Preview Sheet for Test 4 and Final, Thursday, May 4, 10:30 a.m. to 1:00 p.m.

Test 4 (50%)

- Chapters 12 and 23
- Lectures from 4/3 through 5/1; Problem Sets 8 and 9

Final (50%)

- All major topics this semester: gravimetric analysis, statistics, spectroscopy, activity and solubility, systematic treatment of equilibrium, acid-base chemistry, titrations, extractions, and chromatography

Instructions before starting the test:

1. Write your name in the space above and on the backs of pages 2-10.
2. Your exam booklet should have **eleven** pages total, with questions on pages 2-10, and a periodic table and other reference data on Page 11. Check to see you have 11 pages now. If you do not, ask for another copy of the exam.
3. **You may use as an additional reference a single sheet of 8.5"x 11" paper, both sides of which you may fill with information.**
4. Part 1 of this test, which is worth 50 points, consists of a series of mathematical and short essay questions focused on titrations and separations. Explain all relevant points completely and succinctly.
5. Part 2 of this test, which is worth 50 points, consists of 20 multiple-choice questions covering all major topics covered this semester. Each question is counted equally in determining your final exam score. Circle the best response to each question. You will not be penalized for incorrect answers. You do not need to justify your answers, and no partial credit will be awarded.
6. This exam will not be handed back, but it is your prerogative to come to my office to look over your exam after it is graded.
7. You may start this exam as early as 10:30 a.m. You must turn in your exam by 1:00 p.m.

Also note the formulas you will be given on the exam:

$$K_w = [H^+][OH^-] = K_a K_b = K_1 K_{b2} = K_2 K_{b1} = 1.0 \times 10^{-14} \qquad pK_w = pH + pOH = 14.00$$

$$q^n = \left(\frac{V_1}{V_1 + KV_2}\right)^n \qquad D = K + \frac{KK_a}{[H^+]} \qquad k_i' = \frac{t_i'}{t_m} = K_i \frac{V_s}{V_m} \qquad \alpha_{ij} = \frac{t_j'}{t_i'} = \frac{K_j}{K_i}$$

$$\frac{S_i}{S_{std}} = F\frac{[i]}{[std]} \qquad \Re_{ij} = \frac{\Delta t_r}{\overline{w}} = \frac{\sqrt{N}}{4}\left(1 - \frac{1}{\alpha_{ij}}\right)\left(\frac{k_j'}{1 + k_j'}\right) \qquad N = \frac{L}{H}$$

$$H = \frac{\sigma^2}{x} = A + \frac{B}{u_x} + Cu_x$$

It is your responsibility to write on your reference sheet other possibly useful equations.