R22 Regulation *Subject code: 4E2AQ*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

B.Tech II Semester Supplementary Examinations, January 2024

DATA STRUCTURES

(Common to CSE & CSE(AI&ML))

Maximum Marks: 60 Date:31.01.2024 Duration: 3 hours

Note:
1. **This question paper contains two parts A and B.**
2. **Part A is compulsory which carries 10 marks. Answer all questions in Part A.**
3. **Part B consists of 5 Units. Answer any one full question from each unit.**
4. **Each question carries 10 marks and may have a, b, c, d as sub questions.**

Part-A

All the following questions carry equal marks (10x1M=10 Marks)		CO	Bloom Tx
1 a	Define data abstraction.	CO1	L1
b	Define Time complexity.	CO1	L1
c	Define node and give the syntax for node creation in single linked list.	CO2	L1
d	Convert the given infix expression (a+b)/(c+d)-(d*e) into post fix.	CO2	L1
e	Define binary tree traversal.	CO3	L1
f	Define max heap.	CO3	L1
g	Give the time complexity of linear search.	CO4	L1
h	Define sorting.	CO4	L1
i	Define DFS.	CO5	L1
j	Give the formula to calculate balance factor in AVL tree.	CO5	L1

Part-B

Answer All the following questions. **(5X10M=50Marks)**				
2	Explain about Linear and Non-linear data structures.	10	CO1	L2
	OR			
3	Discuss in detail about Big O, Omega and Theta notations.	10	CO1	L2
4	a) State the difference between array and linked list. b) Develop an algorithm to insert a new node at the beginning in doubly linked list.	5 5	CO2	L2 L3
	OR			
5	Discuss about Single linked implementation of ADT?	10	CO2	L2
6	Create a binary tree using the following data elements 1,2,3,4,5,6,7,8,9,10,11,12 and represent in linked list and sequential representation.	10	CO3	L3
	OR			
7	Explain Insertion & Deletion into a Max Heap.	10	CO3	L2

8	Develop an algorithm to find the element using binary search.	10	CO4	L3
	OR			
9	State and explain Insertion sort with an example.	10	CO4	L2
10	Discuss the applications of Breadth First Search and Depth First Search.	10	CO5	L2
	OR			
11	Define AVL tress and what are the types of rotations exist in AVL tree.	10	CO5	L2