Equations Sheet

Electricity:

$$F_{\text{Electric}} = k\frac{q_1 q_2}{d^2}, \text{where q is charge}$$

$$1 \text{ volt} = 1 \frac{\text{Joule}}{\text{Coulomb}}$$

$$\text{Current} = \frac{\text{Voltage}}{\text{Resistance}}, \quad I = \frac{V}{R}$$

$$1\ ampere = 1\ \frac{volt}{ohm}$$

$$\text{Power} = \text{Voltage} \times \text{Current} = VI$$

$$1\ watt = 1\ ampere \times 1\ volt = 1\frac{Joule}{s}$$

Electromagnetic Induction:

$$\text{Induced } V \propto \text{Number of loops} \times \text{Area of loops} \times \frac{\Delta B}{\Delta t}$$

$$\frac{\text{Primaty Voltage}}{\text{Secondaty Voltage}} = \frac{\text{N}_{\text{loops}}\ \text{Primary}}{\text{N}_{\text{loops}}\ \text{Secondary}}$$

$$(\text{Voltage} \times \text{Current})_{\text{primary}} = (\text{Voltage} \times \text{Current})_{\text{secondary}}$$

Electromagnetic Waves:

$$\text{Frecuency} = \frac{c}{\text{Wavelength}}, \quad f = \frac{c}{\lambda}$$

$$c = 3 \times 10^8\ m/s \text{ (speed of light)}$$

λ = Wavelength

$$1\ nm = 10^{-9}\ meters$$

$$1\ Hz = \frac{1}{second}$$

Light Quanta (Photons):

$$\text{Eenergy} = hf = h\frac{c}{\lambda}$$

h = Planck's Constant = $4.14 \times 10^{-15}\ eV \cdot s$

Matter Waves:

$$\text{Wavelength} = \frac{h}{\text{Momentum}} = \frac{h}{mv}$$

h = Planck's Constant = $6.63 \times 10^{-34} J\ s$

$$1\ Joule = 1\ \frac{kg\ m^2}{s^2}$$