Física 3 – Engenharia de Telecomunicações - Formulário 2

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$$c=\frac{Q}{U} \qquad E_{el}=\frac{Q^2}{2C} \qquad E_{el}=\frac{C.U^2}{2} \qquad \mu_E=\frac{\varepsilon E^2}{2}=\frac{E_{el}}{Volume} \qquad Volume=Ab.h \qquad A=\pi r^2 \qquad A=b.h$$

$$U=U_1+U_2+U_3 \qquad U=U_1=U_2=U_3 \qquad Q=Q_1+Q_2+Q_3 \qquad Q=Q_1=Q_2=Q_3 \qquad C_{eq}=C_1+C_2+C_3$$

$$\frac{1}{C_{eq}}=\frac{1}{C_1}+\frac{1}{C_2}+\frac{1}{C_3} \qquad C_{eq}=\frac{C_1.C_2}{C_1+C_2} \qquad C=\frac{R}{k} \qquad E=\frac{k.Q}{r^2} \qquad V=\frac{k.Q}{r} \qquad C=\frac{\varepsilon.A}{d} \qquad E=\frac{\sigma}{\epsilon_0}=4\pi k\sigma$$

$$V=V_0-4\pi k\sigma x \qquad U=-4\pi k\sigma.\Delta x \qquad c=\frac{a.b}{k(b-a)} \qquad V=k.\left(\frac{Q_1}{R}+\frac{Q_2}{b}\right) \qquad |U|=\frac{k.Q.(b-a)}{a.b}$$

$$c=\frac{L}{2k\ln\left(\frac{b}{a}\right)} \qquad E=\frac{Q_1}{2\pi\varepsilon L r} \qquad V=\frac{\sigma_1}{\varepsilon}.a.\ln\left(\frac{r_{ref}}{r}\right)+\frac{\sigma_2}{\varepsilon}.b.\ln\left(\frac{r_{ref}}{b}\right) \qquad |U|=\frac{2kQ}{L}.\ln\left(\frac{b}{a}\right) \qquad k_0=9.10^9 Nm^2/C^2$$

$$\varepsilon_0=8,85.10^{-12}C^2/Nm^2 \qquad \chi_0=1 \qquad \epsilon=k.\varepsilon_0 \qquad k=\frac{1}{4\pi\varepsilon} \qquad E_R=E_0-E_i \qquad E_R=\frac{E_0}{k} \qquad E_i=\left(1-\frac{1}{k}\right).E_0$$

$$\sigma_i=\left(1-\frac{1}{k}\right).\sigma_0 \qquad Q_i=\left(1-\frac{1}{k}\right).Q_1 \qquad U_R=\frac{U_0}{k} \qquad C'=k.C_0 \qquad U_p=k.U_0 \qquad E_p=k.E_0 \qquad \sigma_p=k.\sigma_0$$

$$Q_p=k.Q_0 \qquad \Delta Q=(k-1).Q_0 \qquad Q_M=4\pi\varepsilon R^2 E_M \qquad Q_M=\varepsilon A E_M \qquad i=\frac{Q}{\Delta t}=\frac{dQ}{dt} \qquad Q=\int_{t_0}^{t} i(t)dt \qquad Q=n.e$$

$$|e|=1,6.10^{-19}C \qquad i=\int \vec{j}.d\vec{A} \qquad j=\frac{i}{A} \qquad R=\rho\frac{L}{A} \qquad R_{eq}=R_1+R_2+R_3 \qquad \frac{1}{R_{eq}}=\frac{1}{R_1}+\frac{1}{R_2}+\frac{1}{R_3} \qquad R_{eq}=\frac{R_1.R_2}{R_1+R_2}$$

$$Pot\hat{e}ncia=\frac{E_n}{\Delta t} \qquad Pot\hat{e}ncia=i.U=R.i^2=\frac{U^2}{R} \qquad V=\frac{\Delta x}{\Delta t} \qquad V=V_0+at$$

$$\vec{F}=q.\vec{v}x\vec{B} \qquad |\vec{F}|=q.v.B.sen(\theta) \qquad x=x_0+v_0t+\frac{at^2}{2} \qquad V^2=V_0^2+2a.\Delta x$$

$$\vec{A}x\vec{B}=det\begin{vmatrix} \vec{i} & \vec{j} & \vec{k} \\ A_x & A_y & A_z \\ B_x & B_y & B_z \end{vmatrix}$$

