5E1355

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B. Tech. V - Sem. (Main / Back) Exam., March - 2022

Computer Science & Engineering

5CS4 – 05 Analysis of Algorithms

CS, IT

Time: 3 Hours **Maximum Marks: 120**

Min. Passing Marks: 42

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

Q.1 Define Time Complexity.

Q.2 Explain an algorithm with its steps.

Q.3 Define 0/1 Knapsack problem.

Q.4 What are the differences between Greedy method and Dynamic Programming?

Q.5 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 programing approach is applicable? Discuss matrix chain multiplication with reference to dynamic programing technique. Explain 0/1 Knapsack problem with suitable example.

Q.3 Discuss Boyer Moore algorithm. Find the pattern ABCBC in the text ACABABCABCBCA 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.
