Physics 108 Assignment#8 (due on 5/27/2015)

Reading materials:

Pedrotti 3rd Edition: **Chapter 23:** 23-6, 23-7
                                Chapter 25: 25-1 through 25-6
Lecture Notes: pp. 83 – 85 and 93-102

Homework: (Pedrotti 3rd Edition)

1.   23-17

2.   23-18

3.   23-19

4.   23-21

5.   25-1

6.   25-4

7.   25-7

8.   25-8

9.   25-9

10.   (**Extra point**) Explain how the color of a rainbow changes with the height from the ground using $n^2(\omega) = 1 + \dfrac{\omega_p^2}{\omega_0^2 - \omega^2}$. The sun shine comes from the back of the observer. You can treat rain water droplets as being spherical with a natural frequency ω_0 larger than ω of visible light.

11.   (**Extra 2 points**) From $\sigma_b = \hat{n} \cdot \vec{P} = \hat{n} \cdot \left(\chi \varepsilon_0 \vec{E}\right)$, prove that $\varepsilon = \vec{E}_0 / \vec{E} = 1 + \chi$ either using capacitor arrangement or Gauss's law and $\vec{D} = \varepsilon_0 \vec{E} + \vec{P}$.