Coulomb's Law and Force Analysis
Lesson Notes

Focus Question:

How can Coulomb's Law be combined with vector physics and algebra to conduct a force analysis of an electrostatic phenomenon?

Coulomb's Law

As an equation, Coulomb's Law is stated using the above symbols and a proportionality constant (**k**). This proportionality constant is referred to as the **Coulomb's Law constant**. Its units determine the units that must be used when substituting values into the equation for F, Q, and d.

$$F_{elect} = k \cdot \frac{Q_A \cdot Q_B}{d^2}$$

$$k = 9.0 \times 10^9 \ N \cdot m^2/C^2$$

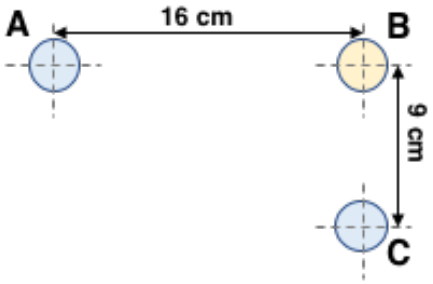
This video steps through the solution to four complex problems. Here are the four problems.

Problem 1

Three charges - A, B, and C - lie along the cm-axis at the positions as shown. Their charge values and type are listed. Determine the net electric force on B.

Problem 2

Three charges - A, B, and C - are arranged as shown. Their charge values and type are listed. Determine the net electric force on B.



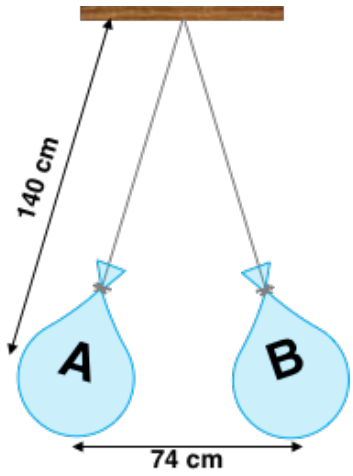
Q_A = +5.4 μC

Q_B = -3.6 μC

Q_C = +4.8 μC

Problem 3

Two identical 7.6-gram balloons are charged with the same type and quantity of charge. Their diagonal distance to the point of support is 140 cm and they have a separation distance 74-cm apart. Determine the quantity of charge on the balloons.



Problem 4

Charge A (+3.8 μC) and Charge B (+5.2 μC) lie 100-cm apart along the axis as shown. Where along the axis would a third charge C be placed in order for the net electric force upon it to the be 0 N?