Homework 6

Due Friday 3/8/2013 - at beginning of class

Griffiths' 4 Problems (3rd Edition numbers are the same)

4.5

4.10

4.15

4.18

4.20

4.21

Additional Problems

E.6.1 A dipole formed of a $+Q$ and $-Q$ charge spaced a distance a apart has dipole moment pointing in the $+\hat{z}$ direction. The center of the dipole is located at $+R\hat{z}$ a distance R above a neutral dielectric slab occupying the volume $z < 0$ with dielectric constant κ. Compute the force the dielectric plane exerts on the dipole.

E.6.2 A point charge $+Q$ is a distance R above a neutral dielectric slab with dielectric constant κ occupying the volume $z < 0$. Compute the electric field immediately above and below the dielectric surface. From the field, calculate the bound charge density at the surface.

E.6.3 A linear dielectric with dielectric constant κ occupies the volume $-a < z < a$. A uniform volume charge density ρ is fixed within the dielectric. Compute the electric field everywhere. Compute the polarization everywhere.