FIRST SEMESTER EXAMINATION, 2022 – 23
M.TECH COMPUTER SCIENCE & ENGG.
ADVANCED DATA STRUCTURES AND ALGORITHMS

Duration: 3:00 hrs   **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	Answer any four parts of the following.	5x4=20
	a) What is the Red- Black Trees? Explain with Example.	
	b) What is the Mergeable Heap? Explain the Mergeable Heap Operations.	
	c) Define B-Tree. What is the difference of B-Tree and B+ Tree.	
	d) What is the hashing? Explain collision resolution techniques in hashing.	
	e) What is the data structure? Explain different type of data structure.	
	f) What do you understand by Priority Queues?	
Q 2.	Answer any four parts of the following.	5x4=20
	a) What is the AVL Tree? Explain different AVL tree operation.	
	b) What are the Operations on Disjoint sets?	
	c) What is the different Type of Randomized Algorithms?	
	d) Explain why Stack is a recursive data structure.	
	e) What do you understand by k-server Problem?	
	f) how we can calculate Quick Sort complexity in worst case	
Q 3.	Answer any two parts of the following.	10x2= 20
	a) What is Priority Queue? What are some types of Queue? What is the Complexity Analysis of Queue operation?	
	b) Compare Heaps vs Arrays to implement Priority Queue? List out all different sorting algorithms that are available and state which sorting algorithm is considered as the fastest?	
	c) Explain Rabin-Karp string matching algorithms and analyze its running time. How to Convert a Binary Tree to a Doubly Linked List. Explain with example	
Q 4.	Answer any two parts of the following.	10x2= 20
	a) What do you understand by the concept of NP hard and NP complete? Explain with suitable examples.	
	b) What is knapsack problem? Explain 0-1 Knapsack Problem using recursion.	
	c) Explain the different type of Randomized Algorithms. Give a suitable example of Random Walks.	
Q 5.	Answer any two parts of the following.	10x2= 20
	a) What is the Genetic Algorithm? Which libraries are used for GA implementation in python?	
	b) Explain the blockchain data structure and blockchain Architecture in details	
	c) Write a short note on (i) Tuple (ii) Splay Trees	

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