Homework #1 BCHS 3304 – *Spring 2011*
Review of Basic Calculations, Life, Thermodynamics, and Water

Note: This homework will not be collected. However, quizzes and exams will assume that you have completed and understand the homework assignment and can answer related questions.

Reading Assignment: Chapter 1 of *Biochemistry*
Chapter 2 of *Biochemistry*.

Show all work and remember to incorporate your units throughout your calculations.

1. Convert using scientific notation to liters: 8 nanoliters, 22 microliters, 40 milliliters, 9 deciliters, 6 kiloliters.

2. Convert using scientific notation to grams: 6.1 mg, 22 μg, 21 mg, 103 ng, 10 kg.

3. You have just begun your Senior Honor's Thesis. Your advisor asks you to make a series of stock solutions. She also explains that you may use a pH meter to adjust the pH. Calculate how much of the solid reagent you would add to make the following:

A. 200 ml 1 M Tris, pH 8.0 (MW=121.4 g/mole)
B. 1.0 L 5 M NaCl (MW= 58.44 g/mole)
C. 10 ml 100 mg/ml ampicillin (MW=371.4 g/mole)
D. 200 ml 0.5 M EDTA (ethylene diamine tetra-acetic acid; MW=292.2 g/mole)
E. 500 ml 1 M $MgCl_2$ (Note: $MgCl_2$ is sold by the chemical company as co-crystallized with H_2O. Thus, the MW of $MgCl_2 \cdot 6H_2O$ is 203.30 g/mole)

4. For your first experiment, you need to make a solution that is commonly called TE and stands for **T**ris-**E**DTA. It is comprised of 10 mM Tris, 1 mM EDTA, pH 8.0. Calculate and describe how you would make 200 ml of TE using the stock solutions that you have already made above in #3.

5. Complete the following problems from Chapter 1 (p. 4-6) in the *Student Companion to Biochemistry:* Problems # 1, 4, 8, 9, 10, 12, 13, 15, 17, 18.

6. Complete the following problems from Chapter 1 (p. 20-21) in your *Biochemistry* textbook*:* Problems # 1-13.

7. Complete the following problems from Chapter 2 (p. 14-16) in the *Student Companion to Biochemistry*: Problems # 1, 3, 4, 8-10, 12-14, 16.

8. Complete the following problems from Chapter 2 (p. 37-38) in your *Biochemistry* textbook: Problems # 1, 3, 8, 9, 10, 11, 16, 17.