

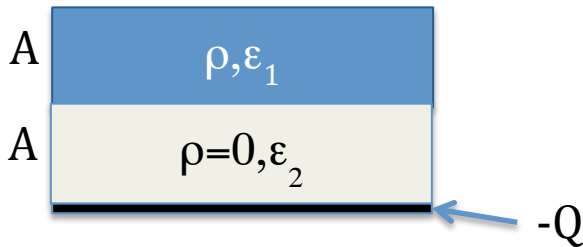
Phys 110A, HW#11; Due Thurs 11/17

1. Problem 5.17 (5.16 in 3rd edition) The one with two parallel moving plates.

2. Use the technique of example 5.12 to find the vector potential inside an infinite wire of Radius R , carrying a total current I . Assume the current is uniformly distributed throughout the bulk of the wire. (Set $A=0$ at the surface of the wire.)

Sample Midterm Problems for the rest of this HW:

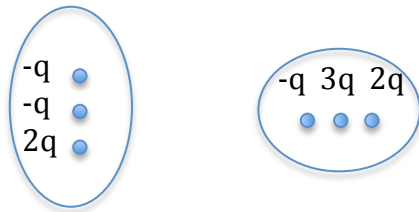
Problem 3: A large, thin conducting plate is given a charge of $-Q$. On top of this plate is a slab of linear dielectric with permittivity ϵ_2 and thickness A . (It is uncharged). On top of **that** slab is another slab of linear dielectric with permittivity ϵ_1 and thickness A . Important: This upper slab is sprinkled with a uniform charge density of ρ . (Not surface charge; it's throughout the upper slab.) The TOTAL charge in the upper slab is $+Q$.



A) Find the electric field everywhere. (Hint: it's not constant in the upper slab.) (Another hint: use the fact that the total upper-slab charge is $+Q$ to figure out the fields outside the slab first.) Warning: the area of the slab "a" is not given, but you can solve for it with the above information. Don't use "A" for this area, because A is already specified!

B. Find the location and amount of all the BOUND charge. (Hint: it's not all surface charge!)

Problem #4: Two molecules with internal charges are shown.



Inside each molecule, neighboring charges are a distance " f " apart. ($2f$ from the charge at one side to the charge at the other side.) The two molecules are a distance " g " apart, where $g \gg f$.

A) Find the torque on the left-side molecule. (Also tell me which way it would prefer to rotate.)

B) Find the force on the right-side molecule. (Including the direction!)