$$\sigma_{cp}=\frac{V^2}{R} \qquad V=\frac{2\pi R}{T} \qquad f=\frac{1}{T} \qquad R=\frac{m.v}{q.B} \qquad v=\frac{E}{B} \qquad \vec{v}=\vec{v}_x+\vec{v}_y \qquad V=\sqrt{V_x^2+V_y^2} \qquad T=\frac{2\pi m}{q.B}$$

$$p=\frac{2\pi m V_x}{q.B} \qquad \vec{F}=i.\vec{L}x\vec{B} \qquad |\vec{F}|=i.L.B.sen(\theta) \qquad d\vec{F}=id\vec{L}x\vec{B} \qquad \tau=N.i.A.B.sen(\theta) \qquad \vec{B}=\frac{\mu_0.q.\vec{v}x\vec{r}}{4\pi r^2}$$

$$B = \frac{\mu_0 . q . v . sen(\theta)}{4\pi r^2} \qquad \mu_0 = 4\pi . 10^{-7} \, Tm/A \qquad d\vec{B} = \frac{\mu_0 . i . d\vec{L} \times \hat{r}}{4\pi r^2} \qquad dB = \frac{\mu_0 . i . dL \, sen(\theta)}{4\pi r^2}$$

$$F = \frac{\mu_0 . i_1 . i_2 . L}{2\pi d} \qquad B = \frac{\mu_0 . i}{4\pi R}\left[sen(\phi_2) - sen(\phi_1) \right] \qquad B = \frac{\mu_0 . i}{2\pi r} \qquad B = \frac{\mu_0 . i . \alpha}{4\pi r} \qquad B = \frac{N . \mu_0 . i}{2} . \frac{R^2}{\left(R^2 + z^2\right)^{\frac{3}{2}}}$$

$$B = \frac{N . \mu_0 . i . A}{2\pi z^3} \qquad B = \frac{\mu_0 . i . N}{L} \qquad B = \frac{\mu_0 . i . N}{2\pi r} \qquad B = \frac{\mu_0 . i . r}{2\pi R^2} \qquad \oint_c \vec{B} . d\vec{L} = \mu_0 . i_{envolvido} \qquad \vec{B} . d\vec{L} = B . dL . cos(\theta)$$

$$\vec{B} d\vec{L} = B_x dL_x + B_y dL_y + B_z dL_z \qquad i_{envolvido} = \pm i_1 \pm i_2 \pm i_3 \pm ... \qquad \mu = NiA \qquad B = \frac{\mu_0 . \mu}{2\pi z^3} \qquad \vec{\tau} = \vec{\mu} \times \vec{B}$$

$$|\vec{\tau}| = \mu . B . sen(\theta) \qquad E_n = -\mu B . cos(\theta) \qquad W_{ext} = \Delta E_n = E_{nf} - E_{ni} \qquad \oint_S \vec{B} . d\vec{A} = 0 \qquad \phi_B = \int_S \vec{B} . d\vec{A}$$

$$\phi_B = B . A . cos(\theta) \qquad \phi_B = \vec{B} . \vec{A} \qquad \vec{B} . d\vec{A} = B . dA . cos(\theta) \qquad \vec{B} . d\vec{A} = B_x dA_x + B_y dA_y + B_z dA_z$$

$$\vec{\mu}_R = \sum_{i=1}^{n} \vec{\mu}_i \qquad \vec{M} = \frac{\vec{\mu}_{total}}{Volume} \qquad \vec{M} = \frac{d\vec{\mu}}{dv} \qquad M = \frac{1}{L} \qquad \vec{B}_m = \mu_0 . \vec{M} \qquad \vec{B}_R = \vec{B}_{ext} + \vec{B}_m \qquad B_m = \chi_m . B_{ext}$$

$$M = \frac{\chi_m}{\mu_0} . B_{ext} \qquad B_R = k_m . B_{ext} \qquad k_m = 1 + \chi_m \qquad M_{sat} = \frac{\rho . N_A . \mu}{M_{mol}} \qquad B_S = \frac{\mu_0 . M_{sat}}{\chi_m} \qquad \mu_m = k_m . \mu_0$$

$$N_A = 6,02 \times 10^{23} \qquad k = 1,38 \times 10^{-23} \, j/k \qquad \eta = \frac{m}{M_{mol}} = \frac{N}{N_A}$$