## PHY114 S09 Problem Set 1

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## 1 Due Monday 26 Jan 2008

Note: You **MUST** put your workshop number on the top of your solutions. Your workshop number is a number from 1 to 15 that identifies your workshop. You may find it on the "Course Info" page of the course website.

- 1. How many electrons make up a charge of -29.0  $\mu C$ ?
- 2. Two charged spheres are 8.5 *cm* apart. They are moved apart and the forces is now only one quarter of the original. How far apart are they now? The charges remain the same.
- 3. What is the total charge of all the electrons in 25 kg of pure Gold? (Look up how many electrons there are in a Gold atom and how much each Gold atom weighs).
- 4. A charge Q is transferred from an initially uncharged plastic ball to an identical ball 13 cm away. The force of attraction is then 18 mN. What is the charge Q in Coulombs? How many electrons were transferred?
- 5. Inside an atom the gravitational attraction is much smaller than electric forces. Calculate the magnitude of the electric force between a proton and an electron in a hydrogen atom. Compare with the gravitational force. Look up the masses of the particles as well as the distance between the proton and the electron in a hydrogen atom (it is called a Bohr radius).