

322552(22)

**B. E. (Fifth Semester) Examination, April-May/
Nov.-Dec. 2020**

(New Scheme)

(CSE Branch)

ANALYSIS & DESIGN of ALGORITHMS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : All questions are compulsory. Part (a) of each question is compulsory and carry 2 marks. Attempt any two from part (b), (c) and (d) and carry 7 marks.

Unit-I

1. (a) Define all the types of asymptotic notation. 2
- (b) State master theorem and explain it using examples. 7

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(c) Solve the recurrence equation using substitution method. 7

$$T(n) = 2T\left(\left\lfloor \frac{n}{2} \right\rfloor + 16\right) + n$$

(d) Find big oh (O) notation for following equation : 7

(i) $f(n) = 10n^2 + 7$

(ii) $f(n) = 2^n + 6n^2 + 3n$

Unit-II

2. (a) Define divide & conquer method. 2

(b) Use Strassen's algorithm to compute the matrix product. 7

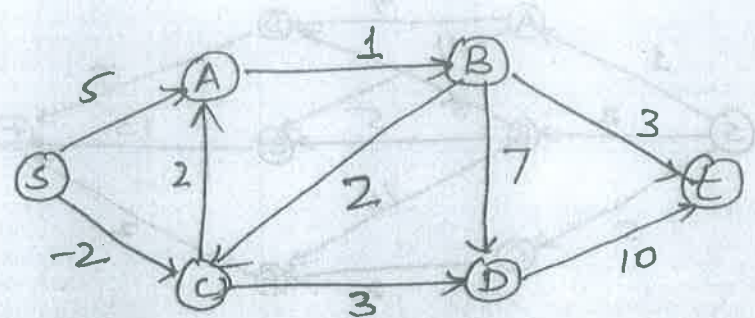
$$A = \begin{bmatrix} 1 & 5 \\ 3 & 8 \end{bmatrix} \quad B = \begin{bmatrix} 7 & 4 \\ 6 & 2 \end{bmatrix}$$

(c) Explain Huffmann algorithm with suitable example. 7

(d) Solve following graph for single source shortest path using Bellman Ford algorithm. 7

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Unit-III

3. (a) Explain AND/OR graph. 2

(b) Explain BFS with suitable example. 7

(c) The 6 no. of matrix are given

$$A_1 = 30 \times 35, A_2 = 35 \times 15, A_3 = 15 \times 5,$$

$$A_4 = 5 \times 10, A_5 = 10 \times 20, A_6 = 20 \times 25$$

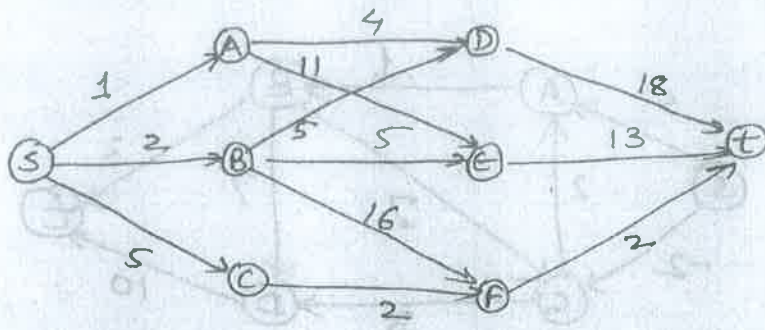
Solve using chained matrix multiplication method to find an optimal parenthesization of a matrix. 7

(d) Consider a multistage graph to find the minimum cost path from s to t node. 7

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PTO

[4]



Unit-IV

4. (a) Write 2 application of back tracking. 2
- (b) Explain n queens problem with suitable examples. 7
- (c) For a given set $s = \{5, 10, 15, 20, 25, 30\}$ and $X=45$. Obtain the subset sum problem using back tracking. 7
- (d) Explain Hamiltonian cycle problem using suitable example. 7

Unit-V

5. (a) Explain NP Hard. 2
- (b) Write & explain Cook's theorem. 7

[5]

- (c) Explain 15 puzzle problem with suitable example. 7
- (d) Given three items along with their weights & respective values as

Item	W	V
I_1	1	2
I_2	2	3
I_3	3	4

for Knapsack of capacity $W = 3$. Solve using Branch & Bound technique to so as to give maximum possible value. While considering all constraints. 7