Physics 2321 E&M Equation list.

$\mid F \mid = \frac{1}{4\pi\epsilon_0}\frac{\mid q_1 \mid \mid q_2 \mid}{r^2}$ $\vec{F_{12}} = \frac{1}{4\pi\epsilon_0}\frac{q_1 q_2}{r^2}\hat{r}_{12}$	$\vec{E} = \frac{\vec{F}}{q_0}$ $k = \frac{1}{4\pi\epsilon_0}$	$\mid E \mid = \frac{1}{4\pi\epsilon_0}\frac{\mid q \mid}{r^2}$
$\Phi = \int \vec{E} \cdot d\vec{A}$ $E = \frac{\sigma}{\epsilon_0}$	$\oint \vec{E} \cdot d\vec{A} = \frac{q_{enc}}{\epsilon_0}$ $E = \frac{1}{4\pi\epsilon_0}\frac{q}{r^2}$	$E = \frac{\sigma}{2\epsilon_0}$ $E = \frac{\lambda}{2\pi\epsilon_0 r}$
$\Delta U = -W$ $V = -\frac{W_\infty}{q}$ $E_x = -\frac{\partial V}{\partial x}$ $E = -\frac{\Delta V}{\Delta s}$ $V = k_e \int_{charge} \frac{dq}{r}$	$U = -W_\infty$, $U(r \to \infty) = 0$ $\Delta V = V_f - V_i$ $E_y = -\frac{\partial V}{\partial y}$ $V = \frac{1}{4\pi\epsilon_0}\sum_{i=1}^{n}\frac{q_i}{r_i}$ $V = \frac{k_e q}{r}$	$\Delta V = -\frac{W}{q}$ $\Delta V = -\int_i^f \vec{E} \cdot d\vec{s}$ $E_z = -\frac{\partial V}{\partial z}$ $U = k_e \sum_{i,j>i}^{n}\frac{q_i q_j}{r_{ij}}$
$q = CV$ $U = \frac{1}{2}CV^2$ $C = \epsilon_0\frac{A}{d}$	$C_{eq} = \sum C_j$ $C = \kappa C_0$ $C = \frac{l}{2k\ln(b/a)}$	$\frac{1}{C_{eq}} = \sum_j \frac{1}{C_j}$ $C = 4\pi\epsilon_0 R$ $C = \frac{ab}{k(b-a)}$
$I = \frac{dq}{dt}$ $\vec{J} = (ne)\vec{v_d}$ $\sigma = \frac{J}{E}$	$J = \frac{I}{A}$ $I = \frac{V}{R}$ $R = \rho\frac{L}{A}$	$I = \int \vec{J} \cdot d\vec{A}$ $\rho = \frac{E}{J}$ $P = IV$
$\varepsilon = \frac{dW}{dq}$ $P = I\varepsilon$ $\tau = RC$	$R_{eq} = \sum R_j$ $q = C\varepsilon(1 - e^{-t/RC})$	$\frac{1}{R_{eq}} = \sum \frac{1}{R_j}$ $q = q_0 e^{-t/RC}$
$\vec{F_B} = q\vec{v} \times \vec{B}$ $\omega = \frac{qB}{m}$	$\vec{F} = q(\vec{E} + \vec{v} \times \vec{B})$ $v_\perp = v\sin\phi$	$qvB = \frac{mv^2}{r}$ $\vec{F_B} = I\vec{L} \times \vec{B}$
$d\vec{B} = \frac{\mu_0}{4\pi}\frac{Id\vec{s} \times \vec{r}}{r^3}$ $\vec{F_{12}} = \frac{\mu_0 I_2 I_1 L}{2\pi d}$ $B = \frac{\mu_0 I N}{2\pi r}$	$B = \frac{\mu_0 I}{2\pi r}$ $\oint \vec{B} \cdot d\vec{s} = \mu_0 I_{enc}$ $B = \frac{\mu_0 I}{4\pi a}(\cos\theta_1 - \cos\theta_2)$	$B = \frac{\mu_0 I \phi}{4\pi R}$ $B = \mu_0 I n$ $I_d = \mu_0\epsilon_0\frac{d\Phi_E}{dt}$
$\Phi_B = \int \vec{B} \cdot d\vec{A}$ $\oint \vec{B} \cdot d\vec{A} = 0$ $\oint \vec{B} \cdot d\vec{s} = \mu_0 I_{enc} + \mu_0\epsilon_0\frac{d\Phi_E}{dt}$ $L = \frac{N\Phi_B}{i}$	$\varepsilon = -\frac{d\Phi_B}{dt}$ $\varepsilon = NAB\omega\sin\omega t$ $L = l\mu_0 n^2 A$	$\oint \vec{E} \cdot d\vec{s} = -\frac{d\Phi_B}{dt}$ $\varepsilon = \Delta V = Blv$ $\varepsilon_L = -L\frac{di}{dt}$