

## Homework 8

**Distributed: Monday, March 19, 2001****Due: Friday, March 23, 2001**

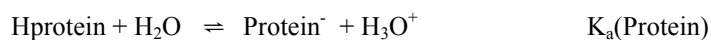
Name \_\_\_\_\_ Recitation Section (circle one): Dan: 9:30 10:30 Aimee: 9:30 10:30

This homework uses the virtual lab. Using a computer that is running Microsoft windows, go to <http://ir.chem.cmu.edu> and click on "Virtual Lab" in the upper left-hand corner. You can then either,

- Run the lab as a Java Applet in a web browser by clicking on "Run the applet >>".
- Download and install the lab on your computer, by clicking on "download" at the bottom of the page.

To load the assignment, select "Load Homework..." from the "File" menu, and select "Chem106: Homework 8".

This assignment utilizes a protein that acts as a weak acid, according to the equation:



1) (2 pts) The cabinet named Homework 8 contains a solution labeled "Protein". This solution contains a dilute mixture of the protein and HCl. What is  $K_a$  of the protein? (Please show your work.)

$K_a =$  \_\_\_\_\_

2) (3pts) Based on your answer to part 1, at what pH will the ratio  $[\text{Protein}^-]/[\text{Hprotein}] = 0.75$ ? (Please show your work.)

pH = \_\_\_\_\_

3) (5pts) Create 100ml of solution such that when you add between 1 and 5ml of the protein solution of part 1, the ratio  $[\text{Protein}^-]/[\text{Hprotein}] = 0.75$ . Please test that your solution works. Also please describe what you did, and report the solutions and amounts you mixed together to make your 100ml solution.