

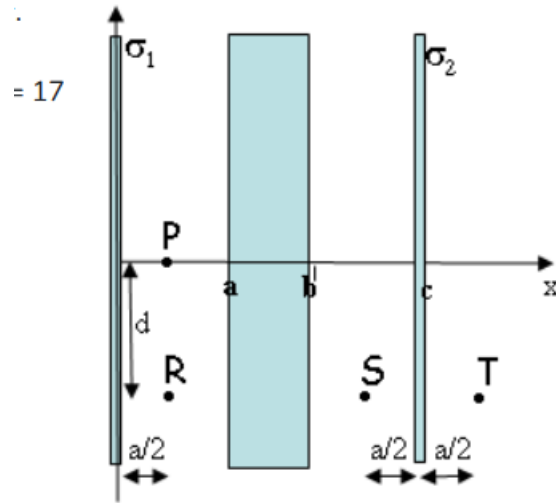
Physics 212

HW Problem

Question 0.1: Electric Potential

An infinite sheet of charge is located in the $y - z$ plane at $x = 0$ and has uniform charge density $\sigma_1 = 0.59 \mu\frac{C}{m^2}$. Another infinite sheet of charge with uniform charge density $\sigma_2 = -0.35 \mu\frac{C}{m^2}$ is located at $x = c = 30$ cm. An uncharged infinite conducting slab is placed halfway in between these sheets (i.e., between $x = 13$ cm and $x = 17$ cm).

- 1) What is $E_x(P)$, the x-component of the electric field at point P, located at $(x,y) = (6.5 \text{ cm}, 0)$?
- 2) What is σ_a , the charge density on the surface of the conducting slab at $x = 13$ cm?
- 3) What is $V(R) - V(P)$, the potential difference between point P and point R, located at $(x,y) = (6.5 \text{ cm}, -17 \text{ cm})$?
- 4) What is $V(S) - V(P)$, the potential difference between point P and point S, located at $(x,y) = (23.5 \text{ cm}, -17 \text{ cm})$?



- 1 What is $E_x(P)$, the x-component of the electric field at point P, located at $(x,y) = (6.5 \text{ cm}, 0)$?