

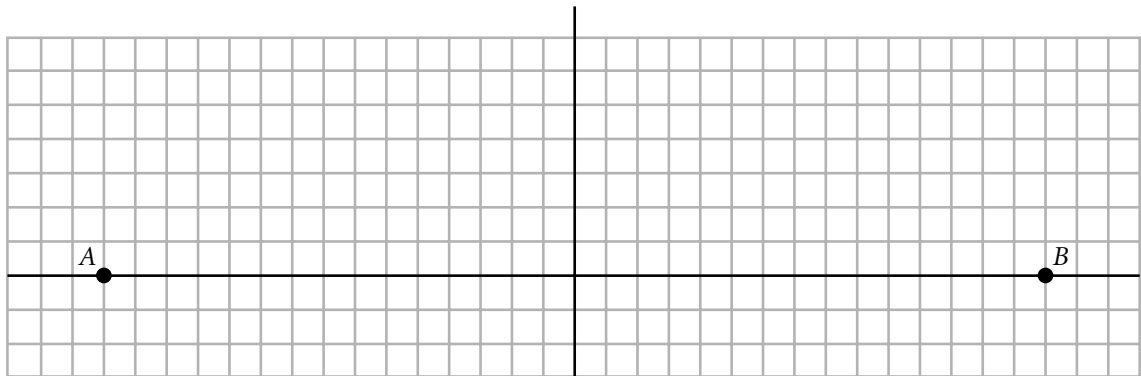
Chapter
17

HOLT PHYSICS
Mixed Review

Electric Forces and Fields

Use $k_C = 8.99 \times 10^9 \text{ N}\cdot\text{m}^2/\text{C}^2$.

1. Two spheres, A and B, are placed 0.60 m apart, as shown. Sphere A has $+3.00 \mu\text{C}$ excess charge. Sphere B has $+5.00 \mu\text{C}$ excess charge.



- a. How many electrons are missing on sphere A? on sphere B?

- b. How do the forces of B on A and A on B compare? Does the greater charge exert a greater force?

2. A third spherical charge, C, of $+2.00 \mu\text{C}$, is placed on the line connecting spheres A and B. Find the resultant force exerted by A and B on C when C is placed in the following locations.

- a. 0.20 m to the left of A

- b. 0.20 m to the right of A between A and B

- c. exactly in the middle between A and B

Chapter **17**

HOLT PHYSICS
Mixed Review *continued*

3. Alpha particles are made of two protons and two neutrons.
 $m_p = 1.673 \times 10^{-27} \text{ kg}$; $m_n = 1.675 \times 10^{-27} \text{ kg}$; $q_e = 1.60 \times 10^{-19} \text{ C}$

a. Find the electric force acting on an alpha particle in a horizontal electric field of $6.00 \times 10^2 \text{ N/C}$.

b. What is the acceleration of this alpha particle?

c. How does this acceleration compare with gravity? Describe the particle's trajectory. Will it be close to horizontal? to vertical free fall?

4. A $2.00 \mu\text{C}$ point charge of mass 5.00 g is suspended on a string and placed in a horizontal electric field. The mass is in equilibrium when the string forms a 17.3° angle with the vertical.

a. In the space below, sketch a free-body diagram of the problem. Show the vertical and horizontal components of the tension force in the string.

b. Find the electric force on the charge in this field.

c. Find the strength of the electric field.

5. How many electrons are there in 1.00 C ? How many electrons are there in $1.00 \mu\text{C}$?

HRW material copyrighted under notice appearing earlier in this book.