

00216

**B.Tech. COMPUTER SCIENCE AND
ENGINEERING (BTCSEVI)**

Term-End Examination

June, 2013

**BICS-014 : DESIGN AND ANALYSIS OF
ALGORITHM**

Time : 3 Hours

Maximum Marks : 70

Note : Seven questions are required to be answered.

1. (a) Describe master's Method for solving recurrence relations. 5+5=10
(b) Solve the following recurrence relation
 $T(n) = 2T(n/2) + n^2$

2. (a) Define NP-hard problems and give one example also. 5+5=10
(b) Write quick - sort algorithm and explain its average case time complexity.

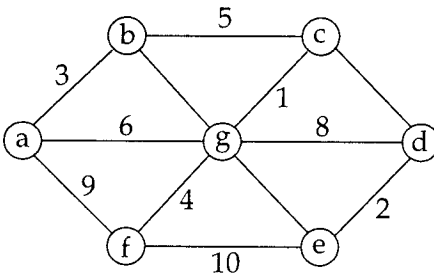
3. (a) Find the minimum number of operations required for the following chain Matrix Multiplication using dynamic programming
A (30, 40) × B (40, 5) × C (5, 15) × D (15, 6)
(b) What is Universal Hashing ? 6+4=10

4. Given an array of elements. 10
 5, 3, 9, 4, 2, 7, 12, 6, 11

If we apply heap sort algorithm on the above array. What will be heap structure initially and after each iteration ?

5. (a) What is polygon triangulation problem ? $5+5=10$
 (b) Write an $O(n)$ median finding algorithm.

6. Write Krushkal's algorithm for minimum 10
 spanning tree. Apply this algorithm on the graph given below.



7. (a) Discuss probabilistic method for verifying matrix multiplication. 5+5=10
 (b) What is cook's theorem ? Explain NP completeness reduction for subset sum problem.
8. (a) Discuss various method for amortized analysis of algorithms. 6+4=10
 (b) Give randomized solution for eight queen problem.

9. (a) What is the time complexity of Strassen's Matrix multiplication algorithm and why ?
- (b) Solve the following 0/1 Knapsack problem using dynamic programming. 5+5=10
- $m(w) = 6, n = 3$
- $(w_1, w_2, w_3) = (2, 3, 3)$
- $(p_1, p_2, p_3) = (1, 2, 4)$
10. Write short notes on **any two** : 5+5=10
- (a) Dixon's factorization algorithm
- (b) Approximation algorithms
- (c) Huffman coding
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