

B022415(022)

**B. Tech. (Fourth Semester) Examination,
April-May 2022
(AICTE Scheme)**

(Computer Science Engg. Branch)

DESIGN & ANALYSIS OF ALGORITHMS

Time Allowed : Three hours

Maximum Marks : 100

Minimum Marks : 35

Note : Attempt all questions. Attempt any two parts from (a), (b) and (c) of each unit. Each part carries 10 marks.

Unit-I

1. (a) Explain asymptotic notations used in designing algorithm.
(b) Write the algorithm of Bubble sort and analyze it.

[2]

(c) Explain master method and solve the following using master slave method :

(i) $T(n) = 3T(n/2) + n^2$

(ii) $T(n) = 2T(n/2) + n \log n$

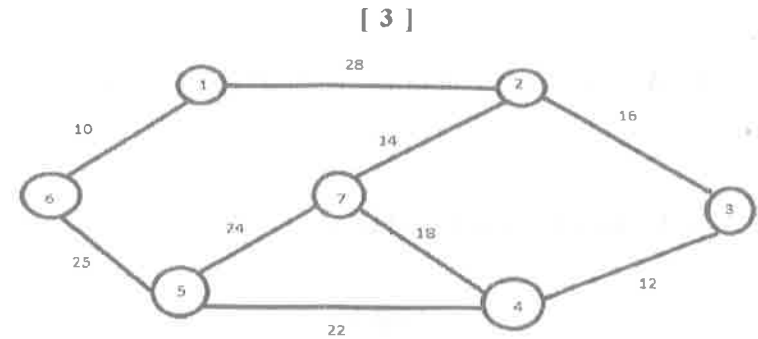
(iii) $T(n) = \sqrt{2} T(n/2) + \log n$

Unit-II

2. (a) Write the algorithm of Merge sort and analyze it.
 (b) Solve the following using divide and conquer algorithm for matrix multiplication :

$$A = \begin{bmatrix} 1 & 3 \\ 7 & 5 \end{bmatrix}, B = \begin{bmatrix} 6 & 8 \\ 4 & 2 \end{bmatrix}$$

(c) Find the minimal spanning tree using Prim's algorithm for following graph :



Unit-III

3. (a) Given two sequences X [1 m] and Y [1.....n]. Find the longest common sequence to both :

X A B C B D A B
 Y B D C A B A

(b) Give the matrix having {4, 10, 3, 12, 20 and 7}, size 4×10, 10×3, 3×12, 12×20, 20×7 so compute the optimal solution using Matrix Chain multiplication.

(c) Explain Boyer Moore algorithm with its complexity. Also shows the complexity comparison of string matching algorithm.

Unit-IV

4. (a) Explain Hamilton cycle with an example.

[4]

- (b) What is Graph colouring method? Explain with an example.
- (c) Explain Knapsack problem.

Unit-V

5. (a) For the given set of items and knapsack capacity = 5 kg, find the optimal solution for the 0/1 knapsack problem making use of dynamic programming approach :

Item	Weight	Value
1	2	3
2	3	4
3	4	5
4	5	6

- (b) Explain travelling sales person problem with an example.
- (c) Write short note on :
- (i) NP Complete Classes
 - (ii) FIFO Branch and Bound