6E 6022

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6E6022

B.Tech. VI Semester (Main/Back) Examination, May 2015

Computer Science & IT

6CS2A Design and Analysis of Algorithms

Time : 3 Hours **Maximum Marks : 80**

Min. Passing Marks : 24

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 suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Derive the recurrence relation for merge sort algorithm's time complexity. Also , solve it **(8)**

   b) Solve the following optimal merge pattern problem using greedy approach 5,4,7,2,9,11,4,8 **(8)**

OR

1. a) Describe strassen's method of matrix multiplication **(8)**

   b) consider a knepsack of capacity 10 and items with prices as (40,30,20,50) and weights (5,4,6,3). What is the maximum profit that can be earned if fractional items are allowed **(8)**

Unit - II

2. a) Solve the following instance of LCS problem through dynamic programming
   x=ABCDCDBCAD
   y=BACCDCABBD **(8)**

   b) Compare dynamic programming and divide and conquer approach **(4)**

   c) State lower bound theory **(4)**

OR

2. a) Find the optimal parenthesization of multiplication of a matrix chain specified by (4,16,10,8,20). Show all tables and decision steps involved **(12)**

   b) What is backtracking **(4)**

Unit - III

3. a) Find the pattern ABCBC in the text ACABABCABCBCA using KMP matcher **(10)**

   b) Discuss the formulation of simple assignment problem of size n **(6)**

OR

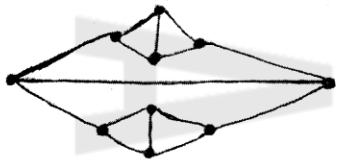
3. a) Describe Boyer moore pattern matching algorithm with appropriate examples of good prefix and bad character **(10)**

   b) What is importance of Rabin Karp string matching algorithm **(6)**

Unit - IV

4. a) Compare Las Vegas and Monte carlo algorithmic approaches **(6)**

   b) Give a randomized solution for Min-cut of following graph **(8)**



   c) State multicommodity flow problem **(2)**

OR

4. a) Solve $f = (x_1 \vee \overline{x_2})(x_3 \vee \overline{x_4})(\overline{x_1} \vee x_3)(x_2 \vee \overline{x_5})(x_4 \vee x_6)(x_4 \vee \overline{x_6})$ using a randomized algorithm. **(10)**

   b) Briefly describe flow shop scheduling and network capacity assignment problem **(6)**

Unit - V

5. Write short notes on any two

   a) Complexity classes of decision problems.

   b) Approximation algorithms.

   c) Cook's theorem and its applications. **(8+8)**