Formulário

Constantes: $\boldsymbol{\varepsilon_0 = 8,85 \times 10^{-12}\ F/m}$; $\boldsymbol{\mu_0 = 4\pi \times 10^{-7}\ T.m/A}$; $\boldsymbol{e = 1,6 \times 10^{-19}\ C}$

$\boldsymbol{m_{e^-} = 9,11 \times 10^{-31}\ kg}$; $\boldsymbol{m_{p^+} = 1,67 \times 10^{-27}\ kg}$; $\boldsymbol{1\ eV = 1,6 \times 10^{-19}\ J}$

$$\vec{F} = \frac{1}{4\pi\varepsilon_0}\frac{|q_1||q_2|}{r^2}\hat{r} \qquad \vec{F} = q_o\,\vec{E}$$

$$d\vec{E} = \frac{1}{4\pi\varepsilon_0}\frac{dq_{criad}}{r^2}\,\hat{r} \qquad \vec{E} = \int_{toda\ Q\ criad} \overrightarrow{dE}$$

$$\vec{p} = qd\,\vec{u}_{-+} \quad ; \quad |\vec{E}| = \frac{1}{2\pi\varepsilon_0}\frac{p}{z^3} \quad (z \gg d)$$

$$\oint_{\forall\, \sup fechada} \vec{E}\cdot\overrightarrow{dA} = \frac{q_{inter}}{\varepsilon_0}$$

$$W = \int_i^f \vec{F}\cdot\overrightarrow{ds} = -\Delta U \quad ; \quad \frac{W}{q_o} = \int_i^f \vec{E}\cdot\overrightarrow{ds} = -\frac{\Delta U}{q_o} = -\Delta V \quad ; \quad U = q_o\,V$$

$$\vec{E} = -grad\,V \;\; ; \;\; \vec{E} = -\left(\frac{\partial V}{\partial x}\,\hat{\imath} + \frac{\partial V}{\partial y}\,\hat{\jmath} + \frac{\partial V}{\partial z}\,\hat{k}\right)$$

$$V = \frac{1}{4\pi\varepsilon_0}\frac{q}{r} \quad /// \quad |\Delta V| = Ed$$

$$C = \frac{|Q|}{\Delta V} \quad ; \quad \varepsilon = \kappa\varepsilon_0 \quad ; \quad U = \frac{q^2}{2C} = \frac{1}{2}CV^2 \quad /// \quad C = \frac{\varepsilon_0 A}{d} \quad |\vec{E}| = \frac{\sigma}{\varepsilon_0}$$

★ $C_{eq} = \sum_{j=1}^{n} C_j$ ★ $\frac{1}{C_{eq}} = \sum_{j=1}^{n}\frac{1}{C_j}$

$$\Delta V = \mathcal{E}\left(1 - e^{-t/\tau}\right); \quad Q = C\mathcal{E}\left(1 - e^{-t/\tau}\right) \;\; ; \;\; I = \frac{dq}{dt} = \left(\frac{\mathcal{E}}{R}\right)e^{-t/\tau} \;\; ; \;\; Q' = Q_0\left(e^{-t/\tau}\right) \;\; ; \;\; \tau = RC$$

$$\mathrm{I} = \frac{\mathrm{dq}}{\mathrm{dt}} \quad ; \quad P = IV \quad ; \quad \mathcal{E} = \frac{dW}{dq}$$

$$R = \frac{V}{I} \quad /// \quad R = \rho\frac{L}{A} \quad ; \quad \rho - \rho_0 = \rho_0\alpha(T - T_0)$$

★ $R_{eq} = \sum_{j=1}^{n} R_j$; ★ $\frac{1}{R_{eq}} = \sum_{j=1}^{n}\frac{1}{R_j}$

$$\overrightarrow{F_B} = q\,\vec{v}\times\vec{B} \quad ; \quad \overrightarrow{dF_B} = i\,\overrightarrow{dL}\times\vec{B} \quad /// \quad (\vec{E}\perp\vec{B}):\ \vec{F} = \overrightarrow{F_E} + \overrightarrow{F_B} = q_o\vec{E} + q\,\vec{v}\times\vec{B}$$

$$Nota: \left|\overrightarrow{F_{cent}}\right| = \frac{mv^2}{r}$$

$$\vec{\mu} = I\vec{A} \quad ; \quad \vec{B}(z) = \frac{\mu_0}{2\pi}\frac{\vec{\mu}}{z^3} \quad (z \gg R)$$

$$\overrightarrow{dB} = \frac{\mu_0}{4\pi}\frac{I\overrightarrow{dl_{criad}}\times\hat{r}}{r^2} \qquad \vec{B} = \int_{toda\ I\ criad}\overrightarrow{dB}$$

$$\oint \vec{B}\cdot\overrightarrow{ds} = \mu_0 I_{enl}$$

	Campo Elétrico ($\vec{E}$)	Campo Magnético ($\vec{B}$)	
Criadores + Detetores/ ocupantes	Cargas (q)	Cargas em movimento ($q\vec{v}$) I (corrente elétrica)	
Forças	$\vec{F} = k\left\|\frac{q_{criad}q_o}{r^2}\right\|\hat{r}$	Cargas individuais $\vec{F} = q_o\vec{v}\times\vec{B}$	Correntes $\overrightarrow{dF} = I_o\overrightarrow{dl}\times\vec{B}$
Campo	$\vec{E} = \frac{\vec{F}}{q_o}$ $\qquad$ $\vec{E} = k\left\|\frac{q_{criad}}{r^2}\right\|\hat{r}$	$\overrightarrow{dB} = k_m\frac{(I\overrightarrow{dl})_{criad}\times\hat{r}}{r^2}$	
Fluxo do vector Campo Integral de superfície (fechado)	Lei de Gauss $\oint_{\forall\ sup\ fechada}\vec{E}\cdot\overrightarrow{dA} = \frac{q_{inter}}{\varepsilon_0}$	$\oint_{\forall\ sup\ fechada}\vec{B}\cdot\overrightarrow{dA} = 0$	
Integral de percurso/linha do vector Campo (se fechado='Circulação')	$W = \int_i^f\vec{E}\cdot\overrightarrow{ds} = -\Delta V$ $\qquad$ $\oint\vec{E}\cdot\overrightarrow{ds} = 0$	Lei de Ampère $\oint\vec{B}\cdot ds = \mu_o I_{enlaçadas}$	

$$\varepsilon = -\frac{d\left(\int\vec{B}\cdot\overrightarrow{dA}\right)}{dt}$$