Δq (charge difference) $\qquad e = \frac{\Delta q}{n}$

$\Delta q_{12} = q_2 - q_1 = 9.98 \times 10^{-19} C \qquad e_1 = \frac{\Delta q_{21}}{6} = 1.66 \times 10^{-19} C$

$\Delta q_{13} = q_1 - q_3 = 1.64 \times 10^{-19} C \qquad e_2 = \frac{\Delta q_{13}}{1} = 1.64 \times 10^{-19} C$

$\Delta q_{14} = q_1 - q_4 \simeq 0 \qquad 0$

$\Delta q_{51} = q_5 - q_1 = 4.97 \times 10^{-19} C \qquad e_3 = \frac{\Delta q_{51}}{3} = 1.66 \times 10^{-19} C$

$\Delta q_{61} = q_6 - q_1 = 6.62 \times 10^{-19} C \qquad e_4 = \frac{\Delta q_{61}}{4} = 1.65 \times 10^{-19} C$

$\Delta q_{23} = q_2 - q_3 = 11.6 \times 10^{-19} C \qquad e_5 = \frac{\Delta q_{23}}{7} = 1.65 \times 10^{-19} C$

$\Delta q_{24} = q_2 - q_4 = 10 \times 10^{-19} C \qquad e_6 = \frac{\Delta q_{24}}{6} = 1.67 \times 10^{-19} C$

$\Delta q_{25} = q_2 - q_5 = 4.99 \times 10^{-19} C \qquad e_7 = \frac{\Delta q_{25}}{3} = 1.66 \times 10^{-19} C$

$\Delta q_{26} = q_2 - q_6 = 3.34 \times 10^{-19} C \qquad e_8 = \frac{\Delta q_{26}}{2} = 1.67 \times 10^{-19} C$

$\vdots \qquad \vdots$

$$e_{average} = 1.659 \times 10^{-19} C$$

Pb # 9

Rutherford Scattering formula will no longer hold when α particles begin to penetrate or touch the nucleus.

Conservation of energy $\qquad K_i + U_i = K_f + U_f$

initially the α-particle is far from the nucleus $\Rightarrow U_i = 0$