###### Electromagnetism Chapter 16

Electrostatics

* There are two kinds of electric charge.


  + Electric charge is conserved.
  + Positively charged particles are called
  + Uncharged particles are called
  + Negatively charged particles are called

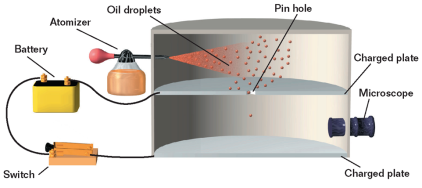
Electric charge is quantized:

-- charge is measured in coulombs (C)

-- charge on one p+ or e– =

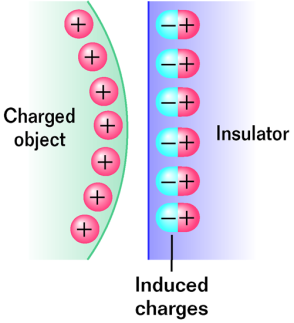
A conductor loses –1.05 x 10–18 C of charge. How many e– did it lose?

The experiment that lead to determining the charge of a particle was



**Transfer of Charge**

* An is a material in which charges can move freely.
* An is a material in which charges cannot move freely.
* Insulators and conductors can be charged by .
* Conductors can be charged by .
* is a process of charging a conductor by bringing it near another charged object and grounding the conductor.



A surface charge can be induced on insulators by .

With , the charges within individual molecules are realigned such that the molecule has a slight charge separation.

**Coulomb Law**

* Two charges near one another exert a force on one another called the
* Coulomb’s law states that the electric force is to the magnitude of each charge and to the of the distance between them.
* The resultant force on a charge is the of the individual forces on that charge. (pp A)
* Adding forces this way is an example of the principle of . (pp b)
* When a body is in , the net external force acting on that body is zero. (pp C)
* The Coulomb force is a .
* A is a force that is exerted by one object on another even though there is no physical contact between the two objects.

**Electrostatic force can be:**

ATTRACTIVE REPULSIVE

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Magnitude of elec. force between two charges is found using Coulomb’s law:

kc = 9 x 109 N.m2/C2

q = magnitude of charge (C)

r = separation between charges (m)

A +4.0 x 10–8 C charge and +7.6 x 10–9 C charge are 28 cm apart.

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Find mag. and dir. of force between them.

How far apart must two protons be for them to repel each other with a force of 7.6 x 10–26 N?

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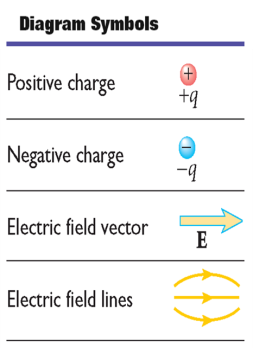
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**Electric Field**

* An is a region where an electric force on a test charge can be detected.
* The SI units of the
* The , is in the direction of the electric force that would be exerted on a small positive test charge.

**Electric Field Strength**

* Electric field strength depends on and . An electric field exists in the region around a charged object.
* Electric Field Strength Due to a Point Charge

**Electric Field Lines**

* The number of electric field lines is to the electric field strength.
* Electric field lines are to the electric field vector at any point.

**Conductors in Electrostatic Equilibrium**

* The electric field is everywhere inside the conductor.
* Any on an isolated conductor resides entirely on the conductor’s outer surface.
* The electric field just outside a charged conductor is to the conductor’s surface.
* On an irregularly shaped conductor, charge tends to accumulate where the radius of the surface is smallest, that is, at sharp points.