

18. (a) The charge on the sphere is

$$q = 4\pi\epsilon_0 VR = \frac{(200 \text{ V})(0.15 \text{ m})}{8.99 \times 10^9 \frac{\text{N}\cdot\text{m}^2}{\text{C}^2}} = 3.3 \times 10^{-9} \text{ C} .$$

- (b) The (uniform) surface charge density (charge divided by the area of the sphere) is

$$\sigma = \frac{q}{4\pi R^2} = \frac{3.3 \times 10^{-9} \text{ C}}{4\pi(0.15 \text{ m})^2} = 1.2 \times 10^{-8} \text{ C/m}^2 .$$