Vakioita:

$g = 9.80 m/s^2$, $\epsilon_0 = 8.854 \times 10^{-12} C^2/N \cdot m^2$, $\mu_0 = 4\pi \times 10^{-7} T \cdot m/A$ ja $e = 1.602 \times 10^{-19} C$. $1eV = 1.602 \times 10^{-19} J$. $c = 3.0 \times 10^8 m/s$, elektronin massa $m_e = 9.11 \times 10^{-31} kg$,
Matemaattisia kaavoja: $sin^2(\alpha) + cos^2(\alpha) = 1$,
Pallon pinta-ala $A = 4\pi r^2$, pallon tilavuus $4\pi r^3/3$.
Ympyrän kehän pituus $l = 2\pi r$ ja ympyrän pinta-ala $A = \pi r^2$.

Ohessa sekalainen kokoelma kaavoja, joista voi olla hyötyä. Huomaa, että kaikki kaavat eivät ole yleispäteviä vaan soveltuvat vain erikoistapauksiin

$\vec{F} = \frac{1}{4\pi\epsilon_0}\frac{q_1 q_2}{r^2}\,\hat{r} \quad \vec{E} = \frac{\vec{F}_0}{q_0} \quad \vec{E} = \frac{1}{4\pi\epsilon_0}\frac{q}{r^2}\,\hat{r} \quad \vec{E} = \frac{1}{4\pi\epsilon_0}\int\frac{dq}{r^2}\,\hat{r}$

$p = qd \quad \vec{\tau} = \vec{p} \times \vec{E} \quad U = -\vec{p} \cdot \vec{E}$

$U = \frac{1}{4\pi\epsilon_0}\frac{qq_0}{r} \quad V = \frac{U}{q_0} \quad V = \frac{1}{4\pi\epsilon_0}\frac{q}{r} \quad V = \frac{1}{4\pi\epsilon_0}\int\frac{dq}{r}$

$V_a - V_b = \int_a^b \vec{E} \cdot d\vec{l} \quad E_x = -\frac{\partial V}{\partial x} \quad E_y = -\frac{\partial V}{\partial y} \quad E_z = -\frac{\partial V}{\partial z} \quad E_r = -\frac{\partial V}{\partial r} \quad C = \frac{Q}{V} \quad C = \epsilon_0 \frac{A}{d}$

$U = \frac{Q^2}{2C} \quad u = \frac{1}{2}\epsilon_0 E^2 \quad C = KC_0 \quad \epsilon = K\epsilon_0$

$$\oint \mathrm{E} \cdot d\mathrm{A} = \frac{Q_{enc}}{\epsilon_0}$$

$$\oint \mathrm{B} \cdot d\mathrm{A} = 0$$

$$\oint \mathrm{B} \cdot d\mathrm{l} = \mu_0 \left(I_{enc} + \epsilon_0 \frac{d\Phi_E}{dt} \right)$$

$$\oint \mathrm{E} \cdot d\mathrm{l} = -\frac{d\Phi_B}{dt} \quad (\text{tai } \mathcal{E} = -\frac{d\Phi_B}{dt})$$

$\Phi_E = \int \vec{E} \cdot d\vec{A} \quad \Phi_B = \int \vec{B} \cdot d\vec{A}$

$\vec{F} = \frac{1}{4\pi\epsilon_0}\frac{q_1 q_2}{r^2}\,\hat{r} \quad \vec{E} = \frac{\vec{F}_0}{q_0} \quad \vec{E} = \frac{1}{4\pi\epsilon_0}\frac{q}{r^2}\,\hat{r} \quad \vec{E} = \frac{1}{4\pi\epsilon_0}\int\frac{dq}{r^2}\,\hat{r}$

$p = qd \quad \vec{\tau} = \vec{p} \times \vec{E} \quad U = -\vec{p} \cdot \vec{E}$

$U = \frac{1}{4\pi\epsilon_0}\frac{qq_0}{r} \quad V = \frac{U}{q_0} \quad V = \frac{1}{4\pi\epsilon_0}\frac{q}{r} \quad V = \frac{1}{4\pi\epsilon_0}\int\frac{dq}{r}$

$V_a - V_b = \int_a^b \vec{E} \cdot d\vec{l} \quad E_x = -\frac{\partial V}{\partial x} \quad E_y = -\frac{\partial V}{\partial y} \quad E_z = -\frac{\partial V}{\partial z} \quad E_r = -\frac{\partial V}{\partial r} \quad C = \frac{Q}{V_{ab}} \quad C = \epsilon_0 \frac{A}{d}$

$U = \frac{Q^2}{2C} \quad u = \frac{1}{2}\epsilon_0 E^2 \quad C = KC_0 \quad \epsilon = K\epsilon_0 \quad I = \frac{dQ}{dt} \quad J = \frac{I}{A} \quad \vec{J} = nq\vec{v}_d$

$\vec{E} = \rho\vec{J} \quad R = \frac{\rho L}{A} \quad V = IR \quad P = V_{ab}I \quad \tau = RC$

$\vec{F} = q(\vec{E} + \vec{v} \times \vec{B}) \quad \vec{F} = q\vec{v} \times \vec{B} \quad \vec{F} = I\vec{l} \times \vec{B} \quad d\vec{F} = Id\vec{l} \times \vec{B} \quad \omega_c = \frac{v}{R} = \frac{|q|B}{m}.$

$\vec{\tau} = \vec{\mu} \times \vec{B} \quad U = -\vec{\mu} \cdot \vec{B} \quad \vec{\mu} = NI\vec{A} \quad \vec{B} = \frac{\mu_0}{4\pi}\frac{q\vec{v} \times \hat{r}}{r^2} \quad d\vec{B} = \frac{\mu_0}{4\pi}\frac{I\ d\vec{l} \times \hat{r}}{r^2}$

$\mathcal{E} = -L\frac{di}{dt} \quad U = \frac{1}{2}Li^2 \quad u = \frac{B^2}{2\mu}$

$c = \frac{1}{\sqrt{\epsilon_0\mu_0}} \quad E = cB \quad \vec{E}(x,t) = E_{\max}\,\hat{\jmath}\,\cos(kx - \omega t) \quad \vec{B}(x,t) = B_{\max}\,\hat{k}\,\cos(kx - \omega t)$

$u = \epsilon_0 E^2 \quad S = \epsilon_0 c E^2 \quad \vec{S} = \frac{1}{\mu_0}\vec{E} \times \vec{B} \quad I = S_{\text{av}} = \frac{1}{2}\epsilon_0 c {E_{\max}}^2$

$v = \frac{c}{n} \quad n_a \sin\theta_a = n_b \sin\theta_b \quad \sin\theta_{crit} = \frac{n_b}{n_a} \quad \tan\theta_p = \frac{n_b}{n_a}$