

61. (a) Using the density of water ($\rho = 1000 \text{ kg/m}^3$), the weight mg of the spherical drop (of radius $r = 6.0 \times 10^{-7} \text{ m}$) is

$$W = \rho V g = (1000 \text{ kg/m}^3) \left(\frac{4\pi}{3} (6.0 \times 10^{-7} \text{ m})^3 \right) (9.8 \text{ m/s}^2) = 8.87 \times 10^{-15} \text{ N} .$$

- (b) Vertical equilibrium of forces leads to $mg = qE = neE$, which we solve for n , the number of excess electrons:

$$n = \frac{mg}{eE} = \frac{8.87 \times 10^{-15} \text{ N}}{(1.60 \times 10^{-19} \text{ C})(462 \text{ N/C})} = 120 .$$