A uniformly charged sphere of a non-conductor has radius $R_1$, and charge $Q_1$. It is enclosed in a concentric thin metal spherical shell whose radius is $R_2$. ($R_2 > R_1$). The metal shell has total charge $Q_2$.

(a) Calculate the electric field a distance 37.0 cm from the common center of the two spheres. (Numerical answer including sign.)

(b) Calculate the electric field a distance of 17.5 cm from the common center. (Numerical answer including sign.)

(c) Calculate the electric field a distance 2.00 cm from the common center. (Numerical answer including sign.)

\[ Q_1 = 175 \mu C \]
\[ Q_2 = -325 \mu C \]
\[ R_1 = 10.0 \text{ cm} \]
\[ R_2 = 25.0 \text{ cm} \]

\[ |E| = \frac{\kappa Q_1}{r^2} + \frac{\kappa Q_2}{r^2} = \frac{9.00 \times 10^9 \text{ N} \cdot \text{m}^2/\text{C}^2}{(0.37)^2} - \frac{3.25 \times 10^9}{(0.04)^2} \]
\[ = -9.86 \times 10^6 \text{ N/C} \]

\[ |E| = \frac{\kappa Q_1}{r^2} = \frac{9.00 \times 10^9 \text{ N} \cdot \text{m}^2/\text{C}^2}{1.75 \times 10^{-4} \text{ C}} = 5.14 \times 10^7 \text{ N/C} \]

\[ |E| = \frac{\kappa |\text{charge enclosed}|}{r^2} = \frac{9.00 \times 10^9 \text{ N} \cdot \text{m}^2/\text{C}^2}{1.75 \times 10^{-4} \text{ C}} \times \frac{4}{3} \pi \left(0.13\right)^3 \]
\[ = 3.15 \times 10^7 \text{ N/C} \]