

- OLD EXAM ON WIKI
- GRADED HWK OUTSIDE MY DOOR
- FORMULA SHEET 1 PAGE (BOTH SIDES) DUE 9 AM FRIDAY

Review: expect you to be able to

- Apply finding  $V, \rho, E$  in Newton's Laws
- Setup a soln of PDE by sep variables & method images
- apply bndry conditions to get a unique soln
- understand soln from sep var is not general soln

$$\Rightarrow V = \sum_n a_n Q_n$$

A soln to sep variable

- applying superposition principle to get general soln
- applying orthogonality relation to find  $a_n$ 's
- find  $E$  for a dipole given potential in spherical & cartesian coords
- understand how get  $\vec{E}$  from a collection of dipoles
- find & apply  $\sigma_b$  &  $\rho_b$  to get  $\vec{E}$
- use  $\vec{D}$  to find  $\vec{E}$

$$b_{all} + b_{et} = 1.10$$

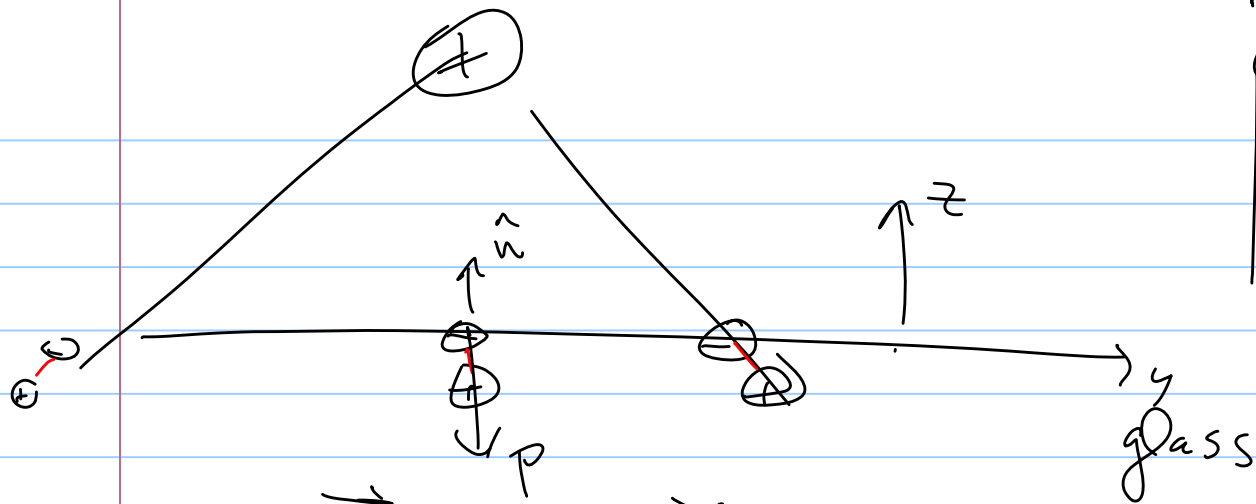
$$\uparrow$$

$$b_{at} = 1.00 + b_{eet}$$

$$b_{all} + 1.00 + b_{eet} = 1.10$$

$$2 b_{eet} = 10$$

$$b_{eet} = .05$$



$$\nabla \cdot \vec{P} = \vec{P} \cdot \hat{n} = |\vec{P}| \cos \varphi = \frac{P_z}{z}$$

Assume  $\vec{P} = \epsilon_0 \chi_e \vec{E}$  LINEAR DIELECTRIC

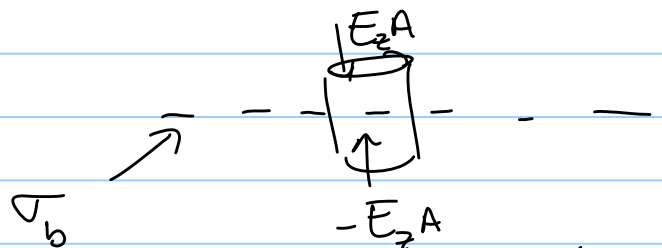
$$P_z = \epsilon_0 \chi_e E_z^{\text{total}} = \nabla \cdot \vec{P} = \epsilon_0 \chi_e \left( E_z^{\text{pt charge}} + \frac{\sigma_b}{2\epsilon_0} \right)$$

Feedback:  $E$  generates  $P$  &  $P$  makes more  $E$  or less

$E^{\text{tot}}$  is due to both pt charge & dipoles generated by  $E_{\text{pt}}$

$$E_z^{\text{tot}} = E_z^{\text{pt charge}} + E_z^{\text{bound charge}} \quad \frac{\sigma_b}{2\epsilon_0}$$

easy



$$E_2 A - (-E_2 A) = \frac{\sigma_b A}{\epsilon_0}$$