Chapter 14

Electrostatic Force $F_Q = \frac{kq_1q_2}{r^2}$ (Coulomb's Law)

- do not put signs on the charges when using the eq.
- use the signs of the charges to figure out the dir.
- Vector nature: FBD + find find F_{net} (x-y chart) (vect. diag)
  Static eq.

Electric Field Intensity/Strength:

$$\vec{E}_Q = \frac{\vec{F}_Q}{q} \qquad \vec{E}_Q = \frac{kQ}{r^2}$$ (Q ← central charge) (for a point source)

* Direction: base on the force acting on a positive test charge
* Do not put signs on charges in equation
* Vector nature: FBD at a certain point for the test charge
  ($\vec{E}_{net}$ based on a vector addition diagram / x-y chart)

Gravitational Force: $F_g = \frac{Gm_1m_2}{r^2}$ (similar to Coulomb's law)

$F \propto \frac{1}{r^2}$ (inverse squared Law)

Gravitational Field Intensity/Strength:

$$\vec{g} = \frac{\vec{F}_g}{m} \qquad \vec{g} = \frac{GM}{r^2}$$ (M ← central mass (source)) (for a point source)

Chapter 16

Magnetic fields

- use a compass to find the direction of a mag field.
- magnet (see field line sheet)
- current carrying conductor
- loop
- solenoid

] RH Rule

Magnetic force

- current carrying conductor in a mag. field (RH Rule)

$$F_{mag} = BIl\sin\theta$$

- charged particle in a mag. field (RH Rule)

$$F_{mag} = qvB\sin\theta$$

(v ← velocity of perpendicular)

also: $F_{mag} = F_c$ and $qV = \frac{1}{2}mv^2$

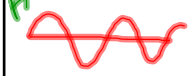
$$qvB = \frac{mv^2}{r}$$

Motors + Generators

- motor effect (current in a mag field = motion)
- generator effect (motion of a wire/magnet = current)
- structure of motor/generator
- slip ring commutator vs split ring
- AC vs DC generator

$emf = vlB_\perp$

- Alternator

AC 

DC 

or AC/alternator

Lenz's Law

- Transformers

$$\frac{N_p}{N_s} = \frac{V_p}{V_s} = \frac{I_s}{I_p}$$