

General Chemistry I
Problem Set 2 (on Chapter 3)
(Chapter 4 will not be covered on Test 1)
Due Wednesday, September 21, 2005 (at 5 p.m.)

Total points for this assignment = 44. Note that your eight highest problem set scores will be equally weighted in computing the homework portion of your cumulative score.

For the math problems, remember to show in writing the process by which you have obtained your answers. However, you do not need to justify how you determined molar masses. Final numerical answers must contain the correct number of significant figures (see pp. 25-29 of Silberberg and the class handout for rules) and have the right physical units attached to receive full credit. Remember to include at least one additional non-significant figure for any intermediate result you write down—this minimizes rounding error.

Also note the extent to which this problem set draws on “Chapter 2 material” on nomenclature. The relatively small number of nomenclature rules, names, and formulas you are asked to memorize is truly foundational for all of your subsequent work in chemistry.

1. Problem 3.17 (8 points)
2. Problem 3.29 (3 points) Note that your final answer should be a whole number; fractions of a Fe^{2+} ion are impossible!
3. Problem 3.40 (5 points) The subscripts in your empirical and molecular formulas should be whole numbers; again, fractions of atoms are impossible.
4. Problem 3.54 (4 points). Hint for part (d): Balance the S atoms first.
5. Problem 3.68 (5 points)
6. Problem 3.72 (5 points)
7. Problem 3.84 (7 points). Note the definition of percent yield:
$$\% \text{ yield} = \frac{\text{experimental mass of product}}{\text{theoretical mass of product}} \times 100\%$$

The theoretical mass is what one calculates from stoichiometry. The experimental mass will usually be a little (and sometimes a lot) lower than the theoretical mass. This can be attributed to a number of causes, such as loss of product on the sides of flasks or beakers, incomplete precipitation of product from solution, or the inefficiency of a particular reaction. Odds are that you will experience % yields less than 100% in lab this semester!
8. Problem 3.95 (3 points)
9. Problem 3.99 (4 points)