

Name:

1) CLASS(3)

Francis Hauksbee puts two small aluminum foil balls, with the same mass $m = 1.0 \times 10^{-3}$ kg, at the end of two pieces of strings with length $l = 10$ cm. He then hangs them from somewhere, then charges them, touching by a charged plastic rod. He observes that the balls move away from each other and stop. He then measures the distance between them $d = 12$ cm. See fig. 1.

a) Draw a free body diagram for the ball on the right. Name the forces with letters, and in a table explain what each letter represents.

[3 pts]

b) Use your knowledge from mechanics. Calculate each one of the forces. [3 pts]

c) Can you find the charge on each foil? Find the multiplication of the charges; the unit is C^2 . [4 pts]

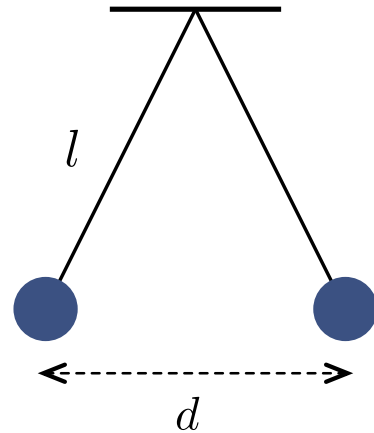


Figure 1: Charged balls of aluminum foil.

2) PHORUM(weekend)

Make a narrow water stream. Charge a plastic rod and bring it close to the stream.

a) Water is neutral. How come? Explain it to me. I only understand Coulomb's Law. [Resolved]

b) To show our theory is correct, give me an estimation of the charge on the rod. Model the rod as a point charge and each water molecule as a dipole. What information do you need? What measurements you need to do?