

Roll No. ....

Total Pages : 02

**BT-4/M-23**

**44154**

**DESIGN AND ANALYSIS OF ALGORITHMS**

**PC-CS-208A**

Time : Three Hours]

[Maximum Marks : 75

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

**Unit I**

1. (a) What are Asymptotic Notations ? Explain all notations in detail. 10  
(b) Explain the concept of Strassen Multiplication. 5
2. What do you mean by Recurrence ? Write Master Theorem for solving Recurrence. 15

**Unit II**

3. Write Algorithm for Matrix Chain multiplication and explain it with the help of example. 15
4. What are Red-Black trees ? Write algorithms for insertion and deletion in Red-Black trees. 15

### Unit III

5. (a) What are strongly connected components ? Explain. 7.5
- (b) Differentiate between Breadth first search and Depth first search. 7.5
6. (a) Illustrate the concept of NP-hard and NP-complete classes. 5
- (b) Explain the concept of Relaxation and write Bellman Ford algorithm. 10

### Unit IV

7. Explain the terms Residual networks, Augmenting paths and Cuts and write Ford Fulkerson Algorithm. 15
8. Explain the following : 15
- (i) Zero-one principle
  - (ii) Comparison network
  - (iii) Bitonic sorting network.