HOMEWORK   5

Due: Tuesday, March 7

Problems: EM waves in vacuum and media; Wave Polarization

Energy and Momentum of EM waves (Sections 9.2,9.3.1 and 9.3.2 Griffiths)

9.9; 9.12; and   9.14

Problem 5

Suppose the electric field in an electromagnetic wave is

$$E(r, t) = E_0 \frac{(\hat{e}_z - \hat{e}_x)}{\sqrt{2}} \sin(ky - \omega t),$$

where $E_0, k,$ and ω are respectively the amplitude, wave number, and frequency of the electromagnetic wave $E(r, t)$. Determine:

(a) the magnetic field;

(b) the Poynting vector.