADT) in linked lists that has no NULL links, Justify.	L1	2	2
4.	List the Applications of Stack ADT concerning computing systems.	L1	2	2
5.	How the insertion sort is done with the array?	L1	3	2
6.	Define Sorting with an example.	L1	3	2
7.	Differentiate Tree depth and height.	L2	4	2
8.	Give the Pre-& Postfix form of the expression $(a+((b*(c-e))/f))$.	L2	4	2
9.	Find the number of edges present in a complete graph having n vertices.	L3	5	2
10.	Compare Complete Graph and Finite Graph.	L2	5	2

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

Q.No	Questions	BLT	CO	Marks
11.	a Explain the Asymptotic Notation in detail and their types with a suitable example program.	L2	1	16
	Or			
	b i Explain the shallow and deep copying and differentiate its advantages and disadvantages.	L2	1	8
	ii Write a short note on Namespace in python and its types.	L2	1	8
12.	a i Write a program to traverse a doubly linked list using only one space for the address field with every node.	L2	2	8
	ii Explain the list ADT with an example.	L2	2	8
	Or			
	b Briefly explain the Stack ADT and Queue ADT and its various operations with suitable program.	L2	2	16

13.	a	i	Define Hash function. How will you calculate the hash function using division?	L3	3	8
		ii	Suppose we are sorting an array Z [2 5 1 7 9 12 11 10] using Bubble sort. Give all the steps while sorting the array. What is the best- and worst-case time complexity of Bubble sort?	L3	3	8
			Or			
	b	i	Identify the time complexity of the quick sort algorithm.	L3	3	8
		ii	Suppose we are sorting an array X [5 4 1 10 18 15 11] using Insertion sort. Give all the steps while sorting the array. Calculate its best time and worst time complexity based on the given example.	L3	3	8
14.	a		The inorder and preorder traversal of a binary tree are: "D B E A F C G" and "A B D E C F G" respectively. What would be the post order traversal of the binary tree? Illustrate the steps.	L2	4	16
			Or			
	b		Explain about the AVL tree along with its properties and advantages with suitable example.	L2	4	16
15.	a		Discuss DFS and BFS algorithm with an example.	L2	5	16
			Or			
	b		Discuss Minimum cost spanning tree and Kruskal's algorithm with an example.	L2	5	16