Here is the first extra credit problem. Turn in an answer (hard copy, or email copy) by next Wednesday, January 15, to earn either one point extra credit (if you turn in something that is an attempt), two points (if you made a decent attempt at the problem) or three points (if you get the problem correct).

Work together in groups of 2-4. (If it is impossible to get together with someone, I'll accept individual submissions, but I prefer group submissions).

Phosphate is a triprotic acid with 3 pK's. pK_1=2.2, pK_2=7.2, pK_3=12.4. In a solution of 0.01 M phosphate buffer at pH 7.0 (i.e. concentration of all protonated species is 0.01 M), what is the M of each of the individual species, i.e. what are the following concentrations:

$[H_3PO_4]$, $[H_2PO_4^{-1}]$, $[HPO_4^{-2}]$, and $[PO_4^{-3}]$?

Show your work.

Dr. Light