3º teste EcO 8/6/2007

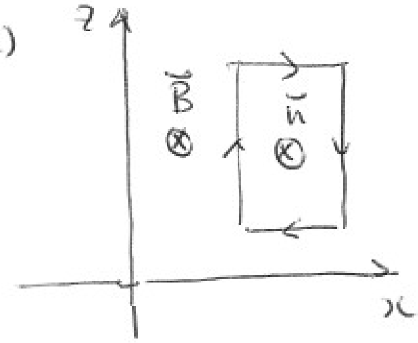
$\boxed{\text{VERSÃO B}}$ Soluções

I

a) $\boxed{\vec{B} = \frac{\mu_0}{2\pi} I \cos(\omega t) \frac{1}{z} \vec{e}_y}$

b) $\vec{n} \parallel \vec{B} \Rightarrow \boxed{\Phi(t) = \frac{\mu_0}{2\pi} I_0 \cos(\omega t)\, a \ln(3)}$

c)



$$\mathcal{E} = -\frac{d\Phi}{dt} = \frac{\mu_0}{2\pi} I_0 \omega \sin(\omega t)\, a \ln(3)$$

$$\boxed{I = \frac{\mu_0}{2\pi} \frac{I_0}{R} \omega \sin(\omega t)\, a \ln(3)}$$

$0 < \omega t < \pi/2 \Rightarrow \sin \omega t > 0 \Rightarrow I > 0 \Rightarrow$ sentido indicado.

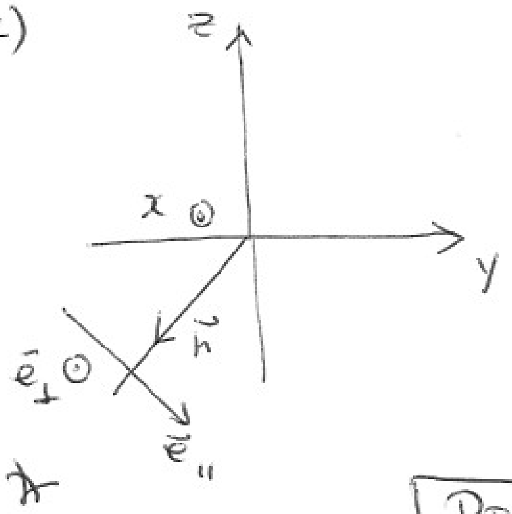
II

a) $\vec{k} = \alpha \vec{e}_y - \beta \vec{e}_z$; $\vec{k} \cdot \vec{E} = 0 \Rightarrow E_0 \cos[\cdot\cdot](\alpha + \beta) = 0$

$$\boxed{\alpha = -\beta = -\sqrt{2} \times 10^{-2}\ \text{m}^{-1}}$$

b) $\boxed{\vec{n} = \frac{\vec{k}}{|\vec{k}|} = -\frac{1}{\sqrt{2}} \vec{e}_y - \frac{1}{\sqrt{2}} \vec{e}_z}$

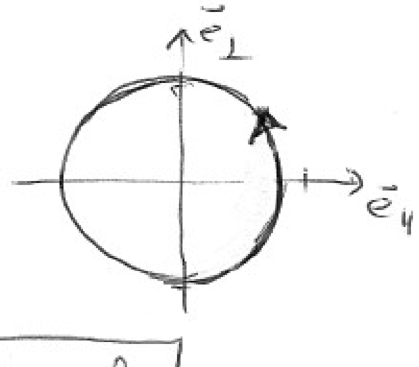
c)



$\vec{e}_\perp = \vec{e}_x$; $\vec{e}_\parallel = \frac{1}{\sqrt{2}} \vec{e}_y - \frac{1}{\sqrt{2}} \vec{e}_z$

$\vec{E} = E_\parallel \vec{e}_\parallel + E_\perp \vec{e}_\perp$

$$\begin{cases} E_\perp = \sqrt{2} E_0 \sin[\cdot] \\ E_\parallel = \sqrt{2} E_0 \cos[\cdot] \end{cases}$$



$\boxed{\text{Polarização circular esquerda}}$