

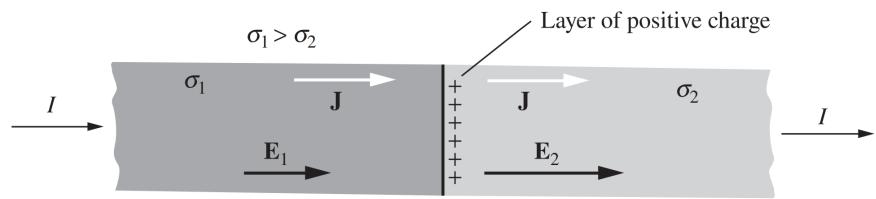
PHYS UN1602 Recitation Week 5 Worksheet

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Problem 1

Show that the total amount of charge at the junction of the two materials in the figure below is $\epsilon_0 I \left(\frac{1}{\sigma_2} - \frac{1}{\sigma_1} \right)$, where I is the current flowing through the junction, and σ_1 and σ_2 are the conductivities of the two conductors.



Problem 2

A laminated conductor is made by depositing, alternately, layers of silver 100 angstroms thick and layers of tin 200 angstroms thick (1 angstrom = 10^{-10} m). The composite material, considered on a larger scale, may be considered a homogeneous but anisotropic material with an electrical conductivity σ_{\perp} for currents perpendicular to the planes of the layers, and a different conductivity σ_{\parallel} for currents parallel to that plane. Given that the conductivity of silver is 7.2 times that of tin, find the ratio $\sigma_{\perp}/\sigma_{\parallel}$.