Campos eléctricos

$$\vec{F} = K\frac{q_1 q_2}{r^2}\vec{u}_r \qquad \vec{E} = \frac{\vec{F}}{q}$$

$$K = \frac{1}{4\pi\varepsilon_0} = 9\cdot 10^9 \text{(S.I.)}$$

$$V = -\oint_L \vec{E}\cdot\vec{dr} \qquad V_A - V_B = \int_A^B \vec{E}\cdot\vec{dr}$$

$$\vec{E} = K\frac{q}{r^2}\vec{u}_r \qquad V = K\frac{q}{r}$$

$$\int_S \vec{E}\cdot\vec{dS} = \frac{\sum Q}{\varepsilon_0} \qquad E = \frac{\sigma}{\varepsilon_0}$$

Condensadores

$$C = \frac{Q}{V} \qquad C = \frac{\varepsilon_0 S}{d}$$

$$W = \frac{Q^2}{2C} = \frac{QV}{2} = \frac{V^2 C}{2}$$

$$\omega = \frac{1}{2}\varepsilon_0 E^2$$

$$E_d = \frac{E}{\varepsilon_r} \qquad \varepsilon = \varepsilon_0\varepsilon_r$$

Corriente continua

$$I = \int_S \vec{J}\cdot\vec{dS}$$

$$\vec{J} = n\cdot e\cdot\vec{v}_a \qquad \vec{J} = \sigma\cdot\vec{E}$$

$$R = \frac{V_1 - V_2}{I} \qquad R = \rho\frac{L}{S}$$

$$\rho = \rho_0(1+\alpha(T-T_0))$$

$$P = V_{AB}\cdot I \qquad P_R = R\cdot I^2$$

$$\varepsilon = \frac{dW}{dq} \qquad P = \varepsilon\cdot I$$

$$V_A - V_B = I\sum R - \sum\varepsilon$$

$$I = \frac{\sum\varepsilon}{\sum R}$$

Fuerzas magnéticas

$$\vec{F} = q(\vec{v}\times\vec{B}) \qquad d\vec{F} = I\,\vec{dl}\times\vec{B}$$

$$\vec{m} = I\cdot\vec{S} \qquad \vec{M} = \vec{m}\times\vec{B}$$

$$V_H = \frac{I\cdot B\cdot d}{n\cdot e\cdot S}$$

Campos magnéticos

$$\vec{dB} = \frac{\mu_0}{4\pi} I \frac{\vec{dl}\times\vec{r}}{r^3}$$

$$\frac{\mu_0}{4\pi} = 10^{-7} \text{(S.I.)}$$

$$B = \frac{\mu_0 I}{4\pi x}\operatorname{sen}\beta\Big|_{\beta_1}^{\beta_2}$$

$$B = \frac{\mu_0 I}{2\pi x}$$

$$B = \frac{\mu_0 I}{2R}\operatorname{sen}^3\alpha = \frac{\mu_0 I R^2}{2(R^2+z^2)^{3/2}}$$

$$\oint_L \vec{B}\cdot\vec{dl} = \mu_0\sum I \qquad B = \frac{\mu_0 N I}{l}$$

Inducción electromagnética

$$\varepsilon = -\frac{d\phi}{dt}$$

$$\phi_{21} = M\cdot I_1 \qquad \phi = L\cdot I$$

$$I(t) = \frac{\varepsilon_0}{R}(1 - e^{-\frac{t}{L/R}})$$

$$I(t) = \frac{\varepsilon_0}{R} e^{-\frac{t}{L/R}}$$

$$W_L = \frac{1}{2}L\cdot I^2 \qquad \omega = \frac{B^2}{2\mu_0}$$

Corriente alterna

$$\varphi = \varphi_u - \varphi_i \qquad \operatorname{tg}\varphi = \frac{L\omega - 1/C\omega}{R}$$

$$Z = \frac{U_m}{I_m} = \sqrt{R^2 + (L\omega - 1/C\omega)^2}$$

$$p(t) = u(t)\cdot i(t)$$

Semiconductores

$$n\cdot p = n_i^2 \qquad N_A + n = N_D + p$$