2. Al spheres

\[ m_e = m_x = 0.0250 \text{ kg} \]
\[ V = 80.0 \text{ cm} = 0.800 \text{ m} \]
\[ Z_{Al} = 13 \] (4 protons + 13 e's)

Atomic mass = 26.982 g/mole

(a) How many e's in each sphere?

\[ n_e = \text{no. by definition (if atoms are neutral - Al}^0) \]
\[ Z_{Al} = 13 \times n_e \times (0.0250 \text{ kg} / 0.026982 \text{ g/mole}) \]
\[ n_e = 13 / (0.026982 \text{ g/mole}) \times 1.67 	imes 10^{-24} \text{ kg/electron} \]
\[ n_e = 7.25 	imes 10^{19} \]

(b) How many e's are transferred in order to cause a force of 1 N/m²?

\[ F = q_e E \]
\[ E = \frac{V}{r^2} \]

\[ q = \frac{E r^2}{V} \]
\[ q = 8.43 \times 10^{-10} \text{ C} \]

Amount of charge transferred

\[ \text{Number of e's transferred would be the charge divided by the charge of 1 electron (q/e).} \]
\[ \text{So, since} \]
\[ n_e = 7.25 	imes 10^{19} \text{ electrons} \]

(c) What fraction of electrons in each sphere is transferred?

\[ \text{Fraction} = \frac{\text{# transferred}}{\text{Total # of e's}} \]
\[ \text{Fraction} = 7.25 \times 10^{24} e/2 \]

\[ \text{Fraction} = 7.25 \times 10^{-10} \]