CHEMISTRY 133
Spring, 2015 Homework Set 2.2 Additional Problem
Only Problems in Bold are Submitted for Grading

Additional Problems:

1. The transmittance of a dye is measured at 524 nm using a 1 cm cell in five samples. At this wavelength, the dye is known to have a molar absorbtivity of 63,200 M^{-1} cm^{-1}. Given the transmittance values in the table below, and assuming that the uncertainty on each transmittance measurement is a constant value of 0.008, calculate the concentration of each dye sample and its uncertainty. You may want to consult Harris Appendix C which covers propagation of uncertainty in such cases.

Dye Sample #	Transmittance (not given as a %)	Conc	Unc. Conc.
1	0.092	1.64×10^{-5} M	0.06×10^{-5} M
2	0.131	1.40×10^{-5} M	0.04×10^{-5} M
3	0.489	4.9×10^{-6} M	0.1×10^{-6} M
4	0.864	1.00×10^{-6} M	0.06×10^{-6} M
5	0.913	6.3×10^{-7} M	0.6×10^{-7} M

Conc. = C where C = A/εb and A = -logT or C = -logT/εb
If unc. = S, $S_C = [(\partial C/\partial T)^2 S_T^2]^{0.5} = |-S_T/(2.303\varepsilon bT)| = S_T/(2.303\varepsilon bT)$