Maxwell equations

$$\oint_S \boldsymbol{E}\,.\,d\boldsymbol{A} = \frac{Q}{\epsilon_0}$$

$$\oint_S \boldsymbol{B}.\,d\boldsymbol{A} = 0$$

$$\oint_C \boldsymbol{B}.\,d\boldsymbol{l} = \mu_0 \int_S \left(\boldsymbol{j} + \epsilon_0 \frac{\partial \boldsymbol{E}}{\partial t}\right).\,d\boldsymbol{A}$$

$$\oint_C \boldsymbol{E}.\,d\boldsymbol{l} = -\frac{d}{dt}\int_S \boldsymbol{B}.\,d\boldsymbol{A}$$

Other Electricity and Magnetism key equations

$\boldsymbol{F} = \frac{q_1 q_2}{4\pi\epsilon_0 r^2}\,\hat{\boldsymbol{r}}$	Coulomb's Law
$\boldsymbol{F} = q\boldsymbol{E}$	Force in E-field
$\oint_S \boldsymbol{E}\,.\,d\boldsymbol{A} = \frac{Q}{\epsilon_0}$	Gauss' Law for electric field
$\boldsymbol{E} = \frac{q}{4\pi\epsilon_0 r^2}\hat{\boldsymbol{r}}$	E-field for a point charge
$\boldsymbol{E} = \frac{\lambda}{2\pi r\epsilon_0}\hat{\boldsymbol{r}}$	E-field for a line charge
$\boldsymbol{E} = \frac{\sigma}{2\epsilon_0}\hat{\boldsymbol{z}}$	E-field for a plane of charge
$\oint_C \boldsymbol{E}.\,d\boldsymbol{l} = 0$	Electrostatic circulation of E-field
$\phi(r) = -\int_\infty^r \boldsymbol{E}.\,d\boldsymbol{l}$	Scalar electric potential
$\boldsymbol{E} = -\boldsymbol{\nabla}\phi$	Electric field from potential
$\Delta\phi = IR$	Ohm's law
$I = \int_S \boldsymbol{j}.\,d\boldsymbol{A}$	Current and current density
$u_E = \frac{\epsilon_0 E^2}{2}$	E-field energy density
$\boldsymbol{p} = q\boldsymbol{d}$	Electric dipole
$\phi(\theta) = \frac{Qd\cos\theta}{4\pi\epsilon_0 r^2}$	Electric dipole potential
$\boldsymbol{E} = \frac{Qd}{4\pi\epsilon_0 r^3}\left(2\cos\theta\hat{\boldsymbol{r}} + \sin\theta\hat{\boldsymbol{\theta}}\right)$	Electric dipole field
$\boldsymbol{\tau} = \boldsymbol{p}\times\boldsymbol{E}$	Torque on electric dipole
$U = -\boldsymbol{p}.\boldsymbol{E}$	Electric dipole energy
$\boldsymbol{F} = q(\boldsymbol{v}\times\boldsymbol{B})$	Magnetic force

$\boldsymbol{F} = q(\boldsymbol{E} + \boldsymbol{v} \times \boldsymbol{B})$	Lorentz force
$\oint_S \boldsymbol{B}.d\boldsymbol{A} = 0$	Gauss' Law for magnetic field
$\oint_C \boldsymbol{B}.d\boldsymbol{l} = \mu_0 I_{enc}$	Ampère's Law (magnetostatics)
$\boldsymbol{F_{wire}} = l(\boldsymbol{I} \times \boldsymbol{B})$	Force on a wire
$\boldsymbol{I} = nAq\boldsymbol{v}$	Electric current
$d\boldsymbol{B} = \frac{\mu_0 I}{4\pi r^2}\ d\boldsymbol{l} \times \hat{\boldsymbol{r}}$	Biot-Savart Law
$\boldsymbol{B}(z=0) = \frac{\mu_0 I}{2a}\hat{\boldsymbol{z}}$	Field from loop of current
$\boldsymbol{B}(s) = \frac{\mu_0 I}{2\pi s}\widehat{\boldsymbol{\theta}}$	Field from infinite wire
$\frac{F}{l} = \frac{\mu_0 I_1 I_2}{2\pi s}$	Force on parallel currents
$\Phi_m = \int_S \boldsymbol{B}.d\boldsymbol{A}$	Magnetic flux
$\mathcal{E} = -\oint_C \boldsymbol{E}.d\boldsymbol{l}$	Motional EMF in B-field
$\mathcal{E} = -\frac{d\Phi_m}{dt}$	Faraday's Law
$B_{in} = \mu_0 nI$	Field in a solenoid
$\boldsymbol{\mu} = I\boldsymbol{A}$	Magnetic moment
$\boldsymbol{\tau} = \boldsymbol{\mu} \times \boldsymbol{B}$	Torque on magnetic dipole
$U = -\boldsymbol{\mu}.\boldsymbol{B}$	Magnetic dipole energy
$\oint_C \boldsymbol{B}.d\boldsymbol{l} = \mu_0\left(I_{enc} + \epsilon_0 A\frac{\partial E}{\partial t}\right)$	Ampère-Maxwell Law
$\Phi_{21} = M_{21}I_1$	Mutual induction
$M = \frac{\mu_0 N_1 N_2 A}{l}$	Mutual inductance
$\mathcal{E}_1 = \frac{N_1}{N_2}\ \mathcal{E}_2$	Transformer EMF
$\mathcal{E}_1 \mathrm{I}_1 = \mathcal{E}_2 I_2$	Transformer power conservation
$\mathcal{E} = -L\frac{dI}{dt}$	Back EMF in a solenoid
$\Phi = LI$	Self inductance
$L = \mu_0 n^2 lA$	Self inductance of a solenoid
$u_B = \frac{B^2}{2\mu_0}$	B-field energy density