

6E6022

Roll No. \_\_\_\_\_

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**6E6022**

**B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016**

**Computer Science & Engineering**

**6CS2A Design and Analysis of Algorithms**

**CS, IT**

**Time: 3 Hours**

**Maximum Marks: 80**

**Min. Passing Marks (Main & Back): 26**

**Instructions to Candidates:-**

*Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. 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

### UNIT-I

Q.1 (a) Solve the recurrence relation for time complexity : [4]

$$T(n) = 2 \quad \text{if } n = 2$$

$$T(n) = 2T(n/2) + 3n \quad \text{if } n > 2$$

(b) Explain various types of asymptotic notations in detail. [4]

(c) Illustrate the operation of merge sort on following array 10, 20, 5, 23, 45, 34, 12.

Also write the algorithm & its complexity. [8]

**OR**

- Q.1 (a) Explain Stassen's matrix multiplication & derive its complexity also? Justify how is it better than ordinary matrix multiplication. [8]
- (b) Explain Prim's algorithm for finding minimum spanning tree. [8]

**UNIT-II**

- Q.2 (a) What is Dynamic programming? How it gives the optimal solution? Consider  $n = 3$ , consider  $M = 6$ ,  $(w_1, w_2, w_3) = (2, 3, 3)$   
 $(p_1, p_2, p_3) = (1, 2, 4)$   
Find optimal solution for given knapsack problem. [8]
- (b) Explain Matrix chain multiplication. Also find the parenthesization for the following matrix  $A_1 = 15 \times 10$ ,  $A_2 = 10 \times 20$ ,  $A_3 = 20 \times 25$  [8]

**OR**

- Q.2 (a) Suggest an approximation algorithm for traveling sales person problems using minimum spanning tree algorithm. Assume that the cost function satisfies the triangle inequality. [8]
- (b) What is backtracking? Explain 8-queens problem, also write algorithm for the same. [8]

**UNIT-III**

- Q.3 (a) Explain Naïve string matching algorithm using suitable example. [8]
- (b) Solve the given assignment problem by branch and bound method. [8]

	Job 1	Job 2	Job 3	Job 4
Person 1	9	2	7	8
Person 1	6	4	3	7
Person 1	5	8	1	8
Person 1	7	6	2	4

**OR**

- Q.3 (a) Explain Boyer Moore Algorithms with suitable example. [8]  
(b) Explain the Quadratic Assignment Problem with suitable example. [8]

**UNIT-IV**

- Q.4 (a) What do you mean by randomized algorithms. Explain Las Vegas algorithms and Monte Carlo algorithms with suitable examples. [10]  
(b) Explain Flow shop scheduling with suitable example. [6]

**OR**

- Q.4 (a) Describe problem definition of Multicommodity flow in the network. State and prove the Ford Fulkerson's theorem. [8]  
(b) Explain Randomized min cut theorem with suitable example. [8]

**UNIT-V**

- Q.5 (a) Explain NP Hard and NP Complete with example. [8]  
(b) Explain the Cook's theorem with suitable example. [8]

**OR**

- Q.5 (a) Prove that Hamilton cycle problem is NP complete. [8]  
(b) Explain Approximation Algorithms for Vertex and Set Cover problem. [8]
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