U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2023 Semester End Main Examinations

Programme: B.E. **Semester: V**
Branch: Computer Science and Engineering **Duration: 3 hrs.**
Course Code: 20CS5PEADS **Max Marks: 100**
Course: Advanced Data Structures **Date: 03.03.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

UNIT - I

1	a)	Write a smart union algorithm and explain with an example.	**08**
	b)	Discuss the construction of disjoint set with a suitable example.	**06**
	c)	Differentiate among various self-organizing list with an example.	**06**

OR

2	a)	Draw the skip list representation for the following set of numbers: 70, 56, 31, 14, 1, 27, 63, 80, 91, 44 with 4 levels. Also show the representation of skip list after deleting element 44 from the list.	**10**
	b)	With a neat diagram, show the representation of a memory efficient XOR linked list. Also list its advantages and disadvantages.	**10**

UNIT - II

3	a)	Construct AVL tree for the following sequence of numbers: 1, 12, 14, 15, 67, 80, 95, 19, 13, 3. Show the steps clearly.	**10**
	b)	Create a 2-3 tree for the following set of alphabets: 'C', 'O', 'M', 'P','U','T','I','N','G' and also show the steps in deleting characters 'M' and 'G' from the tree.	**10**

OR

4	a)	Write a program to perform the insertion and deletion operation on AVL tree.	**08**
	b)	Construct Red Black tree for the following sequence of numbers: 34, 54, 78, 12, 97, 13, 70, 24, 65. Show the steps clearly.	**08**
	c)	Differentiate between Splay tree and AVL tree.	**04**

UNIT - III

5 a) Construct a Trie tree for the following set of strings: **06**
S ={ DEN, DARK, DEM, DUCK, DULL, FOUND, FOUL}

b) Splay Goat tree is a self-balancing binary search tree? Justify your answer with an example. **08**

c) Construct binary index tree for the following sequence numbers: **06**
2, 3, 1, 4, -2, 6, 5, 3, 7, 4, 2, 5. Show the steps clearly.

UNIT - IV

6 a) Apply quadratic probing approach to place the following key elements: **10**
3,2,9,6,11,13,7,12, Table size m=10, Hash function: h(k) = 2k+3.
Show the steps clearly.

b) Write an algorithm for an Extendible hashing technique and insert the following elements into hash table using Extendible hashing technique: 9,14,18,76,27,65,34,51,46,83,94,44,112,71,31. Consider Bucket limit=3. **10**

UNIT - V

7 a) Perform the following operations on Binomial min heap for the following set of elements: **10**
4, 6, 3, 11, 9, 5, 14, 10, 21, 7, 13, 20, 2
i. Create a binomial min heap.
ii. Union of two binomial min heap.

b) Write an algorithm for the following operations on a Binomial heap: **10**
i. Delete(H)
ii. Decrease key(H)

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