General Physics - E&M (PHY 1308) Lecture Notes

Homework001

SteveSekula, 26 August 2010 (created 20 August 2010)

Expectations for the quality of your handed-in homework are available at http://www.physics.smu.edu/sekula/phy1308

no tags

/homework.pdf. Failure to meet these guidelines will result in loss of points as detailed in that document. This assignment covers material from Wolfson Chapter 20. Each problem is worth 20 points, and the total assignment is worth 100 points.

This homework is due no later than 9:00am on Monday, August 30.

Reading Assignment:

Appendix A, Chapter 20 (All)

Problems:

Problem SS-1

A typical static electric shock from rubbing your feet on the carpet involves delivering about 2.0×10^8 C from your hand to the doorknob. How many electrons are transferred from your hand in the process?

Problem SS-2

Consider the static electric shock situation in SS-1. Assuming that just before the spark jumps from your hand to the doorknob that the charge on the doorknob has the same magnitude as the charge on your fingertip, what is the magnitude of the electric force between your fingertip and the

doorknob if they are 5.0mm apart?

Problem SS-3

The human heart lies about 40mm below the surface of the chest. It operates, in part, through the use of electric charge to induce a rhythmic contraction of the muscle tissue (systole). During the systolic phase of heart operation, when blood is forced through the heart, the net electrical charge in the heart is about 2.0×10^{-13} C. What is the magnitude of the electric field, emitted by the heart during systole, at the surface of the human chest?