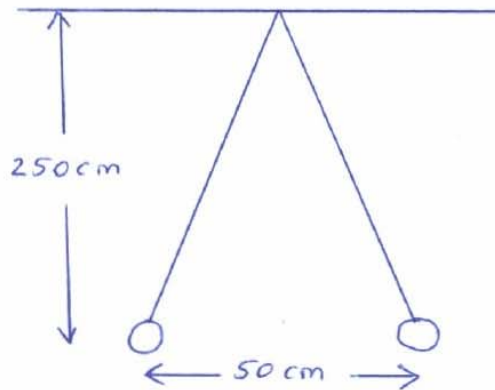# Physics 2020 Assignment 1

1. Estimate the number of electronics in 1 cm³ of water. Express the electric charge of these electrons in esu and coulombs.

2. Compute the ratio of the gravitational force to the coulomb force for:
   a) Two protons
   b) Two electrons

3. Two charged balls each with mass of 300 gm hang as shown in diagram.

   Assuming both balls to have the same charge,
   a) What is the charge on each ball in esu?
   b) What is the electrical force between the balls in dynes?

4. At each corner of a square is a particle with charge q. Fixed at the center of the square is a point charge of opposite sign, of magnitude Q. What value must Q have to make the total force on each of the four particles zero? With Q set at that value, the system, in the absence of other forces is in equilibrium. Do you think the equilibrium is stable?