

Homework #2 BCHS 3304 – Spring 2011

Basic Calculations, Amino Acids, Protein Structure and Purification

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

Reading Assignment: Chapter 4 of *Biochemistry*.
Chapter 5 of *Biochemistry*

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. Your polyacrylamide gel electrophoresis experiment requires 1.0 L of 0.5x TBE. Calculate and describe how you would make this solution using your stock solutions.
3. Your agarose gel electrophoresis experiment requires 500 ml of 1x TAE. Calculate and describe how you would make this solution using your stock solutions.
4. Draw the structure for Methionine. What is its three-letter code? What is its one-letter code?
5. Draw the structure for Cysteine. What is its three-letter code? What is its one-letter code?
6. Complete the following problems from **Chapter 4** (p. 35-39) in the *Student Companion to Biochemistry*: Problems # 2, 5, 6, 7, 10, 11, 13, 20, 21.
7. Complete the following problems from **Chapter 4** in (p. 89-90) your *Biochemistry* textbook: Problems # 1, 3, 6, 7, 15.
8. Complete the following problems of **Chapter 5** (p. 52-57) in the *Student Companion to Biochemistry*: Problems # 1, 6, 8, 9, 11, 13, 14, 16, 22.
9. Complete the following problems **Chapter 5** (p. 121-123) in your *Biochemistry* textbook: Problems # 2, 4, 12, 15, 17.