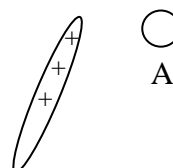


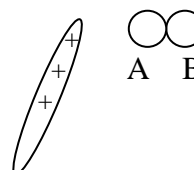
PHYS1022 Electricity and Magnetism
Problem Sheet 1: for workshop

Note that these questions will not be marked, but will be demonstrated in Workshops. Assessed problems are to be found at <http://www.masteringphysics.com> or from the PHYS1022 web pages.

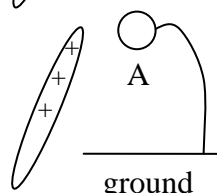
1. a. Metal sphere A is initially neutral. A positively charged rod is brought near, but not touching. Is A now positive, negative or neutral? Explain using charge diagram and words.



- b. Metal spheres A and B are initially neutral and are touching. A positively charged rod is brought near A, but not touching. Is A now positive, negative or neutral? Explain using charge diagram and words.



- c. Metal sphere A is initially neutral. It is connected by a metal wire to the ground. A positively charged rod is brought near A, but not touching. Is A now positive, negative or neutral? Explain using charge diagram and words.



2. A rod of length L has charge distribution $\lambda = k x^3 \text{ Cm}^{-1}$ where x is the distance from one end and k a constant - what is the total charge on the rod?
3. A charge of $q_1 = 4.0 \mu\text{C}$ is at the origin, and a charge $q_2 = 6.0 \mu\text{C}$ is on the x axis at $x = 3.0 \text{ m}$.
- (a) Find the force on charge q_2 .
- (b) Find the force on charge q_1 .
- (c) How would your answers for parts (a) and (b) differ if q_2 were $-6.0 \mu\text{C}$?

Make sure you *define* and draw the forces clearly.

4. Three charges, $+q$, $+2q$, and $+4q$, are connected by strings as shown in the figure. Find the magnitudes of the tensions T_1 and T_2 .

