Gabarito

1. (a) $I = (Em)^2/2\mu_0 c$; $E_m = (2\mu_0 cI)^{1/2}$

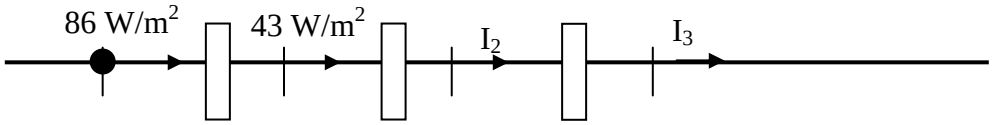
$E_m = 8,7 \times 10^{-2}$ V/m

$B_m = E_m/c = 2,9 \times 10^{-10}$ T

(b) $I = P/4\pi r^2$; $P = I4\pi r^2$

$P = 1,3 \times 10^4$ W

2.



(a) $I_2 = 43\cos^2(70^o)$; $I_2 = 5,0$ W/m^2

(b) $I_3 = 5\cos^2(20^o)$; $I_3 = 4,4$ W/m^2

3.

(a) $\theta_B + \theta_r = 90^o$; $\theta_r = 32^o$

$\theta_B = 58^o$

(b) $n_1 sen(\theta_1) = n_2 sen(\theta_2)$

$sen\theta_B = nsen(90^o - \theta_B)$

$sen\theta_B = n\cos\theta_B$

$tg\theta_B = n$; $n = 1,6$

4.

$A = 2h/h = p'/p$ (em módulo)

$1/f = 1/p + 1/p'$

$1/f = 1/p + 1/2p$

$p' + p = 60$ cm

$p = 20$ cm; $p' = 40$ cm; $f = 13,3$ cm

5. $E_1 = E_0\cos(\omega t)$; $E_2 = 2E_0\cos(\omega t + \varphi)$

$E = E_1 + E_2$ (soma vetorial)

$E^2 = E_0^2 + (2E_0)^2 - 4E_0^2\cos(180 - \varphi)$

$E^2 = E_0^2 (5 + 4\cos\varphi)$; sabendo que: $1 + \cos\varphi = 2\cos^2\varphi/2$

$E^2 = E_0^2 (1 + 8\cos^2\varphi/2)$

Multiplicando os dois membros da equação por $(1/(2\mu_0 c)$

Temos: $I = I_0(1 + 8\cos^2\varphi/2)$

(b) $\varphi = \pi/4$; $\cos^2\varphi/2 = 1/2$

$I = 4I_0\cos^2(\varphi/2)$; $I = 4I_0(1/2)$; $I = 2I_0$