**PRE-LAB EXERCISE**

*Please finish the following exercises before conducting the experiment and bring the answers to the lab section. These exercises consist of 5 questions and are worth a total of 100 points, counted as 3 points of the final grade. These pre-lab exercises cover contents of Experiment E2. Please study the corresponding lab manual carefully before doing these exercises.*

***Question 1 (20 points)***

Define the term “common–ion effect” used in the BACKGROUND section. How do

buffers work by taking advantage of the common-ion effect?

***Question 2 (10 points)***

Give an example of a salt that could be used to make a buffer with NH3.

***Question 3 (20 points)***

If solution A has pH of 3.23 and solution B has pH of 4.23, what is their relationship in terms of [H+]? Analyze mathematically.

***Question 4 (20 points)***

What is the relation between the concentration of buffer components and the buffer capacity? Explain.

***Question 5 (10 points)***

For a buffer having a [base]/[acid] ratio of 1:1, what is the relationship between pH and pKa?

***Question 6 (20 points)***

Using Equations 1 and 2 in the lab manual as models, write the acid dissociation reaction and Ka value for acetic and calculate its pKa value (also record these expressions in your laboratory notebook so you will have them available during the experiment).