Total No. of Printed Pages:2

SUBJECT CODE NO: H-126
FACULTY OF ENGINEERING AND TECHNOLOGY
T.E. (CSE/IT)
Design & Analysis of Algorithms
**(REVISED)**

[Time: Three Hours]   **[Max.Marks:80]**

Please check whether you have got the right question paper.
N.B   i) Q.1 & Q.6 are compulsory.
             ii) Solve any two questions from the remaining each section.

Section A

Q.1   Solve any five questions: 10
       a) Write characteristics of an algorithm.
       b) Explain greedy method.
       c) Explain any one tree traversal technique with an example.
       d) Define feasible and optimal solution.
       e) Define asymptotic notation.
       f) Write an iterative function to find sum of 'n' numbers.

Q.2   a) Find an optimal placement for 13 programs on three tapes To, T1 & T2 where the programs   08
          are of lengths: {12, 5, 8, 32, 7, 5, 18, 26, 4, 3, 11, 10, 6}
       b) What is searching? Explain binary search using divide & conquer.   07

Q.3   a) Explain quick sort using the given data and comment on its time complexity.   08
          {50, 50, 60, 60, 40, 40, 30, 30, 20, 20}
       b) Explain heap sort with an example.   07

Q.4   a) Explain Strassen's matrix multiplications.   08
       b) Explain optimal merge patterns.   07

Q.5   a) Compute minimum cost spanning tree for the following graph.   09
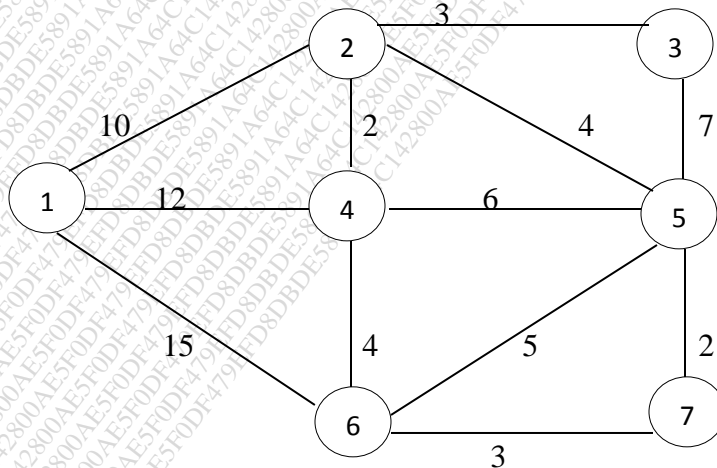
b) Write an algorithm to find smallest & largest number in an array.   06

Section B

Q.6   Solve <u>any five</u> questions: 10
        a) Define multistage graph.
        b) Define implicit & explain constraints.
        c) What is branch & bound method?
        d) State 8-queens problem.
        e) Define chromatic number of graph.
        f) Explain dead-node and live-node.

Q.7   a) Determine optimal binary search tree for n=4, (a1, a2, a3, a4) = (do, if, int, while)   10
           P(1:4) = (3, 3, 1, 1) q(0:4) = (2, 3, 1, 1, 1)

        b) Write an algorithm for all pairs shortest path problem.   05

Q.8   a) Solve sum of subset problems using back tracking for n = 4 (w1, w2, w3, w4) = (11,13,24,7)   08
           & m = 31

        b) Explain connected & biconnected components in a graph.   07

Q.9   a) Solve the following TSP using branch and bound for the given cost matrix. 10

$$\begin{bmatrix} \infty & 10 & 15 & 20 \\ 5 & \infty & 9 & 10 \\ 6 & 13 & \infty & 12 \\ 8 & 8 & 9 & \infty \end{bmatrix}$$

                                                                                     05
        b) Explain graph coloring problem.

Q.10   a) Solve 15-puzzle problem using branch & bound. Initial arrangement is: 10

$$\begin{bmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & & 8 \\ 9 & 10 & 7 & 11 \\ 13 & 14 & 15 & 12 \end{bmatrix}$$

                                                                                     05
        b) Explain Least cost branch & bound & search.