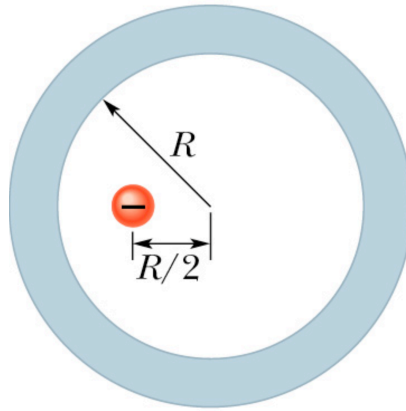


Activity 4, January 26, 2009

The figure shows a cross section of a spherical metal shell of inner radius R . A point charge of $-5.0 \mu\text{C}$ is located at a distance $R/2$ from the center of the shell. The shell is electrically neutral. Our goal is to find the magnitudes and signs of the (induced) charges on the inner and outer surfaces of the metal shell.



(a) First, let's find the (induced) charge on the inner surface of the metal shell. We will use Gauss' law – but what surface should we choose? (Hint: remember that the electric field inside a conductor is zero)

(b) Once you have chosen this surface, it is easy to see what the induced charge on the inner surface must be (use Gauss' law with the surface from (a)).

(c) Now you can calculate the charge on the outer surface (Hint: Remember, the metal shell is electrically neutral).