SHOW ALL WORK!!!!!
REPORT ALL NUMBERS TO THREE SIGNIFICANT FIGURES!
Use the conversion constants and data given on the front page.

Two conducting spheres are connected with a long wire. A total charge of \(1.65 \times 10^{-4} \text{ C}\) is placed on them. The radius of sphere 1 is 6.00 cm, and the radius of sphere 2 is 2.00 cm.

(a) What is the charge on each sphere?
(b) What is the potential of each sphere, using the usual choice for \(V = 0\).
(c) Find the electric field at the surface of each sphere.

\[ a) \text{ we know } V_1 = V_2 \text{ because potential is equal everywhere in a metal.} \]

\[ \frac{kq_1}{r_1} = \frac{kq_2}{r_2} \]

\[ q_1 = \frac{r_1}{r_2} q_2 = 3q_2 \]

but \( q_1 + q_2 = q_{\text{total}} \)

\[ q_1 = 1.24 \times 10^{-6} \text{ C} \quad q_2 = 4.13 \times 10^{-7} \text{ C} \]

\[ q_{\text{total}} = \frac{q_1}{q_2} = \frac{q_{\text{total}}}{4} \]

\[ b) \quad V = \frac{kq_1}{r_1} = \frac{kq_2}{r_2} = 1.86 \times 10^5 \text{ V} \]

\[ c) \quad E_1 = \frac{kq_1}{r_1^2} = 3.10 \times 10^6 \frac{\text{N}}{\text{C}} \]

\[ E_2 = \frac{kq_2}{r_2^2} = 9.28 \times 10^6 \frac{\text{N}}{\text{C}} \]