Total No. of Pages 2 *Roll No. .....*

FOURTH SEMESTER **B.Tech. (CO/SW)**

END SEMESTER EXAMINATION ***MAY-2012***

CO/SW-214 ALGORITHM DESIGN & ANALYSIS

Time: 3:00 Hours *Max. Marks : 70*

Note : Question No. *ONE* is compulsory.
Answer any *FOUR* questions from the rest.
Assume suitable missing data, if any.

1[a] Solve the following recurrence using master's theorem

$T(n) = 7T\left(\frac{n}{2}\right) + n^2$

[b] Define principle of optimality

[c] Greedy approach guarantees to produce optimal solution. True or false? Justify your answer.

[d] What are NP complete problems?

[e] How does traversal occur in breadth first search.

2[a] What are Asymptotic notations? Define Big-Oh and Big-Omega notations. 3

[b] Consider the recurrence

$T(n) = 2T(\frac{n}{2}) + n^2$

Solve it using recurrence tree method. 5

[c] Explain heap sort algorithm in detail. Also analyse its complexity. 7

3[a] What is back tracking approach of problem solving? Write the backtracking algorithm for solution to well known n-queen problem with example. 7

[b] Given the characters <a, b, c, d, e, f> with the following probability of occurrence

P = < 45, 13, 12, 16, 9, 5>

Build a binary tree according to greedy strategy for defining an optimal Huffman code. 8

4[a] Given two sequences S = ABAZDC and T=BACBAD, find the maximum length common subsequence of S and T using dynamic programming approach. 8

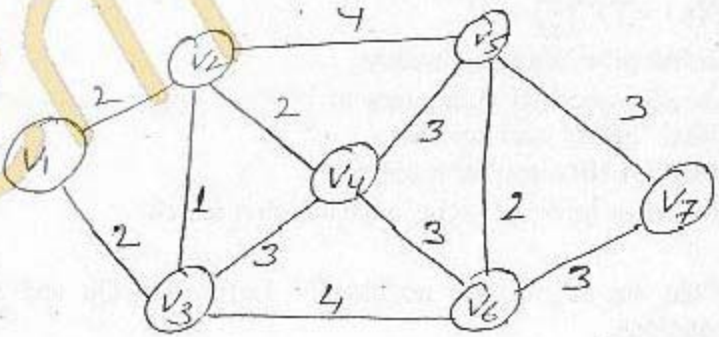
[b] Given a sequence of 3 matrices A_1, A_2, A_3 whose dimensions are $P_0=3, P_1=1\ P_2=2, P_3=1$. what are the m array and S array for these inputs. Also construct optimal parenthesization. 7

5 For the graph shown below obtain the following:

[a] All spanning trees

[b] Minimum spanning tree by Kruskal's method

[c] Shortest path from V_1 to V_7. 15



6[a] Illustrate an algorithm that efficiently solves all pair shortest path problem. 7

[b] Explain the greedy approach to solve the activity section problem. Give example. 8

7[a] Describe the strategy that is used to show that a given problem is NP hard problem. 7

[b] Explain the vertex cover problem and travelling sales man problem. 8