

## Chemistry 1061 Advising Guidelines (revised 6/5/07)

Prerequisites: (*all with grade of C or above*). These are printed in the course schedule and few, if any, exceptions to these are granted.

- MATH 0210 or appropriate math placement score (above 0210). MATH 1200 is recommended.
- CHEM 1020 or 1 year of high school chemistry

If the student meets these prerequisites, follow the checklist below to help determine if the student is adequately prepared for CHEM 1061. If the student feels comfortable with the following skills, check the appropriate boxes. The self-test questions on the next page can help determine competency in each area.

### Math:

- Has *recent* experience in basic and intermediate algebra (within the last few years), or has had a *recent* algebra brush-up.
- Can solve simple algebra equations for a variable.
- Can multiply and divide numbers and variables with exponents.
- Can convert between standard and scientific notation. (Covered in CHEM 1020)
- Has experience with simple unit conversions. (Covered in CHEM 1020)
- Is familiar with logarithms and can solve problems using log, ln and e. (Intended primarily for CHEM 1062)

*(If only three or less of the above boxes are checked, the student should consider taking another math course before attempting CHEM 1061. Preferably, the student should take MATH 1200 if possible. If only a brush-up is needed, "Essential Algebra for Chemistry Students" by David W. Ball can be used if completed carefully.)*

### Chemistry:

- Has *recent* chemistry experience within the last few years: above-average performance in a full-year of high school chemistry, one semester of chemistry 1020, or has had a *recent* chemistry brush-up.
- Understands difference between elements, compounds, and mixtures.
- Understands the difference between an atom, ion, and molecule.
- Has experience balancing chemical equations.
- Has experience with mole calculations and using Avogadro's number.

*(If only three or less of the above boxes are checked, the student should consider taking CHEM 1020 before attempting CHEM 1061.)*

### Other skills

- Has some experience with computers.** Chem 1061 makes extensive use of Microsoft Word and Excel programs in lab. While the first two labs orient the students to Excel, a student with no experience with computers may have trouble keeping up. An introductory computer course would help.
- Is prepared to take a course with a significant outside-class study time requirement.** You should expect to devote about 8 hours per week outside class for homework, lab reports, and studying.

## Chemistry 1061 self-test questions

### ☐ Solve simple algebra equations for a variable

1.  $\frac{8}{a} + 5 = 1$ .  $a = ?$

2.  $2(8-m) = 10$ .  $m = ?$

### ☐ Convert between standard and scientific notation

3. Convert  $4.3 \times 10^{-2}$  to standard notation.

4. Convert 0.000 000 012 to scientific notation.

### ☐ Multiply and divide numbers and variables with exponents

5.  $\frac{x^3}{x^{-2}} = ?$

6.  $(10^4)(10^{-2})(10^3) = ?$

### ☐ Convert units

7.  $1 \text{ nm} = 10^{-9} \text{ m}$ . 450 nm is equal to how many m?

8.  $1 \text{ kcal} = 4.184 \text{ kJ}$  and  $1 \text{ kJ} = 10^3 \text{ J}$ . How many J are equal to 2.83 kcal?

### ☐ Basic theory of logarithms (Intended primarily for CHEM 1062)

9.  $\log 10^4 = ?$  (without a calculator)

10.  $\ln\left(\frac{4}{x}\right) = 2$ .  $x = ?$  (with a calculator)

### ☐ Elements, compounds, and mixtures

11. Identify the following as elements, compounds, or mixtures: a. iron, b. water, c. sodium chloride, d. saltwater.

### ☐ Significant figures in calculations

12.  $4.28 + 1.3 + 9.331 = ?$  (with the correct number of significant figures)

13.  $3.235\left(\frac{2.36}{1.4}\right) = ?$  (with the correct number of significant figures)

### ☐ Atoms, ions, and molecules

14. Identify whether the following substances are made of individual atoms, ions, or molecules:  
a. Al, b.  $\text{CH}_4$ , c. NaCl, d.  $\text{NaNO}_3$

### ☐ Balance chemical equations

15. Balance this equation:  $\text{C}_3\text{H}_8 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$

### ☐ Mole calculations

16. How many Fe atoms are in 2.83 mol Fe? (Avogadro's number =  $6.022 \times 10^{23}$  particles/mol)

17. How many moles Fe are in 128.4 g Fe? (Molar mass Fe = 55.85 g/mol)

18. In the reaction  $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$ , how many grams  $\text{O}_2$  will react with 4.23 g  $\text{H}_2$ ? (Molar mass  $\text{H}_2 = 2.016 \text{ g/mol}$ , molar mass  $\text{O}_2 = 32.00 \text{ g/mol}$ )

### Answers:

1.  $a = -2$ ; 2.  $m = 3$ ; 3. 0.043; 4.  $1.2 \times 10^{-8}$ ; 5.  $x^5$ ; 6.  $10^5$ ; 7.  $4.5 \times 10^{-7} \text{ m}$ ; 8.  $1.18 \times 10^4 \text{ J}$ ; 9. 4; 10.  $(4/e^2) = 0.541$ ; 11. a. element, b. compound, c. compound, d. mixture; 12. 14.9; 13. 5.5; 14. a. atoms; b. molecules, c. ions, d. ions; 15.  $\text{C}_3\text{H}_8 + 5\text{O}_2 \rightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$ ; 16.  $1.70 \times 10^{24}$  Fe atoms; 17. 2.299 moles; 18. 33.6 g  $\text{O}_2$