Preview Sheet for Test 1

Chapters 0, 1, 3, 4, 27

Lectures from 1/22 through 2/9; Problem Sets 1, 2, and 3

The test will be on Thursday, February 15, in Olin-Rice **250**, starting at 8:30 a.m. You will have 2 hours and 30 minutes to work on the exam.

Studying Strategies:

- Focus on your lecture notes and homework first, then look at your lab handout and textbook. (See the course web page for class overheads and homework keys.)
- Do extra problems at the ends of the chapters.
- It is important to understand concepts from lecture not covered explicitly in the homework problems. These will typically be covered by short essay questions.
- If a topic was not covered in homework or in lecture, you are not responsible for it!

Test Format: Around 50 points based on calculations, and around 50 points based on short essay and a few multiple-choice questions. Here's a preview of the instructions:

1. Write your name in the space above and on the backs of the other pages.
2. Your exam booklet should have **11 pages** total, with questions on pages 2-8, formulas and constants on p. 9, statistical tables on p. 10, and a periodic table on p. 11. Check to see you have 11 pages now. If you do not, ask for another copy of the exam.
3. You may use programmable calculators, but chemical data should not be stored in them.
4. You are free to calculate means and standard deviations with your calculator, but do not use other statistical functions available on your calculator. Specifically, *t*-tests should be performed using the approaches presented in the class and in your text. This is to be fair to those who have not taken a statistics course, or who lack statistically savvy calculators.
5. Except for the multiple-choice questions, you should always demonstrate your thought process. You will be awarded credit only for clear, legible work.
6. You have a maximum of **2 hours and 30 minutes** to work on this exam.

Also note the formulas and constants you will be given on the exam (on back):

$$PV = nRT \qquad \bar{x} = \frac{\sum_i x_i}{n} \qquad d_i = x_i - \bar{x} \qquad s = \sqrt{\frac{\sum_i d_i^2}{n-1}} \qquad y = \frac{1}{\sigma\sqrt{2\pi}} e^{\frac{-(x-\mu)^2}{2\sigma^2}}$$

$$z = \frac{x-\mu}{\sigma} \qquad \text{CI} = \bar{x} \pm z\frac{\sigma}{\sqrt{n}} \qquad \text{CI} = \bar{x} \pm t\frac{s}{\sqrt{n}} \qquad \text{standard error} = \frac{s}{\sqrt{n}}$$

$$t_{calc} = \frac{|\mu - \bar{x}|\sqrt{n}}{s} \qquad t_{calc} = \frac{|\bar{x}_1 - \bar{x}_2|}{s_{pooled}}\sqrt{\frac{n_1 n_2}{n_1 + n_2}} \qquad s_{pooled} = \sqrt{\frac{s_1^2(n_1 - 1) + s_2^2(n_2 - 1)}{n_1 + n_2 - 2}}$$

$$t_{calc} = \frac{|\bar{d}|\sqrt{n}}{s_d} \qquad Q_{calc} = \frac{|\text{gap}|}{|\text{range}|}$$

$$e_y = \sqrt{\left(\frac{\partial y}{\partial x_1}\right)^2 e_{x_1}^2 + \ldots + \left(\frac{\partial y}{\partial x_n}\right)^2 e_{x_n}^2} \qquad e_y = a e_x \qquad e_y = \sqrt{e_{x_1}^2 + e_{x_2}^2}$$

$$\frac{e_y}{y} = \sqrt{\left(\frac{e_{x_1}}{x_1}\right)^2 + \left(\frac{e_{x_2}}{x_2}\right)^2}$$

$N_A = 6.022 \times 10^{23}$ mol^{-1} $R = 0.08206$ L atm mol^{-1} K^{-1} 1 atm = 760 torr

1 ppm =1 in 10^6 1 ppb = 1 in 10^9 1 ppt = 1 in 10^{12}

1 L = 1000 mL = 1000 cm^3 T (K) = T(°C) +273.15