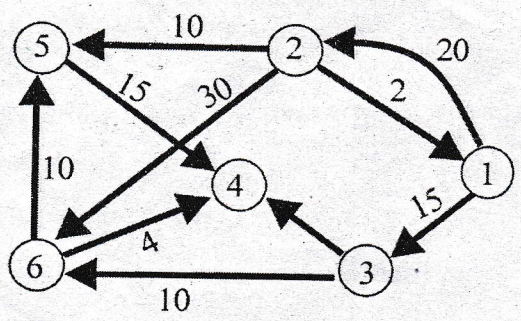
7. Use Single Source Shortest Path to obtain the lengths of Shortest Paths from vertex V_1 to all remaining vertices in the diagraph (See Fig.) 16



Unit–4

8. (a) What is Travelling Salesman Problem ? Explain with example 8

(b) Differentiate between NP, NP-Complete, and NP-hard Problem. 8

9. Explain with example : 8×2=16

- Bin Packing
- Naive String Matching algorithm.

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Printed Pages : 3

Same as 8

MCA / D–16

DESIGN AND ANALYSIS OF ALGORITHMS

Paper–MCA–14–33

Time allowed : 3 hours] *[Maximum marks : 80*

Note : ***Question No. 1 is compulsory.*** *Attempt* ***four*** *more questions selecting* ***one*** *question from each unit. All questions carry equal marks.*

(Compulsory Question)

1. (a) What do you understand by asymptotic notation ? 2×8

(b) Give all the four conditions which need to be satisfied by a binary search tree, if it is not empty.

(c) Explain the term "Lower bound of a problem"

(d) Differentiate between Time and Space complexity.

(e) Name various types of complexity classes.

(f) Give the limitations of Dijkstra's algorithm.

(g) Explain the term Transitive Closure.

(h) What is an algorithm ? What is its role in computing ?

Unit–1

2. What is Bucket Sort ? Explain the algorithm for Bucket Sort. Sort the following list using the same algorithm : 16

20 4 10 8 47 58

Also find Time Complexity

3. (a) What is recurrence relation ? Explain their use with example. 8

(b) What do you understand by the term sorting ? Write down the algorithm for heap sort. 8

Unit–2

4. (a) What are hash tables ? Explain their use with examples. 8

(b) Write an algorithm to delete as element X from a binary search tree T. What is the time complexity of your algorithm. 8

5. Write down the algorithm for finding out the Longest Common Subsequence (LCS). Find the LCS of : 16

S_1 = a a b c d a e f

S_2 = b e a d f

Unit–3

6. (a) Explain Ford Fulkerson method along with example 8

(b) Apply O/I knapsack to find optimal solution such that n = 7, m =15 8

$(p_1, p_2, p_3, p_4, p_5, p_6, p_7)$ =

(10, 5, 15, 7, 6, 18, 3) and

$(W_1, W_2, W_3, W_4, W_5, W_6, W_7)$ =

(2, 3, 5, 7, 1, 4, 1)