

Name: _____ Block: _____

Coulomb's Law & Electric Fields

1. What is the magnitude of the electric force between two objects, each with a charge of $+2.00 \times 10^{-6}$ C, which are separated by a distance of 1.50 m? Is the force attractive or repulsive?

$$+0.0160 \text{ N } \leftarrow \rightarrow$$

2. An object with a charge of $+1.50 \times 10^{-2}$ C is separated from a second object with an unknown charge by a distance of 0.500 m. If the magnitude of the electric force between the two objects is -1.35×10^6 N, what is the charge on the second object?

$$-2.50 \times 10^{-3} \text{ C}$$

3. A particle with a charge of $+1.4$ C is placed in an electric field with a strength of $+0.85 \frac{\text{N}}{\text{C}}$. What is the force on the particle?

$$+1.19 \text{ N}$$

4. An ideal capacitor is made from two parallel metal plates. When the capacitor is fully charged, the electric potential difference between the plates is $+6$ V. If the plates are 0.05 m apart, what is the strength of the electric field inside the capacitor?

$$+120 \frac{\text{V}}{\text{m}}$$

5. The distance between an alpha particle and an electron is 2.00×10^{-25} m. (An alpha particle has a charge of two elementary charges, and an electron is one elementary charge. These numbers may be found on page 2 of your reference tables.)

(a) Calculate the electric force between the charges.

$$\boxed{-1.15 \times 10^{22} \text{ N}}$$

(b) What is the resulting acceleration of the electron? (The mass of an electron may be found on page 2 of your reference tables.) (Hint: $F = ma$.)

$$\boxed{1.26 \times 10^{52} \frac{\text{m}}{\text{s}^2}}$$