

General Physics - E&M (PHY 1308) Lecture

Notes

Quiz002

SteveSekula, 2 September 2010 (created 2 September 2010)

Name: _____

no tags

Date: _____

Rules for the Quiz:

- You are given **5 minutes at the beginning** to look over the quiz quietly and jot some notes on a 3x5-inch notecard. Use this time to think about how to attack the quiz problem(s)
- You are given **10 minutes in the middle** to discuss the quiz with your teammates. Use this time to develop strategies across the group for attacking the problem(s). You are allowed to keep notes from this discussion on the SAME 3x5-inch notecard.
- You then have **15 minutes at the end** to work individually (NO MORE DISCUSSION) to solve the problem(s). Use your notes on the 3x5-inch card to help you attack the problem(s)
- You are allowed to use a calculator
- Your grade will be determined from the weighted-average of your group and not from your individual performance. The highest grade will be weighted the most, and the lowest the least. Low grades will drag the average down, so it is in your best interest to collaborate during the discussion part of this quiz. All members of your team get the same grade, determined from that weighted average.

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1. Lightning occurs when friction in the atmosphere, due to collisions between ice crystals and water droplets, causes the build-up of a charge in clouds. Heavy, slightly negatively charged ice-water droplets fall to the bottom of the cloud while lighter, slightly positively charged ice crystals rise to the top of the cloud. Consider the sketch below of such a situation in clouds.

- a. What is the magnitude of the force exerted by a single, positively charged ice crystal at the top of the cloud on a single, negatively charged ice-water droplet at the bottom of the cloud, assuming the charges are separated by $2.0 \times 10^3 \text{ m}$? Assume that the magnitude of the charges are both equal to $3.0 \times 10^{-17} \text{ C}$.
- b. If a typical cloud-to-cloud lightning flash delivers 10.0 C of charge from one side of the cloud to the other, how many elementary charges are transferred?

