Unit 4: Review
Acids, Bases and pH

I. Using indicators to measure pH

Anthocyanins are plant pigments that can be used as a pH indicator because they change color in response to changes in pH. These pigments are responsible for red, blue, and purple colors that are found in flowers, fruits, and autumn leaves. Anthocyanins were extracted from red cabbage.

Making a set of standards

Seven test tubes were prepared that resemble those below. Colors may vary depending on the concentration of the cabbage extract.

Determining the pH of unknown solutions

Compare the color of your unknowns to your standards to estimate pH. When reading results it is best to place test tubes against a white background.

II. The pH meter and pH paper

When greater accuracy and reliability are needed for the determination of pH, electrometric methods (pH meters) are used. Before a pH meter can be used, it must be calibrated. The pH meter should be calibrated every couple of hours.

The pH meter and pH paper continued

Measuring pH of various solutions using a pH meter

Rinse the electrode with distilled water at the start, between reading and at the end of the exercise.
Measuring pH of various solutions using a pH paper

The pH paper is orange in color (before use) and changes color depending on the pH being tested. Look at the pH key to determine the pH of the solution ranging from 1-12.

III. Buffers

Determining the buffering capacity of a solution

You recorded the pH of two solutions as their buffering capacities were tested with the addition of acid and then base. By plotting your results on a graph, you determined which of the two solutions was the better-buffered solution.

A buffer in solution reduces dramatic changes in pH when an acid or base is added to the solution. The graph of a good buffer will resemble the one below.

IV. How effective are stomach antacids?

Four beakers were labeled: control, Rolaids®, Alka-Seltzer®, and Tums®. To each beaker 50 ml of 0.3 N HCl was added. The initial pH of the HCl was measured.

A Rolaids®, Alka-Seltzer®, and Tums® tablet was dissolved into each of the respective beakers.

The final pH was measured. The antacid with pH closest to neutral is the one neutralizing the most acid.