

HW #1, Due January 21 at 9:00 am

Most of the assigned problems will be from your textbook. The course is aimed roughly at “level II” with a few simpler problems for warm-up and more difficult ones for extra challenge. Reading the book is essential – the text is not just a source of homework problems. Learning to use your textbook is essential to your success in this class.

A typical problem set will have ~12 problems and/or questions. I am happy to talk with you at any time if you need help with an assignment, but you should be in the habit of working on the problems yourself before asking for help. You will probably learn by working with other students, and discussion of the assigned problems is encouraged. However, *please make sure that the work you hand in reflects your understanding of the solution, and not someone else's.*

READING: In the first week we will cover all of Chapter 16 except sections 16-10, 16-11, and 16-12. We will cover section 16 -10 (Gauss's Law) next week. We will not cover section 16-11, but it is quite interesting, especially if you like biology. If you have an engineering bent, 16-12 is also interesting.

For all written work this semester, *show your work and briefly (in words or phrases) explain your reasoning.*

QUESTIONS: Ch. 16 # 6, 10, 14, 18

PROBLEMS: Ch. 16 # 1, 7, 10, 23

ADDITIONAL PROBLEMS:

- 1) A PVC rod is rubbed with wool and acquires a charge of $-3.8 \mu\text{C}$.
 - a) What is the charge in C?
 - b) How many electrons were transferred from the wool to the rod?

- 2) Three charged particles are placed at the corners of an equilateral triangle of side length 0.12 m. The charges are $Q_1 = +2 \text{ mC}$, $Q_2 = -3 \text{ mC}$ and $Q_3 = -4 \text{ mC}$. Determine the force on Q_3 due to the other two charges (magnitude and direction)? For direction, make a diagram and clearly show the direction of the force and give an appropriate angle.

- 3) An electron is sitting in an electric field with a magnitude of $1.2 \times 10^3 \text{ N/C}$.
 - a) What is the magnitude of the force on the electron?
 - b) If the field is pointing due south, what is the direction of the force on the electron?
 - c) What is the magnitude of the acceleration of the electron?
 - d) If the electron starts from rest, how long will it take to reach a speed of $1.2 \times 10^7 \text{ m/s}$?