**AP Physics C: Electricity and Magnetism Formulas**

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|---|---|---|
| $\left\vert\vec{F}_E\right\vert = \frac{1}{4\pi\epsilon_0}\left\vert\frac{q_1 q_2}{r^2}\right\vert$ | $C = \frac{\kappa\epsilon_{0A}}{d}$ | $R = \frac{\rho l}{A}$ |
| $\vec{E} = \frac{\vec{F}_E}{q}$ | $C_p = \sum_i C_i$ | $\vec{E} = \rho\vec{J}$ |
| $\oint \vec{E} d\vec{A} = \frac{Q}{\epsilon_0}$ | $\frac{1}{C_s} = \sum_i \frac{1}{C_i}$ | $I = Nev_d A$ |
| $E_x = -\frac{dV}{dx}$ | $I = \frac{dQ}{dt}$ | $I = \frac{\Delta V}{R}$ |
| $\Delta V = -\int \vec{E} d\vec{r}$ | $U_C = \frac{1}{2} Q\Delta V = \frac{1}{2} C(\Delta V)^2$ | $R_s = \sum_i R_i$ |
| $V = \frac{1}{4\pi\epsilon_0}\sum_i \frac{q_1}{r_1}$ | | $\frac{1}{R_p} = \sum_i \frac{1}{R_i}$ |
| $U_E = qV = \frac{1}{4\pi\epsilon_0}\frac{q_1 q_2}{r}$ | | $P = I\Delta V$ |
| $\Delta V = \frac{Q}{C}$ | | $\vec{F}_M = q\vec{v}\,\mathrm{x}\,\vec{B}$ |
| | | $\oint \vec{B}\, d\vec{l} = \mu_0 I$ |
| | | $d\vec{B} = \frac{\mu_0}{4\pi}\frac{Id\vec{l}\,\mathrm{x}\,\hat{r}}{r^2}$ |
| | | |
| $\vec{F} = \int Id\vec{l}\,\mathrm{x}\,\vec{B}$ | $\Phi_B = \int \vec{B} d\vec{A} =$ | $\mathcal{E} = -L\frac{dI}{dt}$ |
| $B_s = \mu_0 nI$ | $\mathcal{E} = \oint \vec{E} d\vec{l} = -\frac{d\Phi_B}{dt}$ | $U_L = \frac{1}{2} LI^2$ |