

## Physics 540 Fall 2005 -- Numbers to memorize

**On exams, you will be expected to calculate numerical answers, without being given any of these basic numbers.**

You do not have to memorize this exact list, as long as the numbers you did memorize allow you to do equivalent calculations. For example, knowing that  $a_B = 0.529 \times 10^{-10}$  m allows you not to memorize all of  $h$ ,  $e$ , and  $m_e$ . From a knowledge of Avogadro's number and the chemical definition of a mole, you can get the atomic mass unit in g.

$$k_B = 1.38 \times 10^{-23} \text{ J/K}$$

$$N_A = 6.022 \times 10^{23} \text{ molecules/mole}$$

$$h/2\pi = 1.054 \times 10^{-34} \text{ Js}$$

$$e = 1.602 \times 10^{-19} \text{ C}$$

$$m_e = 0.911 \times 10^{-30} \text{ kg}$$

$$1 \text{ amu} = 1.66 \times 10^{-27} \text{ kg}$$

$$\mu_B = 0.927 \times 10^{-23} \text{ J/T (the Bohr Magneton)}$$

In addition to fundamental constants, of course, you do have to memorize a few other numbers. The ones that come to mind are

$$0^\circ\text{C} = 273.15 \text{ K}$$

$$1 \text{ atm} = 10^5 \text{ Pa (actually } 1.013 \times 10^5 \text{ Pa, and 1 "Pascal" is } 1 \text{ N/m}^2\text{.)}$$

You probably have your own list of things you keep in your head, like 22.4 liters per mole at STP, which would enable you to find how many pascals pressure is one atmosphere from the ideal gas formula, if you remember what "STP" is.