**37.6. Model:** Assume the electric field ($E = \Delta V/d$) between the plates is uniform.
**Visualize:** Please refer to Figure 37.9.
**Solve:** **(a)** The mass of the droplet is

$$m_{\text{drop}} = \rho V = \rho\left(\frac{4\pi}{3}R^3\right) = \left(885 \text{ kg / m}^3\right)\frac{4\pi}{3}\left(0.4\times10^{-6}\text{ m}\right)^3 = 2.37\times10^{-16}\text{ kg}$$

**(b)** In order for the upward electric force to balance the gravitational force, the charge on the droplet must be

$$q_{\text{drop}} = \frac{m_{\text{drop}}g}{E} = \frac{\left(2.37\times10^{-16}\text{ kg}\right)\left(9.8\text{ m / s}^2\right)}{20\text{ V}/11\times10^{-3}\text{ m}} = 1.28\times10^{-18}\text{ C}$$

**(c)** Because the electric force is directed toward the electrode at the higher potential (or more positive plate), the charge on the droplet is negative. The number of surplus electrons is

$$N = \frac{q_{\text{droplet}}}{e} = \frac{1.28\times10^{-18}\text{ C}}{1.60\times10^{-19}\text{ C}} = 8$$