

5E1355

Roll No.

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**5E1355**  
**B. Tech. V - Sem. (Main / Back) Exam., March - 2022**  
**Computer Science & Engineering**  
**SCS4 - 05 Analysis of Algorithms**  
**CS, IT**

**Time: 3 Hours**

**Maximum Marks: 120**  
**Min. Passing Marks: 42**

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**Instructions to Candidates:**

**Attempt all ten questions from Part A, five questions out of seven questions from Part B and four questions out of five from Part C.**

**Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used /calculated must be stated clearly.**

**Use of following supporting material is permitted during examination. (Mentioned in form No. 205)**

1. NIL

2. NIL

**PART - A**

**(Answer should be given up to 25 words only)**

**[10×2=20]**

**All questions are compulsory**

**Q1 Define Time Complexity.**

**Q2 Explain an algorithm with its steps.**

**Q3 Define 0/1 Knapsack problem.**

**Q4 What are the differences between Greedy method and Dynamic Programming?**

**Q5 Discuss lower bound theory.**

Q.6 What do you mean by pattern matching?

Q.7 Define Randomized algorithm.

Q.8 What is assignment problem?

Q.9 Define set cover problem.

Q.10 What is decision problem?

### PART - B

(Analytical/Problem solving questions)

[5×8=40]

Attempt any five questions

Q.1 Explain merge sort. Using merge sort algorithm sort the following sequence –

38, 42, 24, 68, 45, 12, 88, 32.

Q.2 Using Quick sort algorithm sort the following sequence-

A = {13, 19, 9, 5, 12, 8, 7, 4, 21, 2, 6, 11}.

Q.3 Solve the TSP problem for the following cost matrix –

	w	x	y	z
w	A	8	13	18
x	3	A	7	8
y	4	11	A	10
z	6	6	7	A

Q.4 Explain Quadratic assignment problem using a suitable example.

Q.5 Prove that the Hamilton cycle problem is NP-Complete.

Q.6 Find optimal parenthesization of matrix chain product whose sequence of dimension is  
(6, 12, 6, 42, 7).

Q.7 Describe Naive String Matching Algorithm in detail.

## **PART - C**

**(Descriptive/Analytical/Problem Solving/Design Questions)**

**[4×15=60]**

**Attempt any four questions**

**Q.1 Show the Strassen's multiplication for the following matrices -**

$$A = \begin{bmatrix} 2 & 5 \\ 7 & 9 \end{bmatrix} \text{ and } B = \begin{bmatrix} 6 & 2 \\ 8 & 5 \end{bmatrix}$$

**Explain the longest common subsequences in detail.**

**Q.2 How and when dynamic programming approach is applicable? Discuss matrix chain multiplication with reference to dynamic programming technique. Explain 0/1 Knapsack problem with suitable example.**

**Q.3 Discuss Boyer Moore algorithm. Find the pattern ABCBC in the text ACABABCABCBACA using KMP matcher.**

**Q.4 Briefly, describe flow shop scheduling and network capacity assignment problem. Compare Las Vegas and Monte Carlo algorithmic approaches also.**

**Q.5 Prove that circuit satisfiability problem belongs to the class NP. Explain approximation algorithm for vertex cover.**

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