Chapter E1: Basic Electrostatics

E1.3 What is the Nature of Charge?

- Charge can be "positive" or "negative".
- Like charges repel. Opposites attract.

E1.4 How Objects Become Charged

The SI unit of charge:

$$1\text{C} \equiv \text{charge of } 6.242 \times 10^{18} \text{ protons} = (6.242 \times 10^{18})e \tag{1}$$

where

$$e \equiv \text{charge of one electron} = 1.602 \times 10^{-19}\text{C} \, . \tag{2}$$

E1.5 Conservation of Charge

Charge is conserved.

E1.6 Coulomb's Law

Coulomb's law says:

$$F_e = \frac{k|q_1 q_2|}{r^2} \, . \tag{3}$$

What do the symbols in this equation stand for?

Under what circumstances does this equation apply?

E1.7 Conductors and Insulators

The difference between insulators and conductors:

- insulators
- conductors

E1.8 Polarization of Neutral Objects

Practice:

Four identical particles, each having a charge of +120 nC are arranged in a square 6.0 cm on each side. Find the magnitude of the force acting on any one of the charges, and describe the direction of this force in words.