IMPORTANT TERMS:

- **Capacitor**
- **Electric field**
- **Electric potential**
- **Electrical potential energy**
- **Volt**
- **voltage**

EQUATIONS:

$$F = k\frac{q_1 q_2}{d^2}$$

$$\textit{Electric potential} = \frac{\textit{Electrical potential}}{\textit{Charge}}$$

$$\textit{1 Volt} = \frac{\textit{Joule}}{\textit{Coulomb}}$$

UNIT V: Electricity and Magnetism

Chapters 32-37

Chapter 33: Electric Fields and Potential

I. Electric Fields (33.1)

A. **Gravitational Field**- the force field that surrounds a _____

1. Idea that things **not in** _____ could exert forces bothered Isaac Newton and many others

2. Concept of **force field** eliminates the _____ factor

B. Space around every **mass** is filled with _____ **field**

C. Space around every **electric charge** filled with an _____ **field**

1. Electric field has both _____ and _____ (**vector**)

2. **Magnitude** (strength) measured by its effect on _____ located in the field

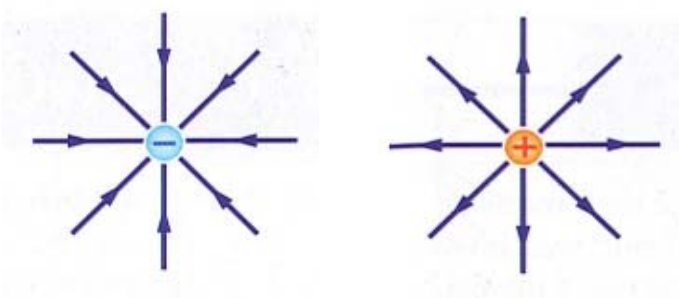
3. **Direction** of electric field at any point, by convention, is the direction of the electrical force on a small _____ **test charge** placed as that point.

II. Electric Field Line (33.2)

A. _____ quantity- Electric field has both magnitude and direction

1. **Negatively** charged particle is surrounded by vectors that point _____ the particle

2. **Positive** charged particle- vectors point _____



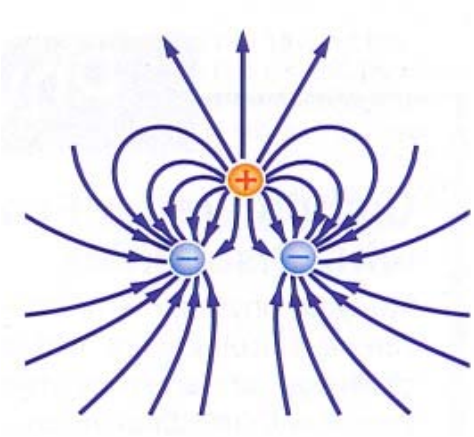
B. Electric Field Lines- used to describe an electric field

1. **Field lines** (***lines of force***) _____ apart when field is _____

2. For **isolated** charge- lines extend to _____

3. For two or more charges- lines emanate from _____ charge and terminate on _____ **charge**

4. Electric field is storehouse of _____



III. Electric Shielding (33.3)

A. Electric charges _____ themselves on the surface of all conductors is such a way that the electric field inside the conductors is _____.

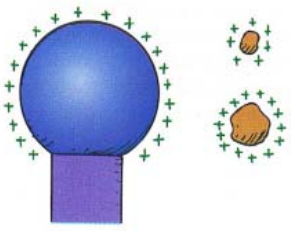
B. Electrical components often encased in metal boxes to _____ them from all outside electrical activity

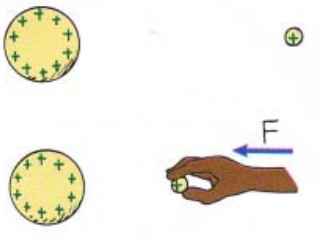
IV. Electric Potential Energy (33.4)

A. Relationship between _____ and _____

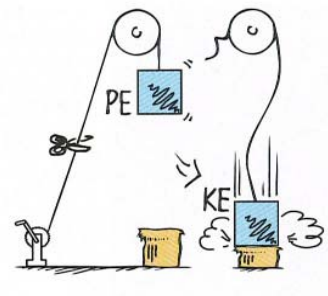
1. **Work** is done when a _____ moves something in the _____ of the force.

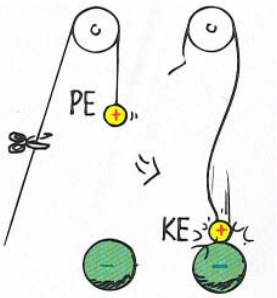
2. Object has **potential energy** by virtue of its _____





B. **Charged object** can have **potential energy** by virtue of its location in an electric field.





1. **Work** is equal to the _____ **gained** by the charge

2. Energy change has called **electrical** _____ **energy**

3. If **charge released**, will _____ in direction according to charge (+ or -) and turn into _____ **energy**

V. Electric Potential (33.5)

A. **Electric Potential Energy per Charge**- total electrical potential energy divided by the amount of charge

1. We call this **Electric Potential**

2. **SI unit of electric potential is a volt (V)**

3. Since potential energy measured in joules and charge measured in coulombs,

4. Since electric potential measured in volts, commonly called _____

B. Can have large voltage with small amount of energy associated with the charged object (rub balloon and becomes negatively charged, perhaps to several thousand volts).

1. Only small amount of _____ involved

2. Amount of _____ also very small

VI. Electrical Energy Storage (33.6)

A. _____- device capable of storing electrical energy

1. Found in nearly all _____ **circuits**

2. Made by **pair of** _____ **plates** separated by a small distance (but not touching)

3. Energy stored in a capacitor comes from the _____ required to _____ **it.**

4. **Energy** is in the form of the _____ **field** between its _____

B. Charged capacitor is _____ when conducting path is provided between the plates

VII. The **Van de Graaff Generator** (33.7)

A. Common laboratory device that can develop high voltages

1. Motor driven belt moves past _____ set of metal needles that are maintained at a high electric potential

2. electrons deposited on the _____ and carried up into the hollow metal sphere

3. _____ leak onto metal points attached to the inner surface of the sphere

4. Electrons move to outer surface of the conducting sphere

5. Charge builds up to a very high electric _____ (_____ of volts)