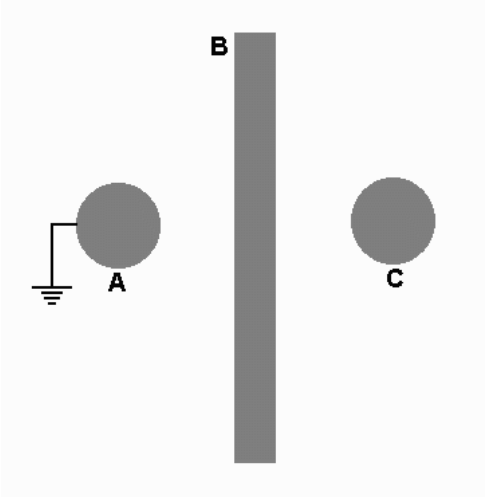
DAY 8 -- Homework

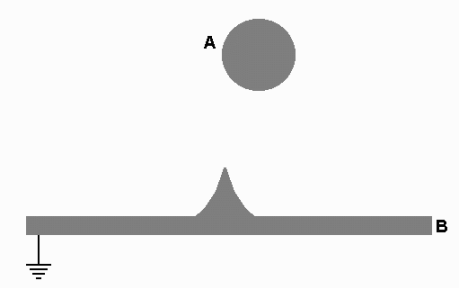
1. **PHY 232 ONLY**
   Imagine that a rock was dropped into the Sun by an astronaut hovering near the orbit of Mercury. Calculate how long (in days) it would take for the rock to reach the Sun – get an exact number, not an estimate. Repeat for Earth, Jupiter, and Pluto. Look up the needed solar system data.

2. Sketch the field lines and equipotential surfaces for each of the three charged conductors shown in the figure. Do each conductor in isolation (not near the others). Consider all to be carrying a positive charge.

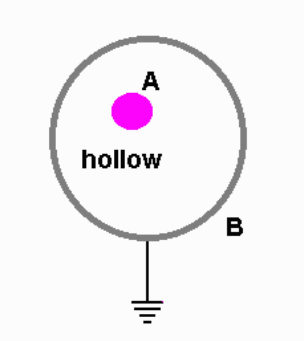
3, 4, 5, 6.
Below and at right are shown various combinations of conductors and insulators—gray objects are conductors; pink objects are insulators. In each case an initial charge distribution is given. Sketch the distribution of charge and the electric field lines once electrostatic equilibrium has been achieved for each case you selected. Your drawings should be neat and accurate. Use different colored pens or pencils to distinguish between positive charges, negative charges, field lines, and the conductors and insulators.



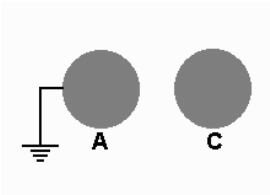
Negative charge is placed on C in such as way that the charge is nitially uniformly distributed around C.



Positive charge is placed on A in such as way that the charge is initially uniformly distributed around A.

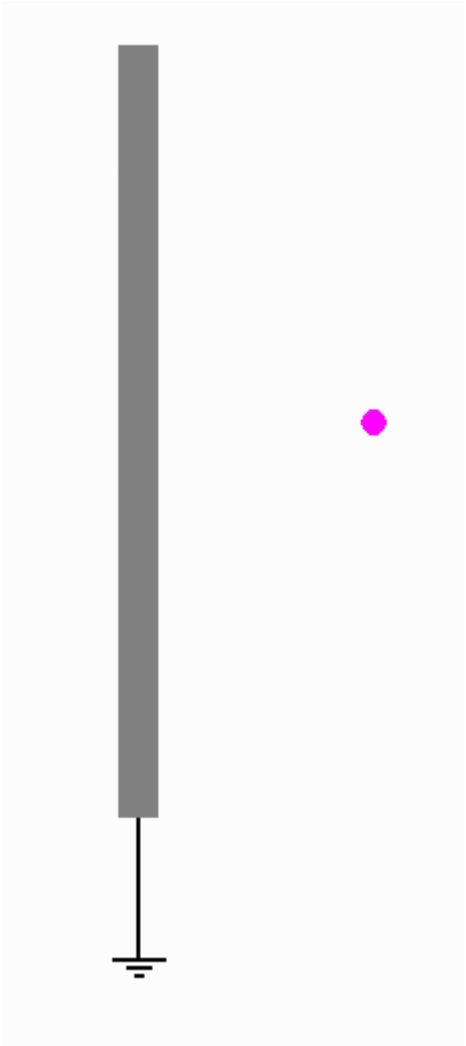


Object A is charged negatively. The initial distribution of charge on A is uniform



A large amount of negative charge is placed on C.

7. A positive point charge is located a certain distance from a large metal plate that is grounded.



(a) Sketch the distribution of charge, the electric field lines, and the equipotential surfaces once electrostatic equilibrium has been achieved. Your drawing should be neat and accurate. Use different colored pens or pencils to distinguish between positive charges, negative charges, field lines, and equipotential surfaces.

(b) Compare your drawing to a drawing of charges, electric field lines, and equipotential surfaces for an electric dipole. Discuss in a few sentences.

8. **PHY 232 ONLY**

In the calculus example today we worked the problem based on points P and B. Can you set up the problem based on P and A? If so, work it out all the way to the point of having the integral ready to put into a computer.