Possibly useful information

$$\oint d\vec{a}\cdot\vec{E}=\frac{Q}{\varepsilon_0} \qquad \oint d\vec{a}\cdot\vec{B}=0$$

$$\oint d\vec{s}\cdot\vec{E}=-\frac{d\Phi_B}{dt} \qquad \oint d\vec{s}\cdot\vec{B}=\mu_0\left(I+\varepsilon_0\frac{d\Phi_E}{dt}\right)$$

$$\vec{D}=\varepsilon\vec{E}=\varepsilon_0\vec{E}+\vec{P} \qquad \vec{B}=\mu\vec{H}=\mu_0(\vec{H}+\vec{M})$$

static: $\vec{E}=\frac{1}{4\pi\varepsilon_0}\int dq\frac{\hat{r}}{r^2}$ static: $\vec{B}=\frac{\mu_0}{4\pi}\int\frac{I\,d\vec{s}\times\hat{r}}{r^2}$

$$u=\frac{\varepsilon_0E^2}{2}+\frac{B^2}{2\mu_0} \qquad \vec{S}=\vec{E}\times\vec{B}/\mu_0$$

$$\frac{1}{f}=(n-1)\left(\frac{1}{R_1}-\frac{1}{R_2}\right) \qquad \frac{1}{s_o}+\frac{1}{s_i}=\frac{1}{f}$$

single slit: $I(\theta)=I_0\left(\frac{\sin\alpha}{\alpha}\right)^2$, $\alpha=\frac{\pi a}{\lambda}\sin\theta$

grating: $I(\theta)=I_1\left(\frac{\sin N\beta}{\sin\beta}\right)^2$, $\beta=\frac{\pi d}{\lambda}\sin\theta$

$$x'=\gamma(x-ut)$$

$$t'=\gamma\left(t-\frac{ux}{c^2}\right)$$

$$\gamma=\left(1-\left(\tfrac{u}{c}\right)^2\right)^{-1/2}$$

$$E=\gamma mc^2$$

$$\vec{p}=\gamma m\vec{v}$$

$$\left(mc^2\right)^2=E^2-(pc)^2$$

$$-\frac{\hbar^2}{2m}\psi''(x)+V(x)\psi(x)=E\psi(x)$$

$c^2 = \dfrac{1}{\varepsilon_0 \mu_0}$ $\quad$ $c = 2.9979 \times 10^8 \ \dfrac{m}{s}$

$\varepsilon_0 = 8.8542 \times 10^{-12} \ \dfrac{F}{m}$ $\quad$ $\mu_0 = 4\pi \times 10^{-7} \ \dfrac{N}{A^2}$

$e = 1.6022 \times 10^{-19} \ C$ $\quad$ $N_A = 6.022 \times 10^{23} \ mole^{-1}$

$m_e = 9.109 \times 10^{-31} \ kg = 0.511 \, MeV / c^2$ $\quad$ $m_p = 1.672 \times 10^{-27} \ kg = 938.27 \, MeV / c^2$

$\mu_B = 9.27 \times 10^{-24} \ \dfrac{J}{T}$ $\quad$ $\mu_N = 5.05 \times 10^{-27} \ \dfrac{J}{T}$

$h = 6.626 \times 10^{-34} \, J \cdot s$ $\quad$ $\hbar = 1.055 \times 10^{-34} \, J \cdot s$

$\hbar c = 197.3$ eV nm $\quad$ $\dfrac{e^2}{4\pi\varepsilon_0 \hbar c} = \dfrac{1}{137}$

Dimensions and SI Units for Basic Electromagnetic Quantities

Quantity	**Unit**	**Abbreviation**	**Conversions**	**Dimensions**
Charge	Coulomb	*C*		Q
Electric potential	Volt	*V*	*J/C*	$ML^2T^{-2}Q^{-1}$
Electric field	Volt/meter	*V/m*	*N/C*	$MLT^{-2}Q^{-1}$
Capacitance	Farad	*F*	*C/V*	$M^{-1}L^{-2}T^{2}Q^{2}$
Current	Ampere	*A*	*C/s*	QT^{-1}
Magnetic field	Tesla	*T*	*N /(A m)*	$MT^{-1}Q^{-1}$
Magnetic flux	Weber	*Wb*	*J/A*	$ML^2T^{-1}Q^{-1}$
Inductance	Henry	*H*	J/A^2	ML^2Q^{-2}
Resistance	ohm	Ω	*V/A*	$ML^2T^{-1}Q^{-2}$