QP Code: P25DR002

Reg. No : .....

Name : .....

ST MARY'S COLLEGE (AUTONOMOUS), THRISSUR-20

I SEMESTER (CBCSS-PG) DEGREE EXAMINATIONS, NOVEMBER 2025

M. Sc. Computer Science

CSS1C02 : ADVANCED DATA STRUCTURES

2024 Admission Onwards

(Credits: 3)

Time: 3 Hours **Maximum Weightage: 30**

Section A

Short answer type questions. Answer **any four**. Weightage **2** for each.
(4x2 = 8 Weightage)

1. Discuss the various factors influencing the time complexity of an algorithm.
2. Analyse how Treaps maintain both Binary Search Tree property and Heap property.
3. Perform a merge operation on two skew heaps: H1 = {3, 8, 10}, H2 = {5, 6, 7}. Show the intermediate steps.
4. Given the infix expression A+B*C/D. Convert it to postfix expression using stack.
5. Define a binary search tree and explain its properties.
6. Define hashing. Discuss any one hashing function with example.
7. Define a queue and discuss various operations on it.

Section B

Short essay-type questions. Answer **any four**. Weightage **3** for each.
(4x3 = 12 Weightage)

8. Discuss deletion operation in a red black tree.
9. Discuss binary tree and its implementation.
10. Compare doubly and circular linked list.
11. Evaluate the importance of queue data structure in BFS.
12. Discuss the main operations applied on data structures.
13. Discuss various array operations.
14. Given a hash table of size 10 and a hash function h(k) = k mod 10, insert the keys {12, 22, 32, 42} using linear probing. Show the table after all insertions.

Turn Over

Section C

Essay-type questions. Answer **any two**. Weightage **5** for each.

(2x5 = 10 Weightage)

15. Compare linear search and binary search algorithm with suitable example.
16. Insert the keys 15, 25, 10, 20, 30, 16 into an initially empty AVL tree. Show rotations if needed after each insertion.
17. Define heap. Explain various opeartions.
18. Compare open addressing and separate chaining technique.

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