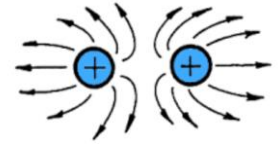


## Electrostatic Force and Field Problem Set

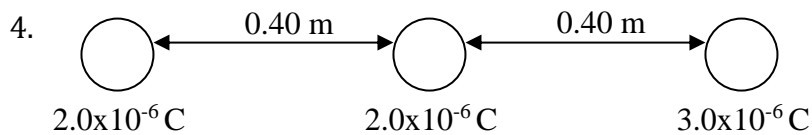
$$\mu = 10^{-6}$$

1. Calculate the electric force between two point charges of  $4.00 \mu\text{C}$  and  $3.00 \mu\text{C}$  when they are  $2.00 \text{ cm}$  apart.



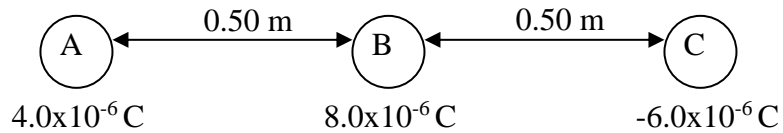
2. Two **equally** charged particles produce an electric force on each other of  $3.40 \times 10^{-2} \text{ N}$  when placed  $0.100 \text{ m}$  apart. What is the charge on each point?

3. How far apart are two point charges of  $2.0 \times 10^{-6} \text{ C}$  and  $4.0 \times 10^{-6} \text{ C}$  if they produce an electric force of  $0.56 \text{ N}$ ?



Three charged objects are placed in a line as shown. Calculate the force on the middle object due to the other charges. Include a direction

Use the following diagram to answer questions 5,6



5. What is the net force on A? Include direction.
6. What is the net force on B? Include direction.

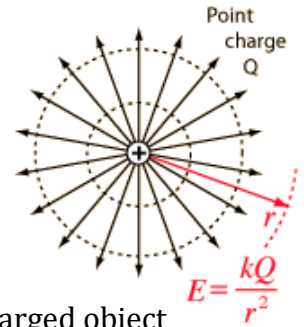
Answers:

1. (270 N)
2. ( $1.94 \times 10^{-7} \text{ C}$ )
3. (0.36 m)
4. ( $1.1 \times 10^{-1} \text{ N}$  left)
5. (0.94 N to the left)
6. (2.9 N to the right)

**Electric Fields:**

- 1) What is the electric field strength 0.750 m from an  $8.00 \mu\text{C}$  charged object?

- 2) At a point a short distance from a  $4.60 \times 10^{-6}$  C charged object, there is an electric field strength of  $2.75 \times 10^5$  N/C. What is the distance to the charged object producing this field?



- 3) What is the electric field strength at a point in space where a  $5.20 \times 10^{-6}$  C charged object experiences an electric force of  $7.11 \times 10^{-3}$  N?

Answers:

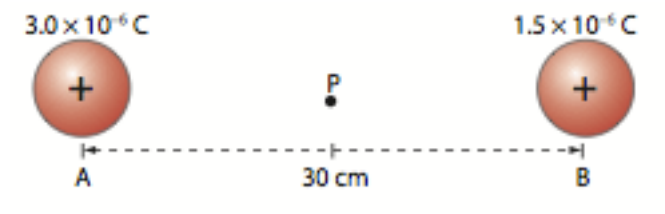
1. ( $1.28 \times 10^5$  N/C)
2. (0.388 m)
3. (1370 N/C)

**Fields produced by multiple charges:**

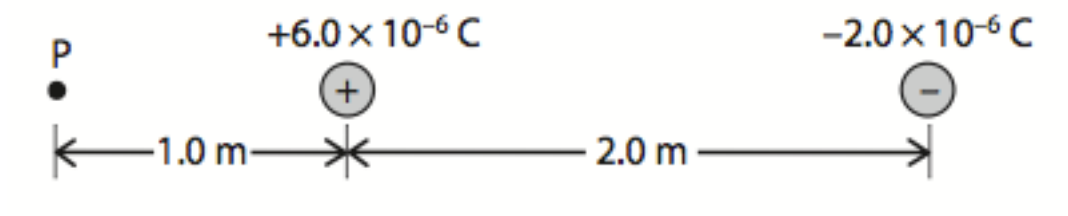
- 4) Calculate the electric field strength midway between a  $4.50 \mu\text{C}$  charged object and a  $-4.50 \mu\text{C}$  charged object if the two charges are 50 cm apart.
  
  
  
  
  
  
  
  
  
  
- 5) Calculate the electric field strength midway between a  $3.0 \mu\text{C}$  charged object and a  $6.0 \mu\text{C}$  object if they are 0.80 m apart.

6) Calculate the electric field strength midway between two  $3.0 \mu\text{C}$  objects if they are 90 cm apart.

7) Two negatively charge spheres, A and B, are 30 cm apart and have the following charges of  $3.0 \times 10^{-6} \text{ C}$  and  $1.5 \times 10^{-6} \text{ C}$  as in the figure below. What is the net electric field at a point P, which is exactly in the middle between the two charges?



8) What is the magnitude and direction of the electric field at point P in the figure below?



Answers:

4.  $(1.30 \times 10^6 \text{ N/C})$
5.  $(1.7 \times 10^5 \text{ N/C})$
6.  $(0 \text{ N/C})$
7.  $(6.0 \times 10^5 \text{ N/C to the right})$
8.  $(5.2 \times 10^4 \text{ N/C to the left})$