

33. (a) Since the incident light is unpolarized, half the intensity is transmitted and half is absorbed. Thus the transmitted intensity is $I = 5.0 \text{ mW/m}^2$. The intensity and the electric field amplitude are related by $I = E_m^2/2\mu_0 c$, so

$$\begin{aligned} E_m &= \sqrt{2\mu_0 c I} = \sqrt{2(4\pi \times 10^{-7} \text{ H/m})(3.00 \times 10^8 \text{ m/s})(5.0 \times 10^{-3} \text{ W/m}^2)} \\ &= 1.9 \text{ V/m} . \end{aligned}$$

- (b) The radiation pressure is $p_r = I_a/c$, where I_a is the absorbed intensity. Thus

$$p_r = \frac{5.0 \times 10^{-3} \text{ W/m}^2}{3.00 \times 10^8 \text{ m/s}} = 1.7 \times 10^{-11} \text{ Pa} .$$