

SECOND SEMESTER M.Sc. DEGREE EXAMINATION, APRIL 2025
(Regular/Improvement/Supplementary)

COMPUTER SCIENCE
FCSS2C06 - DESIGN AND ANALYSIS OF ALGORITHMS

Time: 3 Hours**Maximum Weightage: 30****Section A: Short answer questions. Answer any *four* questions. Each carries 2 weightage.**

1. Compare and contrast P and NP classes.
2. Write a note on asymptotic analysis of algorithms.
3. Compare sequential and binary searching methods.
4. What is the PRAM model of computation? Which are its different versions?
5. What do you mean by scalability of a parallel algorithm? How does it measure?
6. Write on divide and conquer approach with example.
7. What is symmetry breaking? Mention its significance in computer science?

(4 × 2 = 8 weightage)

Section B: Short essay questions. Answer any *four* questions. Each carries 3 weightage.

8. Explain the importance of greedy approach in designing algorithms with an example.
9. Solve *Sum of subset* problem using backtracking approach.
10. Explain with an example, how to analyse an algorithm using RAM model.
11. Analyse merge sort and derive its complexity.
12. State on 'P versus NP Problem'.
13. Briefly explain parallel prefix computation and its importance.
14. Explain Recursion tree method and Master method for solving recurrences with examples.

(4 × 3 = 12 weightage)

Section C: Essay questions. Answer any *two* questions. Each carries 5 weightage.

15. What is the longest common subsequence problem? How does it solve using a dynamic programming approach?
16. Explain Strassen's matrix multiplication in detail. Derive its complexity. Compare it with normal matrix multiplication.
17. Explain any two parallel sorting algorithms and the concept of parallel merging.
18. i) Explain with examples, the complexity classes P, NP, NP Hard and NP Complete.
ii) Explain the concept of polynomial reducibility with an example.

(2 × 5 = 10 weightage)