(3 Hours)   (Total marks : 80)

Note: (1) **Question No. 1 is compulsory.**
          (2) **Attempt any three questions out of remaining five questions.**

Q1.   (a) Sort the following elements using merge sort: [08]
           70, 50, 30, 10, 20, 40, 60
       (b) Explain randomized algorithm with example   [06]
       (c) Explain binary search algorithm and derive its complexity. [06]

Q2.   (a) Explain different string matching algorithms.   [10]
       (b) Explain 8-queen's problem with example.   [10]

Q3.   (a) Solve the following fractional knapsack problem: [10]
           Weights = { 40, 1 0, 20, 24}
           Profits = { 280, 100, 120, 120}   &   W = 60
       (b) Write an algorithm for sum of subsets. Hence solve the following problem: [10]
           S = {10, 7, 5, 18, 12, 20, 15}   &   M = 35

Q4.   (a) Write an algorithm to find minimum and maximum value using divide and
           conquer and also derive its complexity.   [10]
       (b) Explain the different asymptotic notations.   [10]

Q5.   (a) What is LCS? Find LCS for the following strings: [10]
               X = BACDB
               Y = BDCB
       (b) Find the minimum spanning tree for the following graph: [10]
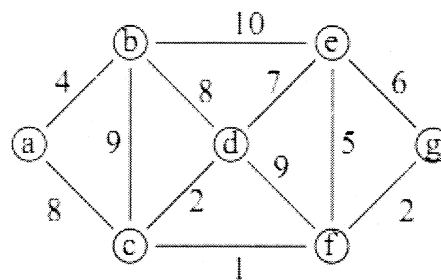
Q6.   Write note on **(any two)** :   [20]
       (a) 15-puzzle problem
       (b) Graph coloring
       (c) Strassen's matrix multiplication