ELECTROSTATICS:

$\mathbf{F}_{12} = \frac{Q_1 Q_2}{4\pi\varepsilon_0 R^2}\mathbf{a}_{R_{12}}$, $\mathbf{F} = \frac{Q}{4\pi\varepsilon_0}\sum_{k=1}^{N}\frac{Q_k(\mathbf{r}-\mathbf{r}_k)}{|\mathbf{r}-\mathbf{r}_k|^3}$, $\mathbf{E} = \frac{\mathbf{F}}{Q}$, $\mathbf{E} = \int \frac{\rho_L dl}{4\pi\varepsilon_0 R^2}\mathbf{a}_R$, $\mathbf{E} = \int \frac{\rho_S dS}{4\pi\varepsilon_0 R^2}\mathbf{a}_R$, $\mathbf{E} = \int \frac{\rho_v dv}{4\pi\varepsilon_0 R^2}\mathbf{a}_R$

$\mathbf{E} = \frac{\rho_S}{2\varepsilon_0}\mathbf{a}_n$, $\mathbf{E} = \frac{\rho_L}{2\pi\varepsilon_0 \rho}\mathbf{a}_\rho$, $Q = \oint_S \mathbf{D}\cdot d\mathbf{S} = \int_v \rho_v dv$, $\nabla\cdot\mathbf{D} = \rho_v$, $W = -Q\int_A^B \mathbf{E}\cdot d\ell$, $V_{AB} = \frac{W}{Q} = -\int_A^B \mathbf{E}\cdot d\ell$, $V = \frac{Q}{4\pi\varepsilon_0 r}$

$\oint \mathbf{E}\cdot d\ell = 0$, $\nabla\times\mathbf{E} = 0$, $\mathbf{E} = -\nabla V$, $W_E = \frac{1}{2}\sum_{k=1}^{n} Q_k V_k$, $W_E = \frac{1}{2}\int \mathbf{D}\cdot\mathbf{E}dv = \frac{1}{2}\int \varepsilon_0 E^2 dv$, $\mathbf{J} = \rho_v \mathbf{u}$, $I = \int_S \mathbf{J}\cdot d\mathbf{S}$, $\mathbf{J} = \sigma\mathbf{E}$,

$R = \frac{\mathrm{V}}{\mathrm{I}} = \frac{\int \mathbf{E}\cdot d\mathbf{l}}{\int \sigma\mathbf{E}\cdot d\mathbf{S}}$, $\mathbf{D} = \varepsilon\,\mathbf{E}$, $\nabla\cdot\mathbf{J} = -\frac{\partial\rho_v}{\partial t}$, $E_{1t} = E_{2t}$, $D_{1n} - D_{2n} = \rho_S$, $D_{1n} = D_{2n}$, $\frac{\tan\theta_1}{\tan\theta_2} = \frac{\varepsilon_{r1}}{\varepsilon_{r2}}$

$\nabla^2 V = -\frac{\rho_v}{\varepsilon}$, $\nabla^2 V = 0$, $C = \frac{Q}{V} = \frac{\varepsilon\oint \mathbf{E}\cdot d\mathbf{S}}{\int \mathbf{E}\cdot d\mathbf{l}}$, $W_E = \frac{1}{2}CV^2 = \frac{1}{2}QV = \frac{Q^2}{2C}$, $C = \frac{Q}{V} = \frac{2\pi\varepsilon L}{\ln\frac{b}{a}}$, $C = \frac{Q}{V} = \frac{4\pi\varepsilon}{\frac{1}{a}-\frac{1}{b}}$, $RC = \frac{\varepsilon}{\sigma}$

MAGNETOSTATICS:

$\mathbf{H} = \int_L \frac{Id\mathbf{l}\times\mathbf{a}_R}{4\pi R^2}$, $\mathbf{H} = \int_S \frac{\mathbf{K}dS\times\mathbf{a}_R}{4\pi R^2}$, $\mathbf{H} = \int_v \frac{\mathbf{J}dv\times\mathbf{a}_R}{4\pi R^2}$, $\mathbf{H} = \frac{I}{4\pi\rho}(\cos\alpha_2 - \cos\alpha_1)\mathbf{a}_\phi$, $\mathbf{H} = \frac{I}{2\pi\rho}\mathbf{a}_\phi$, $\mathbf{a}_\phi = \mathbf{a}_\ell \times \mathbf{a}_\rho$,

$\oint \mathbf{H}\cdot d\mathbf{l} = I_{enc}$, $\nabla\times\mathbf{H} = \mathbf{J}$, $\mathbf{H} = \frac{I}{2\pi\rho}\mathbf{a}_\phi$, $\mathbf{H} = \frac{1}{2}\mathbf{K}\times\mathbf{a}_n$, $\mathbf{B} = \mu\mathbf{H}$, $\Psi = \int_S \mathbf{B}\cdot d\mathbf{S}$, $\oint \mathbf{B}\cdot d\mathbf{S} = 0$, $\nabla\cdot\mathbf{B} = 0$, $\mathbf{H} = -\nabla \mathrm{V}_m$,

$\mathbf{B} = \nabla\times\mathbf{A}$, $\mathbf{A} = \int_L \frac{\mu_0 Id\mathbf{l}}{4\pi R}$, $\mathbf{A} = \int_S \frac{\mu_0 \mathbf{K}dS}{4\pi R}$, $\mathbf{A} = \int_v \frac{\mu_0 \mathbf{J}dv}{4\pi R}$, $\Psi = \oint_L \mathbf{A}\cdot d\mathbf{l}$, $\mathbf{F} = Q(\mathbf{E}+\mathbf{u}\times\mathbf{B})$, $d\mathbf{F} = Id\mathbf{l}\times\mathbf{B}$, $\mathbf{B}_{1n} = \mathbf{B}_{2n}$,

