

Physics 425, Spring 2012

Assignment set #2

Due January 20:

2. Suppose that the electric field in an electromagnetic wave is

$$\vec{E}(\vec{r}, t) = \frac{E_0}{\sqrt{2}} \sin(kz - \omega t)(\hat{x} - \hat{y}).$$

(a) Prove that this solution satisfies the wave equation.

(b) Find the magnetic field using $\nabla \times \vec{E} = -\partial \vec{B} / \partial t$, and prove that

$\vec{E} \perp \vec{B}$. [note that you can ignore the constant DC component]

Due Jan 23:

3. Griffiths Problem 9.33 (a spherical wave); you do not have to prove that the solutions satisfy the Maxwell's equations.