Announcements

- YOU HAVE A TEST ON FRIDAY
  - I'm trying to get your HW6's graded
  - Most old homework solutions are complete in my binder if you want to check some of your ungraded problems against them
    - I only have the one binder and it may be in high demand, so try to not monopolize it!
  - Learning objectives are posted on Campuswire
  - You are probably looking at something like 3 calculation type problems and then a handful of conceptual problems
  - Bring everything. Your book, your notes, your homework, your calculator.
- I'll be around until about 6:30 tomorrow if you have questions
- There is a post category for "Exam Preparation" on Campuswire if you are having more questions!
- AOE (Physics Club) meeting at 4:30pm on Thursday to solve the world's problems

Q1

Are ρ_b and σ_b due to real charges?

A. Nope! They are just fictitious charges we use to describe the summed dipoles!

B. Yes! Actual charges are living at those locations!

C. What are ρ_b and σ_b?

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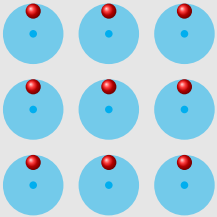
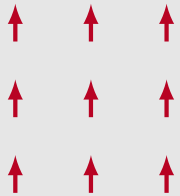
Q2

In the following case, is the bound surface and volume charge density zero or nonzero?



Physical Dipoles



Ideal Dipoles

A. $\sigma_b = 0, \quad \rho_b \neq 0$
B. $\sigma_b \neq 0, \quad \rho_b \neq 0$
C. $\sigma_b = 0, \quad \rho_b = 0$
D. $\sigma_b \neq 0, \quad \rho_b = 0$

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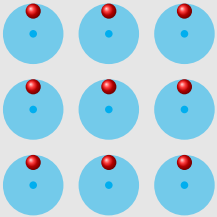

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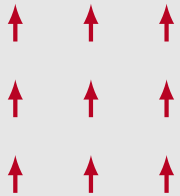

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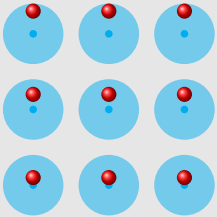

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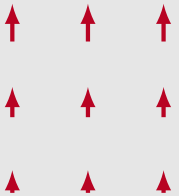

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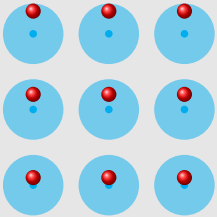

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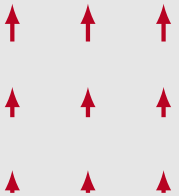

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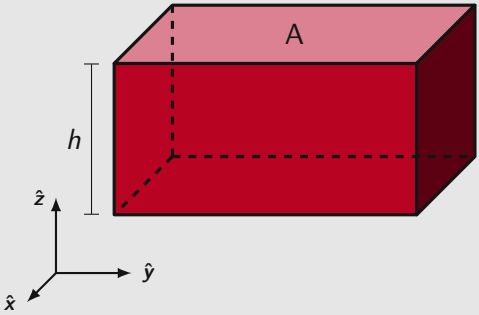
Q4

A dielectric slab (top area A and height h) has been polarized with $\vec{\mathbf{P}} = P_0\hat{\mathbf{z}}$. What is the surface charge density, σ_b, on the bottom surface?

A. 0
B. $-P_0$
C. P_0
D. P_0Ah



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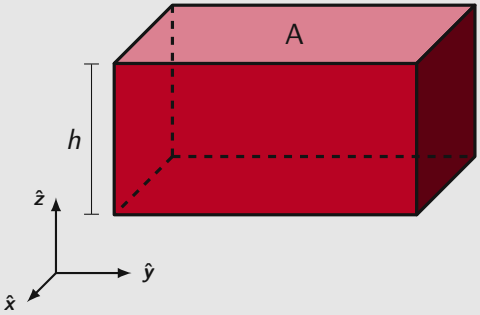
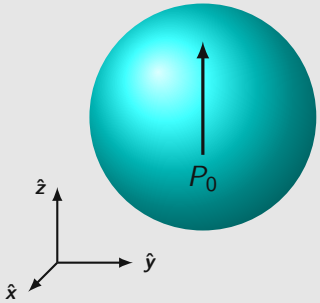


Q5

A dielectric sphere is uniformly polarized,

$$\vec{\mathbf{P}} = +P_0\hat{\boldsymbol{z}}$$

What is the surface charge density?



A. 0
B. C (but $C \neq 0$)
C. $C \sin\theta$
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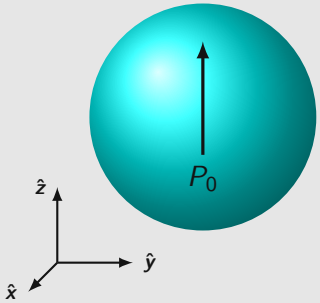

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Q6

At the end of last class we had a cylinder of radius a and height b that had its base at the origin and was aligned along the z axis. This cylinder had a polarization of

$$\vec{\mathbf{P}} = P_0 \left(\frac{z}{b} \right) \hat{\boldsymbol{z}}$$

What is the bound volume charge density? (*Bonus! Also, what is the bound charge density on each cap and the sides?*)

A. 0
B. $\dfrac{P_0}{b}$
C. $-\dfrac{P_0}{b}$
D. $-\dfrac{P_0}{b^2}$

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Test Questions

Any questions or clarifications in preparation for the test?