ส่วนที่ 1 สูตรที่อาจเป็นประโยชน์ในการคำนวณ

$F = k\dfrac{|q_1 q_2|}{r^2},\ k = \dfrac{1}{4\pi\varepsilon_0} = 9\times10^9\ \mathrm{Nm^2/C^2}$ 1 eV = 1.6 x 10^{-19} J

$E = k\dfrac{|Q|}{r^2}$ $\vec{E} = k\int \dfrac{dq}{r^2}\hat{r}$ $\vec{F} = q\vec{E}$

$\Phi_E = \oint \vec{E}\cdot d\vec{A} = \dfrac{Q_{\text{Net,Inside}}}{\varepsilon_0}$

$U_{12} = k\dfrac{q_1 q_2}{r_{12}}$ $U_{123} = k\left(\dfrac{q_1 q_2}{r_{12}} + \dfrac{q_2 q_3}{r_{23}} + \dfrac{q_3 q_1}{r_{31}}\right)$

$\Delta U = q\Delta V$ $V_2 - V_1 = -\int_{\vec{r}_1}^{\vec{r}_2} \vec{E}\cdot d\vec{r}$ $E_x = -\dfrac{\partial V}{\partial x}, E_y = -\dfrac{\partial V}{\partial y}, E_z = -\dfrac{\partial V}{\partial z}$

$V = k\dfrac{Q}{r}$ $V = k\int \dfrac{dq}{r}$ $|\Delta V| = Ed$

$Q = C\Delta V$ $C = \dfrac{\varepsilon_0 A}{d},\ \varepsilon_0 = 8.85\times10^{-12}\ \mathrm{F/m}$ $C = \mathrm{K}C_0$

$\dfrac{1}{C_{total}} = \dfrac{1}{C_1} + \dfrac{1}{C_2}$ $Q_{total} = Q_1 = Q_2$ $V_{total} = V_1 + V_2$

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$I = \dfrac{dq}{dt}$ $I = \vec{J}\cdot\vec{A}$

$V = IR$ $R = \rho\dfrac{\ell}{A}$ $R_{total} = R_1 + R_2$ $\dfrac{1}{R_{total}} = \dfrac{1}{R_1} + \dfrac{1}{R_2}$

$q(t) = q_\infty\left(1 - e^{-\frac{t}{RC}}\right)$ $\tau = RC$ $q(t) = q_0 e^{-\frac{t}{RC}}$

$\vec{F} = q\vec{v}\times\vec{B}$ $\vec{F} = I\vec{L}\times\vec{B}$

$\vec{B} = \int \dfrac{\mu_0}{4\pi}\dfrac{Id\vec{l}\times\hat{r}}{r^2},\ \mu_0 = 4\pi\times10^{-7}\ \mathrm{Wb/(A.m)}$ $\oint \vec{B}\cdot d\vec{l} = \mu_0 I_{\text{Net,Inside}}$ $B = \dfrac{\mu_0 I}{2\pi r}$

$\dfrac{dx^n}{dx} = nx^{n-1}$

$\int x^n dx = \dfrac{x^{n+1}}{n+1} + C$

$ax^2 + bx + c = 0 \quad \Rightarrow \quad x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$