

S11 PHY114 Problem Set 1

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1 Due Monday 24 Jan 2011

1. When a plastic comb is rubbed against a cloth, $2\mu C$ of charge is transferred. How many electrons are transferred to make this happen?
2. How many electrons are there in 50 kg of water? This is roughly the number of electrons in a human body.
3. What is the attractive force between an electron and a proton in a hydrogen atom, assuming that the distance between them is $53 \times 10^{-12} \text{m}$?
4. Two charged particles are at a distance d from each other. They are moved apart and the force is now only one quarter of the original. How far apart are they now? The charges remain the same.
5. Two charges $Q_1 = 7\mu C$ and $Q_2 = 9\mu C$ are located 1.2 m apart. Where will you place charge $Q_3 = -2\mu C$ so that it is in equilibrium? What would happen if we changed its position even slightly towards either Q_1 or Q_2 from this equilibrium position?