Homework #1 BCHS 3304 – *Fall 2009*
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. 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. 500 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. 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 MgCl2 $6H_20$ is 203.30 g/mole)

2. For your first experiment, you need to make a solution that is commonly called TE and stands for Tris-EDTA. It is comprised of 10 mM Tris, 1 mM EDTA, pH 8.0. Calculate and describe how you would make 100 ml of TE using the stock solutions (stock EDTA: 0.5 M EDTA pH 8.0) or that you have already made above in #3.

3. Complete the following problems from Chapter 1 (p. 6-8) in the *Student Companion to Biochemistry:* Problems # 2, 4, 5, 8, 9, 10, 12, 13, 15, 17, 18, 19.

4. Complete the following problems from Chapter 1 (p. 20-21) in your *Biochemistry* textbook: Problems # 1-3, 5-13.

5. Complete the following problems from Chapter 2 (p. 17-19) in the *Student Companion to Biochemistry*: Problems # 1, 3, 4, 7-13, 15-17, 19.

6. Complete the following problems from Chapter 2 (p. 38-39) in your *Biochemistry* textbook: Problems # 1-4, 6, 7, 8, 9, 10-13, 15-17, 20.

Homework #2 BCHS 3304 – *Fall 2009*

Basic Calculations, Amino Acids

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

Reading Assignment: Chapter 4 of *Biochemistry*.

Study Exercises: Chapter 4, p. 92,#1-3

Memorization Assignment: You should be able to draw the structures of each of the twenty amino acids.

You should know the 3 letter and 1 letter code for each amino acid.
You do NOT have to memorize structures for non-standard amino acids.
Show all work and remember to incorporate your units in your calculations.

1. Your advisor asks you to make two concentrated stock solutions for the whole laboratory to use. She explains that it is common to make a concentrated solution to dilute for use. Thus, a 10x solution refers to one that is 10-fold concentrated. Calculate how you would make 1.0 L of each of the following:

A. 10x TBE (0.9 M Tris, 0.9 M Boric Acid, 20 mM EDTA)
Tris MW=121.4 g/mole
Boric Acid MW=61.84 g/mole
EDTA MW=292.2 g/mole

B. 50x TAE (2 M Tris, 2 M Acetic acid, 0.5 M EDTA)
Tris MW=121.4 g/mole
Concentrated Acetic acid (glacial) comes as a solution and is 17.4 M
EDTA MW=292.2 g/mole

2. Draw the structure for Methionine. What is its three-letter code? What is its one-letter code?

3. Draw the structure for Cysteine. What is its three-letter code? What is its one-letter code?

4. Complete the following problems from Chapter 4 (p. 40-45) in the *Student Companion to Biochemistry*: Problems # 2, 5, 6, 7, 8, 10, 13, 14, 17, 18.

5. Complete the following problems from Chapter 4 in (p. 92-93) your *Biochemistry* textbook: Problems # 1, 3, 6, 7, 14.