Code No.: R22CS58101PC | R22 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–M.TECH–I–Semester End Examinations (Regular) - March- 2025
ADVANCED DATA STRUCTURE AND ALGORITHMS
(CSE)

[Time: 3 Hours] **[Max. Marks: 60]**

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

PART-A **(10 Marks)**

1. a) What are Leftist trees? [1M]
   b) What is the role of lazy deletion and cascading cuts in Fibonacci Heaps? [1M]
   c) What is a hash table? [1M]
   d) What is the folding method in hashing? [1M]
   e) What are search structures? [1M]
   f) What is the time complexity of constructing an OBST? [1M]
   g) List the advantages and disadvantages of DST? [1M]
   h) Define Binary Tries. [1M]
   i) What is Dynamic Programming (DP)? [1M]
   j) Compare DFS and BFS in terms of time complexity [1M]

PART-B **(50 Marks)**

2. Create a Binomial Heap from the following numbers: [10, 30, 20, 5, 15]. [10M]

OR

3. What are heap structures, and how do they differ from other tree-based data structures? [10M]

4. Apply the multiplication method (with a constant A=0.618A = 0.618A=0.618) to hash the keys 25, 38, 72, 91 into a hash table of size 10. Show the computation process. [10M]

OR

5. Insert the keys 20, 35, 50, 65, 80 into a hash table of size 11 using quadratic probing. Show the final table after all insertions. [10M]

6. Construct an AVL tree by inserting the following keys in order: 30, 20, 40, 10, 25, 35, 50. Show all rotations required. [10M]

OR

7. Describe the insertion and deletion operations in a B-Tree with examples. [10M]

8. Explain the Brute Force Pattern Matching Algorithm. What is its time complexity? [10M]

OR

9. Explain the Horspool Algorithm. How does it modify the Boyer-Moore approach? [10M]

10. Solve the 0/1 Knapsack Problem using Dynamic Programming for: [10M]
Weights: [2, 3, 4, 5], Values: [3, 4, 5, 6], Knapsack Capacity: 5

OR

11. Explain the Edmonds-Karp Algorithm and how it improves upon Ford-Fulkerson. [10M]

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