$(\mathbf{H}_1 - \mathbf{H}_2)\times\mathbf{a}_{n12} = \mathbf{K}$, $\mathbf{H}_{1t} = \mathbf{H}_{2t}$, $\frac{\tan\theta_1}{\tan\theta_2} = \frac{\mu_1}{\mu_2}$, $L = \frac{\lambda}{I} = \frac{N\psi}{I}$, $M_{12} = \frac{\lambda_{12}}{I_2} = \frac{N_1\psi_{12}}{I_2}$, $W_m = \frac{1}{2}\int \mathbf{B}\cdot\mathbf{H}dv = \frac{1}{2}\int \mu H^2 dv$

WAVES AND APPLICATIONS:

$\mathrm{V}_{emf} = -\frac{d\psi}{dt}$, $\mathrm{V}_{emf} = \oint_L \mathbf{E}\cdot d\mathbf{l} = -\int_S \frac{\partial\mathbf{B}}{\partial t}\cdot d\mathbf{S}$, $\nabla\times\mathbf{E} = -\frac{\partial\mathbf{B}}{\partial t}$, $\mathrm{V}_{emf} = \oint_L \mathbf{E}_m\cdot d\mathbf{l} = \oint_L (\mathbf{u}\times\mathbf{B})\cdot d\mathbf{l}$

$\mathrm{V}_{emf} = \oint_L \mathbf{E}\cdot d\mathbf{l} = -\int_S \frac{\partial\mathbf{B}}{\partial t}\cdot d\mathbf{S} + \oint_L (\mathbf{u}\times\mathbf{B})\cdot d\mathbf{l}$, $\mathbf{J}_d = \frac{\partial\mathbf{D}}{dt}$, $\nabla\times\mathbf{H} = \mathbf{J} + \frac{\partial\mathbf{D}}{dt}$, $\beta = \frac{2\pi}{\lambda}$, $\underline{\gamma} = \alpha + j\beta$

$\alpha = \omega\sqrt{\frac{\mu\varepsilon}{2}\left[\sqrt{1+\left[\frac{\sigma}{\omega\varepsilon}\right]^2} - 1\right]}$, $\beta = \omega\sqrt{\frac{\mu\varepsilon}{2}\left[\sqrt{1+\left[\frac{\sigma}{\omega\varepsilon}\right]^2} + 1\right]}$, $\mathbf{E}(z,t) = E_0 e^{-\alpha z}\cos(\omega t - \beta z)\mathbf{a}_x$

$|\underline{\eta}| = \frac{\sqrt{\mu/\varepsilon}}{\left[1+\left(\frac{\sigma}{\omega\varepsilon}\right)^2\right]^{1/4}}$, $\tan 2\theta_\eta = \frac{\sigma}{\omega\varepsilon}$, $\mathbf{H} = \frac{E_0}{|\underline{\eta}|}e^{-\alpha z}\cos(\omega t - \beta z - \theta_\eta)\mathbf{a}_y$, $\tan\theta = \frac{\sigma}{\omega\varepsilon}$, $\mathbf{a}_E \times \mathbf{a}_H = \mathbf{a}_k$

$\eta_0 = \sqrt{\frac{\mu_0}{\varepsilon_0}} = 120\pi \approx 377\Omega$, $p(t) = \mathbf{E}\times\mathbf{H}$, $p_{ave}(z) = \frac{1}{2}\mathrm{Re}(\mathbf{E}_s \times \mathbf{H}^*{}_s)$, $p_{ave}(z) = \frac{E_0^2}{2|\underline{\eta}|}e^{-2\alpha z}\cos\theta_\eta \mathbf{a}_z$, $P_{ave} = \int_S p_{ave}\cdot d\mathbf{S}$,

$\Gamma = \frac{E_{ro}}{E_{io}} = \frac{\eta_2 - \eta_1}{\eta_2 + \eta_1}$, $\tau = \frac{E_{to}}{E_{io}} = \frac{2\eta_2}{\eta_2 + \eta_1}$, $s = \frac{|\mathbf{E}_1|_{\max}}{|\mathbf{E}_1|_{\min}} = \frac{|\mathbf{H}_1|_{\max}}{|\mathbf{H}_1|_{\min}} = \frac{1+|\Gamma|}{1-|\Gamma|}$, $k_i \sin\theta_i = k_t \sin\theta_t$,

$\Gamma_\parallel = \frac{E_{ro}}{E_{io}} = \frac{\eta_2\cos\theta_t - \eta_1\cos\theta_i}{\eta_2\cos\theta_t + \eta_1\cos\theta_i}$, $\tau_\parallel = \frac{E_{to}}{E_{io}} = \frac{2\eta_2\cos\theta_i}{\eta_2\cos\theta_t + \eta_1\cos\theta_i}$, $\sin^2\theta_{B\parallel} = \frac{1-\mu_2\varepsilon_1/\mu_1\varepsilon_2}{1-(\varepsilon_1/\varepsilon_2)^2}$,

$\Gamma_\perp = \frac{E_{ro}}{E_{io}} = \frac{\eta_2\cos\theta_i - \eta_1\cos\theta_t}{\eta_2\cos\theta_i + \eta_1\cos\theta_t}$, $\tau_\perp = \frac{E_{to}}{E_{io}} = \frac{2\eta_2\cos\theta_i}{\eta_2\cos\theta_i + \eta_1\cos\theta_t}$, $\sin^2\theta_{B\perp} = \frac{1-\mu_1\varepsilon_2/\mu_2\varepsilon_1}{1-(\mu_1/\mu_2)^2}$