Formulário de Prova

CONSTANTES NUMÉRICAS

$\mu_0 = 1\times10^{-6}$ H/m; $\varepsilon_0 = (1/9)\times10^{-10}$ F/m; $c = 3\times10^8$ m/s; $h = 6\times10^{-34}$ J · s; $h = 3\times10^{-15}$ eV· s; $\hbar = h/(2\pi)$; $hc = 900$ eV· nm; $e = 2\times10^{-19}$ C; 1 eV $= 2\times10^{-19}$ J; 1 J $= 5\times10^{18}$ eV; $m_pc^2 =$ 1000 MeV; $m_ec^2 = 0{,}5$ MeV; 1μm $= 10^{-6}$ m; 1 nm $= 10^{-9}$ m; 1 Å $= 10^{-10}$ m; 1 pm $= 10^{-12}$ m; 1 GeV $= 10^3$ MeV $= 10^9$ eV; $\lambda_c = 1{,}8$ pm; $E_1 = \frac{-e^2}{8\pi\varepsilon_0 a_0} = -25$ eV; $a_0 = \frac{h^2\varepsilon_0}{\pi m_e e^2} = (9/\pi)\times10^{-11}$ m; $\text{sen}(30°) = 1/2$; $\text{sen}(45°) = \sqrt{2}/2$; $\text{sen}(60°) = \sqrt{3}/2$

FORMULÁRIO GERAL

div $\mathbf{E} = \frac{\rho}{\varepsilon_0}$; rot $\mathbf{E} = -\dfrac{\partial \mathbf{B}}{\partial t}$; div $\mathbf{B} = 0$; rot $\mathbf{B} = \mu_0\left(\mathbf{j} + \varepsilon_0\dfrac{\partial \mathbf{E}}{\partial t}\right)$; $\mathbf{S} = \mathbf{E}\times\mathbf{B}/\mu_0$; $\mathbf{p} = \varepsilon_0\mathbf{E}\times\mathbf{B}$; $u = \varepsilon_0 E^2/2 + B^2/(2\mu_0)$; $\mathcal{P} = S/c$; $F = \mathcal{P}A$; $I = I_0\left[\frac{\text{sen}\,(\beta/2)}{\beta/2}\right]^2\left[\frac{\text{sen}\,(N\phi/2)}{N\text{sen}(\phi/2)}\right]^2$; $\beta = \frac{2\pi}{\lambda}a\text{sen}(\theta)$; $\phi = \frac{2\pi}{\lambda}d\text{sen}(\theta)$; $\text{sen}(\theta_m^{(d)}) = m(\lambda/a)$; $\text{sen}(\theta_m^{(d)}) = (m + n/N)(\lambda/d)$; $\text{sen}(\theta_m^{(c)}) = m(\lambda/d)$; $R = mN = \frac{\lambda}{\Delta\lambda}$; $\theta_R = \frac{1{,}22\lambda}{D}$; $\langle\text{sen}^2\theta\rangle = 1/2$; $E^2 = (pc)^2 + (m_0c^2)^2$; $\frac{u}{c} = \frac{pc}{E}$; $E = K + m_0c^2 = \gamma m_0 c^2$; $p = \gamma m_0 u$; $\gamma = 1/\sqrt{1-\frac{u^2}{c^2}}$; $x = \gamma(x' + ut')$; $t = \gamma(t' + \frac{ux'}{c^2})$; $v_x = \frac{v_x' + u}{1+(v_x'u)/c^2}$; $v_y = \frac{v_y'}{\gamma(1+(v_x'u)/c^2)}$; $p_x = \gamma(p_x' + uE'/c^2)$, $E = \gamma(E' + up_x')$, $p_y = p_y'$; $\lambda_2 - \lambda_1 = \left(\frac{h}{mc}\right)(1-\cos\theta) = \lambda_c(1-\cos\theta)$; $f = f_0\sqrt{\frac{c+v}{c-v}}$; $\Delta x\cdot\Delta p_x \geq \frac{\hbar}{2}$; $\Delta E\cdot\Delta t \geq \frac{\hbar}{2}$; $L_n = n\hbar$; $r_n = n^2 a_0$; $v_n = e^2/(2n\epsilon_0 h)$; $E_n = \frac{E_1}{n^2}$; $E_n = n^2h^2/(8mL^2)$; $eV_0 = hf - w$; $-\frac{\hbar^2}{2m}\frac{\partial^2\Psi(x,t)}{\partial x^2} + U(x,t)\Psi(x,t) = i\hbar\frac{\partial\Psi(x,t)}{\partial t}$; $-\frac{\hbar^2}{2m}\frac{d^2u(x)}{dx^2} + U(x)u(x) = Eu(x)$; $k_1 = \sqrt{2mE}/\hbar$; $k_2 = \sqrt{2m|E-V|}/\hbar$; $R = (\sqrt{E} - \sqrt{E-V})^2/(\sqrt{E} + \sqrt{E-V})^2$; $T = 1 - R$; $\langle x\rangle = (2k_2)^{-1} = \hbar/\sqrt{8m(E-V)}$; $T = [1 + (\frac{V^2}{4E(E-V)})\text{sen}^2(k_2L)]^{-1}$; $T = [1 + (\frac{V^2}{4E(V-E)})\text{senh}^2(k_2L)]^{-1}$, $T \simeq \frac{16E(V-E)}{V^2}\exp[-\sqrt{8m(V-E)}L/\hbar]$.