

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)***B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 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)***

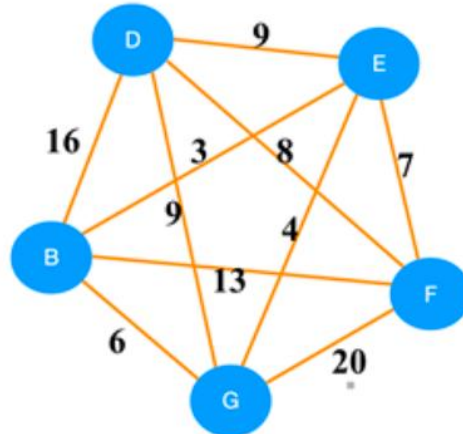
<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
1.	Define an Abstract Data Type (ADT).	L1	1	2
2.	State the importance of inheritance in OOP.	L2	1	2
3.	Differentiate between stack and queue data structures.	L2	2	2
4.	State the main advantage of doubly linked lists over singly linked lists.	L2	2	2
5.	What is a hash function in hashing?	L1	3	2
6.	Compare linear search and binary search.	L2	3	2
7.	Define a binary search tree (BST).	L1	4	2
8.	Translate the infix expression $(A + B) * (C - D)$ into postfix form.	L2	4	2
9.	State any two shortest path algorithms.	L1	5	2
10.	What is topological sorting?	L1	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 i Explain asymptotic notations with examples.	L2	1	8
	i Discuss shallow and deep copying with examples.	L2	1	8
	Or			
	b i Explain the concept of recursion with a simple example.	L2	1	8
	i Explain the concept of namespaces in python.	L2	1	8
12.	a Explain stack ADT and Its operations. Write a python code to perform its operations.	L2	2	16
	Or			
	b Explain the concept of a singly linked list. Implement a class in	L2	2	16

python to perform insertion at the beginning, end, and deletion at a specific position.

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| 13. | a | Explain briefly about quick sort. Explain how pivot selection affects the performance of quick sort. | L2 | 3 | 16 |
| Or | | | | | |
| | b i | Explain the linear search and binary search. | L2 | 3 | 8 |
| | i | Explain the concept of collision in hashing. Describe at least two collision resolution strategies. | L2 | 3 | 8 |
| 14. | a | A binary tree has 9 nodes having a single character per node. The in-order and pre-order traversal yields the following sequence. In-order: e a c k f h d b g and Pre-order: f a e k c d h g b . Draw the binary tree. | L3 | 4 | 16 |
| Or | | | | | |
| | b | What is an AVL Tree? Explain how AVL Trees maintain balance. Illustrate the different types of rotations used to rebalance the tree. | L3 | 4 | 16 |
| 15. | a | Apply Kruskal's algorithm to find the minimum cost spanning tree for the given undirected graph. illustrate its steps. | L3 | 5 | 16 |



Or

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| | b | Write the algorithm for topological sorting. Do topological sorting on the graph given below. | L3 | 5 | 16 |
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