

B.Tech VIth Semester (main/Back) Examination-2009
(Information Technology)

6E3016

Time: 3 Hr.

Maximum Marks: 80

Min. Passing Marks: 24

Instructions to Candidates:

Attempt overall *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.)

Unit-I

- Q.1 (a) What is master's theorem? Explain with suitable example [8]
(b) What is the divide and conquer method? Sort the following sequence using merge sort method.

5, 2, 4, 7, 1, 3, 2, 6

[8]

OR

- Q.1 (a) Use strassen's matrix multiplication algorithm to compute the matrix product of following matrices:

$$A = \begin{bmatrix} 7 & 9 \\ 2 & 5 \end{bmatrix}, \quad B = \begin{bmatrix} 3 & 2 \\ 5 & 5 \end{bmatrix}$$

[8]

- (b) Explain the minimum spanning tree and knapsack problem.

[8]

UNIT-II

Q.2 (a) $X = (A, B, C, B, D, A, B)$ and $Y = (B, D, C, A, B, A)$. Find longest common subsequence (LCS) of the given sequences X and Y , using dynamic programming approach. [8]

(b) Find the order of parenthesization for the optimal chain multiplication:

$$\begin{array}{lll} A_1 = 30 \times 35 & A_2 = 35 \times 15 & A_3 = 15 \times 5 \\ A_4 = 5 \times 10 & A_5 = 10 \times 20 & A_6 = 20 \times 25 \end{array}$$

[8]

OR

Q.2 (a) Write short note on backtracking algorithm.

(b) Solve the travelling salesman problem having the following cost matrix using branch and bound technique:

∞	20	30	10	11
15	∞	16	4	2
3	5	∞	2	4
19	6	18	∞	3
16	4	7	16	∞

[8]

UNIT-III

Q.3 (a) Explain Naive method with some suitable example. Also give the algorithm for the same. [6]

(b) Using Knuth morris-pratt algorithm find whether the pattern $P = (10100111)$ is in text $T = (1001010100111)$ or not. [10]

OR

Q.3 (a) Explain Quadratic assignment problem. [4]

(b) Solve the following assignment problem using branch and bound method for which cost matrix is given below:

	1	2	3	4
a	11	12	18	40
b	14	15	13	22
c	11	17	19	23
d	17	14	20	28

UNIT-IV

- Q.4 (a) Explain the following terms
- (i) Residual network
 - (ii) Augmenting path
 - (iii) Cuts of flow network
- (b) Write ford fulkerson algorithm and explain it.

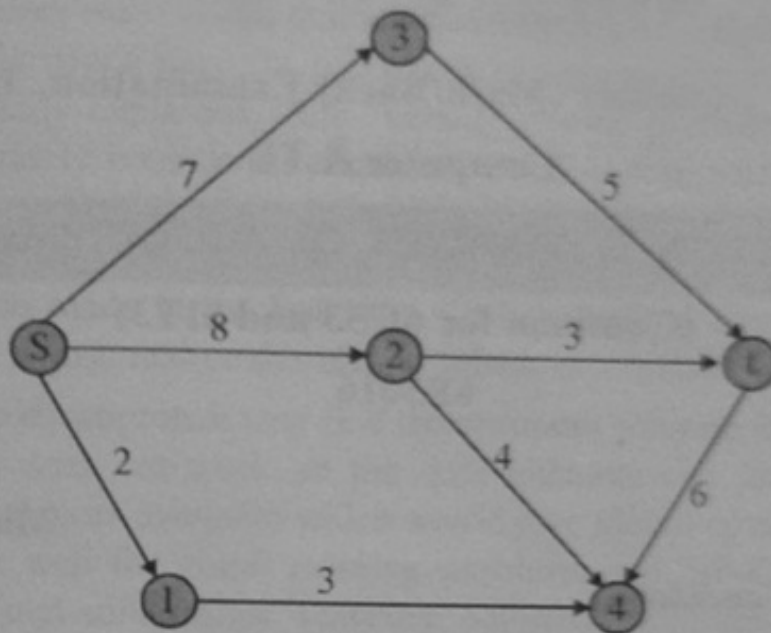
[7]

OR

- Q.4 (a) Explain the monte carlo algorithm
- (b) Define flow network and solve the following flow network for maximum flow:

[6]

[10]



Figure

UNIT-V

- Q.5 (a) Define the terms P, NP, NP-complete. Give suitable example of each.
- (b) Prove that clique problem is NP-complete.

[8]

[8]

OR

- Q.5 (a) What is Cook's theorem? Explain it.
- (b) Explain vertex cover and set cover problem. Prove that vertex cover is NP complete.

[6]

[6+4]