

**Homework #4 BCHS 3304 – Spring 2011**  
***Basic Calculations, Enzymes Catalysis***

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 11 of *Biochemistry*.

*Note: Show all work and remember to incorporate your units in your calculations.*

1. Your thesis advisor asks you to do your first restriction digest. This is a molecular biology technique that uses enzymes to cut DNA at specific sites. You are excited to hear that there are no solutions to be made up because your advisor has purchased enzymes from the Promega company and the concentrated stocks of reaction buffer including 10x buffer and 100x BSA (bovine serum albumen) come with the enzyme. The enzyme you need is EcoRI and it has a stock concentration of 1 U/ $\mu$ l. Your DNA concentration is 5  $\mu$ g/ $\mu$ l. You need to set up a 50  $\mu$ l reaction which incorporates 1  $\mu$ g DNA, 1x buffer, 1x BSA, and 0.5 U EcoRI. Calculate and describe how much of each stock solution, DNA, enzyme and water you would add to make up your restriction digest reaction.
2. After your reaction has been running for 1 hour, you need to check the progress of the restriction digest by agarose gel electrophoresis. You need to make 100 ml of a 1% solution of agarose in 1x TAE. You remember that you made up a 50x TAE stock solution about a month ago. Calculate and describe how you would make your agarose gel.
3. Calculate and describe how you would make 20 ml of 10 mg/ml BSA (bovine serum albumen). BSA is a protein that is commonly incorporated into biochemistry experiments. It is sold as a dry powder.
4. Complete Problems # 1, 2, 3, 4, 5, 9, 12, 18 of Chapter 11 (p. 360-362) in your *Biochemistry* textbook.
5. Complete Problems # 1-4, 6-9, 10-13, 16, 21, 23, 26, and 27 of Chapter 11 (p. 127-131) in the *Student Companion to Biochemistry*.
6. Who won the Nobel Prize in Chemistry 2009? What discovery did this person or people make that it is worthy of a Nobel Prize, and how is this discovery to what we are currently studying in Biochemistry 3304?