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P 1

Eletromagnetismo

Nome:	$n^{\underline{o}}$ **USP**							

1– (4.0)

- (1.0) a)
- (1.0) b)
- (0.5) c)
- (0.5) d)
- (1.0) e)

2– (3.0)

- (1.0) a)
- (1.0) b)
- (0.5) c)
- (0.5) d)
- (1.0) e)

3– (3.0)

- (1.0) a)
- (1.0) b)
- (1.0) c)
- (0.5) d) a distância entre o máximo de segunda ordem e o máximo central.

Formulário

$\vec{D} = \epsilon_o \vec{E} + \vec{P}$ $\quad \vec{B} = \mu_o \vec{H} + \vec{M}$ $\quad \vec{D} = \epsilon \vec{E}$ $\quad \vec{B} = \mu \vec{H}$

$\nabla.\vec{D} = \rho$ $\quad \nabla \times \vec{H} = \vec{J} + \frac{\partial \vec{D}}{\partial t}$ $\quad \sigma_p = \vec{P}.\vec{n}$

$\nabla.\vec{D} = \frac{\partial D_x}{\partial x} + \frac{\partial D_y}{\partial y} + \frac{\partial D_z}{\partial z}$

$\nabla.\vec{D} = \frac{1}{r}\frac{\partial}{\partial r}(rD_r) + \frac{1}{r}\frac{\partial D_\phi}{\partial \phi} + \frac{\partial D_z}{\partial z}$ (coord. cilíndricas)

$\nabla\vec{D} = \frac{1}{r^2}\frac{\partial}{\partial r}(r^2 D_r) + \frac{1}{rsen\theta}\frac{\partial}{\partial \theta}(sen\theta D_\theta) + \frac{1}{rsen\theta}\frac{\partial D_\phi}{\partial \phi}$

$\nabla \times \vec{H} = (\frac{\partial H_z}{\partial y} - \frac{\partial H_y}{\partial z})\vec{i} + (\frac{\partial H_x}{\partial z} - \frac{\partial H_z}{\partial x})\vec{j} + (\frac{\partial H_y}{\partial x} - \frac{\partial H_x}{\partial y})\vec{k}$

$\nabla \times \vec{H} = (\frac{1}{r}\frac{\partial H_z}{\partial \phi} - \frac{\partial H_\phi}{\partial z})\vec{a}_r + (\frac{\partial H_r}{\partial z} - \frac{\partial H_z}{\partial r})\vec{a}_\phi + \frac{1}{r}(\frac{\partial (rH_\phi)}{\partial r} - \frac{\partial H_r}{\partial \phi})\vec{a}_z$ (coord. cilíndricas)

$\vec{k} \times \vec{E} = \omega\vec{B}$ $\quad \vec{S} = \frac{1}{\mu}\vec{E} \times \vec{B}$ $\quad P = f_a \frac{<S>}{c} + 2 f_r \frac{<S>}{c}$ $\quad E_o = cB_o$

$< p > = f_a \frac{<U>}{c} + 2\, f_r \frac{<U>}{c}$ $\quad P_{ot} = \int \vec{S}.d\vec{A}$ $\quad I = I_o cos^2\theta$ $\quad c = 3 \times 10^8\, m/s$

$D_{1n} = D_{2n}$ $\quad E_{1t} = E_{2t}$ $\quad B_{1n} = B_{2n}$ $\quad H_{1t} = H_{2t}$ $\quad \tan\theta_{iB} = \frac{n_t}{n_i}$ $\quad \theta_i + \theta_t = \frac{\pi}{2}$

Interferência

$m\lambda = d\,sen\,\theta$ $\quad (m + \frac{1}{2})\lambda = d\,sen\,\theta$ $\quad \mathrm{m}\lambda = a\,sen\,\theta$ $\quad (m + \frac{1}{2})\lambda = a\,sen\,\theta$ $\quad sen\,\theta = 1.22\,\frac{\lambda}{a}$

$\lambda_n = \frac{\lambda}{n}$

$m\lambda = a\,sen\,\theta$ $\quad (m + \frac{1}{2})\lambda = a\,sen\,\theta$ $\quad sen\,\theta = 1.22\,\frac{\lambda}{a}$

$I = I_o\,(\frac{sen\,\frac{\beta}{2}}{\frac{\beta}{2}})^2\,(\frac{sen\,\frac{N\phi}{2}}{sen\,\frac{\phi}{2}})^2$ $\quad \phi = \frac{2\pi}{\lambda}\,d\,sen\,\theta$ $\quad \beta = \frac{2\pi}{\lambda}\,a\,sen\,\theta$ $\quad R = \frac{\lambda_m}{\lambda_2 - \lambda_1} = \frac{\lambda_m}{\Delta\lambda}$ $\quad R = m\,N$

Película

$2nt = (m + \frac{1}{2})\,\lambda$ $\quad m = 0, 1, 2, ...$

$2nt = m\,\lambda$ $\quad m = 0, 1, 2, ...$

$t\,cos\theta_t = (2m + 1)\frac{\lambda_t}{4}$ $\quad m = 0, 1, 2, ...$

$t\,cos\theta_t = m\,\frac{\lambda_t}{2}$ $\quad m = 0, 1, 2, ...$

Difração

$sen\,\theta = 1.22\,\frac{\lambda}{a}$

$m\lambda = a\,sen\,\theta$

$(m + \frac{1}{2})\lambda = a\,sen\,\theta$

$I = I_o\,(\frac{sen\,\frac{\pi a\,sen\,\theta}{\lambda}}{\frac{\pi a\,sen\,\theta}{\lambda}})^2$

Rêde de difração

$m\lambda = d\,sen\,\theta$ $\quad (m + \frac{1}{2})\lambda = d\,sen\,\theta$

$I = I_o\,cos^2\,(\frac{\pi d\,sen\,\theta}{\lambda})(\frac{sen\,\frac{\pi a\,sen\,\theta}{\lambda}}{\frac{\pi a\,sen\,\theta}{\lambda}})^2$

$R = \frac{\lambda_m}{\lambda_2 - \lambda_1} = \frac{\lambda_m}{\Delta\lambda}$ $\quad R = m\,N$