



R22 Regulation

Subject code: 4E3FC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech III Semester Regular Examinations, February 2024

DATA STRUCTURES (INFORMATION TECHNOLOGY)

Maximum Marks: 60

Date: 23.02.2024 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		CO	Bloom Tx
All the following questions carry equal marks (10x1M=10 Marks)			
1.a)	What are the properties of Abstract Data Type?	CO1	L1
b)	List advantages of linked list over arrays.	CO1	L1
c)	How many binary trees are possible with four nodes?	CO2	L1
d)	What are the features of a threaded binary tree?	CO2	L1
e)	List out properties of Red Black Trees?	CO3	L1
f)	What is the need for priority queue?	CO3	L1
g)	Define Rehashing?	CO4	L1
h)	List out the Applications of set.	CO4	L1
i)	How do you find the degree of a graph?	CO5	L1
j)	What are the properties of Minimum Cost Spanning (MST) Tree?	CO5	L1
Part-B			
Answer All the following questions. (5X10M=50Marks)			Bloom Tx level
2	a) Explain single linked list using insertion operation with an example. [5M] b) Write a program to delete an element from doubly linked list. [5M]	CO1	L2 L2
OR			
3	a) Analyze application of stack and write a program on stack using Array representation. [5M] b) Define queue and write a program on queue using linked list representation. [5M]	CO1	L4 L2
4	a) Write in-order, pre-order and post-order traversal of a binary tree. [5M] b) Discuss in-order traversal of threaded binary tree with an example. [5M]	CO2	L2 L3
OR			
5	a) Explain the binary search tree with an example. [5M] b) Build an AVL tree with the following values: [5M] {15, 20, 24, 10, 13, 7, 30, 36, 25, 42, 29}	CO2	L2 L3
6	a) Construct a Red-Black trees with example [5M] b) Construct a Splay Tree with example. [5M]	CO3	L3 L3
OR			

7	a) Define a Max Heap. Construct a max heap for the following: [5M] {12, 15, 9, 8, 10, 18, 7, 20, 25} b) List and explain the applications of Priority Queues. [5M]	CO3	L3 L2
8	a) Compare binary search and linear search techniques. [5M] b) Explain the Smart union algorithm. [5M]	CO4	L2 L2
	OR		
9	a) Explain hashing, hash table and a function with a example. [4M] b) Write short notes on: [3M+3M] i) Equivalence Relations ii) Dynamic Equivalence Problem.	CO4	L2 L2
10	a) Discuss about topological sorting with an example. [5M] b) Demonstrate Prim's algorithm with an example. [5M]	CO5	L2 L2
	OR		
11	a) Discuss Kruskal's algorithm advantages and disadvantages. [4M] b) Write short notes on: [3M+3M] i) Undirected Graphs ii) Directed graphs.	CO5	L2 L2