

Physics 2321. E&M, Sound & Light

Final Exam.

Name: _____

Light, optics, waves and sound

Constants:

$$\begin{aligned} \epsilon_0 &= 8.85 \times 10^{-12} \text{ F/m} & \mu_0 &= 1.26 \times 10^{-6} \text{ T} \cdot \text{m/A} & e &= 1.6 \times 10^{-19} \text{ C} \\ k &= 9 \times 10^9 \text{ Nm}^2/\text{C} & m_e &= 9.11 \times 10^{-31} \text{ kg} & n_{\text{water}} &= 1.33 & n_{\text{air}} &= 1.00 \end{aligned}$$

Assorted equations:

$$\begin{aligned} y(x, t) &= A \sin(kx - \omega t + \phi) & y(x, t) &= f(x - vt) \text{ or } f(x + vt) & v &= \lambda f \\ v &= \sqrt{\frac{T}{\mu}} & v &= \sqrt{\frac{E}{\rho}} & v &= 331 \text{ m/s} \sqrt{1 + T_C/273} \\ E_\lambda &= \frac{1}{2} \mu \omega^2 A^2 \lambda & P &= \frac{1}{2} \mu \omega^2 A^2 v & s(x, t) &= s_{\text{max}} \cos(kx - \omega t) \\ I &= \frac{P_{\text{avg}}}{4\pi r^2} & \beta &= 10 \log\left(\frac{I}{I_0}\right) & \Delta P(x, t) &= \Delta P_{\text{max}} \sin(kx - \omega t) \\ q &= -\frac{n_2}{n_1} p & \frac{1}{d_o} + \frac{1}{d_i} &= \frac{1}{f} & M &= -\frac{d_i}{d_o} \end{aligned}$$