3º Ext. E.O – Versão C (15/12/2020)

Notar que $\sin\left[\omega t + \alpha x + \beta z - \frac{\pi}{2}\right] = -\cos\left[\omega t + \alpha x + \beta z\right]$

a) $k_x = -\alpha$; $k_y = 0$ $k_z = -\beta$

$$\vec{k} \cdot \vec{E} = E_0 \cos[\cdots](-2\alpha - \beta) = 0 \Rightarrow \alpha = -\frac{1}{2}\beta$$

$$\boxed{\alpha = -\frac{2}{\sqrt{5}} \times 10^{-2}\ m^{-1}}$$

b) $|\vec{k}| = \sqrt{\alpha^2 + \beta^2} = |\alpha|\sqrt{5} = 2 \times 10^{-2}\ m^{-1}$

$$\boxed{\vec{n} = \frac{\vec{k}}{|\vec{k}|} = \frac{1}{\sqrt{5}}\vec{e}_x - \frac{2}{\sqrt{5}}\vec{e}_z}$$

d) Componentes em fase $\Rightarrow$ Pol. linear

e) $n = 1.5$

f) $\langle |\vec{S}| \rangle = \frac{n}{Z_0}\langle |\vec{E}|^2 \rangle = \frac{n}{Z_0}\left(4E_0^2 + E_0^2 + E_0^2\right)\langle \cos^2[\cdots] \rangle$

ou

$$\boxed{\langle |\vec{S}| \rangle = \frac{n}{Z_0} 3E_0^2 = 1.2 \times 10^{-8}\ W/m^2}$$

3° Ficha teórica — Versão D — (15/12/2012)

Note que $\cos[\omega t + \alpha x + \beta z - \pi/2] = \sin[\omega t + \alpha x + \beta z]$

a) $\beta = \frac{4}{\sqrt{5}} \times 10^{-2}\ m^{-1}$

b) $\vec{n} = \frac{1}{\sqrt{5}} \vec{e}_x - \frac{2}{\sqrt{5}} \vec{e}_z$

c) $n = 1.5$

d) linear

e) $\langle |\vec{S}| \rangle = \frac{n}{Z_0} 3 E_0^2 = 1.2 \times 10^{-8}\ W/m^2$