

Group Discussion Section Problems

Week 1– Electric Forces

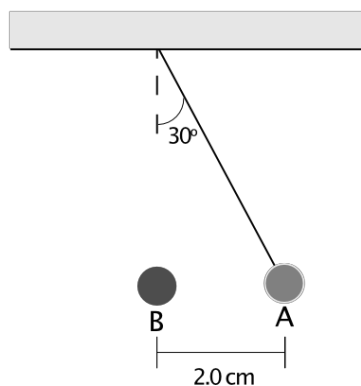
First, write your names on the group workspace to assist your TA in giving you bonus points.

Discuss with your group a method for answering the following two problems. Show your work as you go in your assigned workspace. Use the workspace to plan a strategy and to perform calculations. Your answer should be fully justified by the work shown.

All students must participate in having input into the decision-making process. This includes listening and considering contrarian ideas and hearing comments from each individual in the group equally. Please be supportive of one another.

Based on Problem 2 of Exam 1, Summer 2018

Charge B is fixed in space. Charge A, with a mass of 1 gram, dangles at the end of a string. When the end of the string is attached to the ceiling directly above charge B, charge A reaches equilibrium at a distance of 2cm from Charge B, with the string making an angle of 30 degrees with respect to the vertical, as shown in the figure below.



1. Draw the free body diagrams for each charge.
2. Using the free body diagram and Newton's 2nd Law, calculate the tension in the string.
3. Calculate the electrostatic force acting on charge A. Do the same for charge B.
4. If $q_A + q_B = +33.151 \text{ nC}$, calculate the charge on each object, assuming A is the object with the smaller charge.
5. Next, you attach a conducting wire to charges A and B. How many electrons flow in the wire until the two objects have the same charge? In what direction do these electrons flow?

CHECKPOINT: Raise your hand for the TA when you have an answer.
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