Teoria de camps:

$$\text{grad } V = \frac{\partial V}{\partial x}\vec{i} + \frac{\partial V}{\partial y}\vec{j} + \frac{\partial V}{\partial z}\vec{k}$$

$$dV = \text{grad } V \cdot d\vec{r}$$

$$\Phi = \int_S \vec{F} \cdot d\vec{S} \ ; \quad C = \oint_L \vec{F} \cdot d\vec{r}$$

Camps elèctrics:

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

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

$$V = -\int \vec{E}d\vec{r}; \quad V_A - V_B = \int_A^B \vec{E}d\vec{r}$$

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

$$\int_S \vec{E} \cdot d\vec{S} = \frac{\sum Q}{\varepsilon_0}; \quad E = \frac{\sigma}{\varepsilon_0}$$

Condensadors:

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

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

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

$$E_d = \frac{E}{\varepsilon_r}; \quad \varepsilon = \varepsilon_0 \varepsilon_r$$

Corrent continu:

$$I = \int_S \vec{J} \cdot d\vec{S}$$

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

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

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

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

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

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

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

Forces magnètiques:

$$\vec{F} = q(\vec{v} \times \vec{B}); \quad d\vec{F} = Id\vec{l} \times \vec{B}$$

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

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

Camps magnètics:

$$d\vec{B} = \frac{\mu_0}{4\pi} I \frac{d\vec{l} \times \vec{r}}{r^3}$$

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

$$B = \frac{\mu_0 I}{4\pi x} \text{sen}\,\beta \Big]_{\beta_1}^{\beta_2}$$

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

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

$$\oint_L \vec{B} \cdot d\vec{l} = \mu_0 \sum I; \quad B = \frac{\mu_0 N I}{l}$$

Inducció:

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

$$\Phi_{21} = M \cdot I_1; \quad \Phi = L \cdot I$$

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

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

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

Corrent altern i circuits:

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

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

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

$$\overline{Y} = 1/\overline{Z}; \quad \overline{Z} = \frac{\overline{U}}{\overline{I}} = \frac{U|_{\varphi_u}}{I|_{\varphi_i}} = \frac{U}{I}\Big|_{\varphi}$$

$$\overline{X}_L = L\omega j; \quad \overline{X}_C = -\frac{j}{C\omega}$$

$$[\overline{\varepsilon}] = [\overline{Z}][\overline{J}]; \quad [\overline{I}] = [\overline{Y}][\overline{V}]$$

$$\overline{Z}_{eq} = \frac{\overline{D}}{\overline{D}_{11}}$$

Semiconductors:

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