Name _____

HONORS PHYSICS ELECTROSTATICS REVIEW

1. Be able to briefly describe each method of charging. Be able to tell the difference between them, the circumstances in which each occurs and the end result of each.

   a. friction b. conduction c. induction d. polarization.

2. After rubbing a balloon on your head, the balloon has a charge of -2 μC. What is the charge on your hair?

   $+2\,\mu C$

3. Explain what each of the following equations is used for:

   a) $F = \frac{Kq_1q_2}{d^2}$ Find Force Between two charged objects

   b) $E = \frac{Kq_1}{d^2}$ Find Electric Field Strength at a distance from a Charged object.

   c) $F = Eq$ Find The force on a Charged object In an Electric Field

4. When the symbol "μ" is placed in front of a unit, it means multiply by $\times 10^{-6}$

5. A 3.0 μC charge is located 1.5×10^{-5} m from a -6.0 μC charge, what is the force between the charges?

   $$F = \frac{Kq_1q_2}{d^2} = \frac{(9\times10^9)(3\times10^{-6})(6\times10^{-6})}{(1.5\times10^{-5})^2} = 7.2\times10^8\,N$$

   Is the force attractive or repulsive? ATTRACTIVE

6. Two identically charged objects exert a force of 25 N on each other when they are a distance of 3 m apart, what is the charge of each object?

   $$F = \frac{Kq_1q_2}{d^2} \qquad 25 = \frac{9\times10^9(q^2)}{3^2}$$

   $$q^2 = 2.5\times10^{-8} = 1.58\times10^{-4}$$

   $158\,\mu C$

$F = K\, q_1 q_2 / d^2$

7. Two charges, Q and q, at a certain distance, d, exert a 200 N force on each other. What would the force be if:
   a. Q were doubled and q were tripled.

$$F_{New} = 200 \frac{(2)(3)}{1^2} = \underline{\underline{1200\ N}}$$

   b. d were reduced to 1/4 its original value.

$$F = 200 \frac{(1)(1)}{(1/4)^2} = 200 \frac{1}{1/16} = 200 \cdot 16 = \underline{\underline{3200N}}$$

   c. Q were cut into 1/3, q were doubled and d were doubled.

$$F = 200 \frac{(1/3)(2)}{2^2} = \frac{200}{6} = \underline{\underline{33\ N}}$$

8. a. Calculate the electric field strength 30 cm from a -5 μC charge.

$$E = Kq/d^2 = \frac{(9\times10^9)\,5\times10^{-6}}{(.3)^2} = 500{,}000\ N/C$$

   b. What is the direction of the field?

Toward the Charge

   c. What force would a charge of 0.65 μC feel at that position?

$$F = Eq = 500{,}000\,(.65\times10^{-6}) = 0.325\ N$$

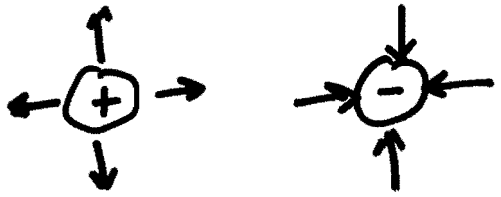
9. What is the strength of the electric field if a 25 μC charge experiences a 100 N force?

$F = Eq$ $\quad 100 = 25\times10^{-6}\,E$

$$E = 4\times10^{6}\ \frac{N}{C}$$

10. How is the direction of the electric field lines determined?
    What can you tell by the spacing between the E-field lines?

The direction of a field line is the direction of The force on a positive charge.



The closer the field Lines the stronger The field

Also Study Lightning Notes

Electrical Potential Energy concepts