



Name: _____

REFERENCE MATERIAL

Things to Memorize: Electrostatics

Electrical Charge

- Electrical **Charge** is a scalar related to how many electrons are missing or in excess.
- Electrical charge is symbolized by q and measured in coulombs (C).
- Electrons have negative charge and protons have positive charge.

Electric Force

- **Electrostatic Force** is the force due to the interaction of two charged particles.
- Force is measured in newtons (N).
 - When using Coulomb's Law, **positive** forces are repulsive.
 - When using Coulomb's Law, **negative** forces are attractive.
- If there are more than two charges, the forces must be combined as vectors.
 1. Draw the situation.
 2. Calculate the force that each pair of charges puts on each other.
 3. Draw the forces on your diagram and assign appropriate signs.
 4. Combine all forces that are colinear.
 5. Use trigonometry to combine forces in more than one dimension if needed.

Electric Field

- **Electric Field** is a vector that shows how much force (and in what direction) a $+1\text{C}$ charge would experience at any point.
- Units: N/C or V/m (they are the same)
- When Drawing Electric Fields:
 - Arrows point **out** of positive charges and **into** negative charges.
 - When lines are **closer** the electric field is **stronger**.
 - Electric field lines are always **perpendicular** to **equipotential** lines.
- The electric field inside a conductor is always 0 N/C .
- Electric Field is nearly uniform (constant) between two oppositely charged plates.
- The size of an electric field is infinite.
- The electric field is zero at an infinite distance from the charged particle.



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Electrostatic Potential Energy

- **Electrostatic Potential Energy** is a scalar that shows how much energy two charges will have in proximity to each other.
- The units for energy are Joules (J).
- Electrostatic Potential Energy is zero when the two charges are separated by an infinite distance.

Electrostatic Potential

- Electrostatic Potential measures the Energy per charge of a particle.
- Electrostatic Potential is measured in Volts.
- Electrostatic Potential is closely related to:
 - Voltage
 - Electromotive Force (EMF)
 - Potential Difference
- **DO NOT** confuse **Electrostatic Potential** with **Electrostatic Potential Energy**. They are two related but different measurements.
- The electrostatic potential inside a conductor is constant.