Ch 22 Q8
When the positively-charged ball is brought near the conductor, the conductor is grounded, electrons are attracted to the conductor from the ground.

a) Ball removed, then ground connection removed - electrons flow back to ground so conductor is left neutral.

b) Remove connection to ground, then ball removed, extra electrons are trapped on the conductor → conductor is left negatively charged.

Ch 22 P 5
Force on lower left charge:

\[
\cos \theta = \frac{a}{12a}, \quad \sin \theta = \frac{c}{12a}
\]

a) \( F_x = F_x(9g) + F_x(-g) + F_x(-2g) \)
\[
= 0 + \frac{1}{4\pi\varepsilon_0} \cdot \frac{2g}{(12a)^2} \left( \frac{-g \cos \theta}{(12a)^2} + \frac{-2g}{a^2} \right) \left( \frac{\text{both to right}}{12 \text{ right}} \right)
\]
\[
= \frac{g^2}{4\pi\varepsilon_0 a^2} \left( 4 + \frac{12}{2} \right) \text{ to right} = \left( 9 \times 10^9 \text{ N/m}^2 \right) \left( 10^{-2} \right) (4.17) = 0.117 \text{ N to right}
\]

b) \( F_y = F_y(9g) + F_y(-g) + F_y(-2g) \)
\[
= \frac{1}{4\pi\varepsilon_0} \cdot \frac{2g}{(12a)^2} \left( \frac{-g \sin \theta}{(12a)^2} + \frac{-2g}{a^2} \right) \left( \frac{\text{both up}}{12 \text{ up}} \right)
\]
\[
= \left( 9 \times 10^9 \text{ N/m}^2 \right) \left( 10^{-2} \right) (2.717) \text{ Down} = -0.046 \text{ N Down}
\]