

# Paper ID [CS307]

(Please fill this Paper ID in OMR Sheet)

**B.Tech. (Semester - 5<sup>th</sup>)**

**DESIGN AND ANALYSIS OF ALGORITHMS (CS - 307)**

**Time : 03 Hours**

**Maximum Marks : 60**

**Instruction to Candidates:**

- 1) Section - A is **compulsory**.
- 2) Attempt any **Four** questions from Section - B.
- 3) Attempt any **Two** questions from Section - C.

## Section - A

**Q1)** (10 x 2 = 20)

- a) What do you understand by Algorithm Evaluation?
- b) What is asymptotic time complexity?
- c) What are Stored RAM Model?
- d) Describe a path in an undirected graph.
- e) Define post order traversal of a Tree.
- f) What is the time complexity of Merge Sort?
- g) Give an example of Dynamic Programming Approach.
- h) What are Union Find Problems?
- i) What is Pattern Matching?
- j) What is NP Complete Problem?

## Section - B

(4 x 5 = 20)

**Q2)** Explain the relationship between Turing Machine and RAM Models.

**Q3)** Describe the Dynamic Programming algorithm for computing the minimum cost order of multiplying a string of n matrices  $M_1 \times M_2 \times M_3 \dots \times M_n$ .

Q4) What are position trees? Describe using examples.

Q5) What are NP, NP Hard and NP complete problems? Explain by giving an example of each.

Q6) Explain the algorithm of a non-deterministic finite automation.

### Section - C

(2 x 10 = 20)

Q7) (a) Consider a Binary tree with names attached to the vertices. Write an algorithm to print the names in (i) Pre-Order, (ii) Inorder, (iii) Post Order.

(b) How Binary tree can be used for searching an element? Explain.

Q8) (a) What are string matching algorithms?

(b) Given a text string x and pattern string y, determine all occurrences of y in x.

Q9) (a) Explain the algorithm for Fast disjoint set union algorithm.

(b) Give an example of NP-Complete Problem.