

Experiment: Taking Crucibles to Constant Weight

1. What is the deadline for finding the constant weight of empty (clean) crucibles?
2. List all glassware or equipment that you will use in this experiment.
3. Why do you need to put the hot crucibles into the desiccator before you weigh them?
4. What does “ a precision of +/- 0.1 mg” mean?
5. What does “constant weight” mean?
6. Draw a flow chart for this experiment.

Experiment: Review of Laboratory Techniques

1. According to the manual, what is an important component of both volumetric flasks and weighing bottles?
2. What is density?
3. How do you use density to calculate volume?
4. What do “ppt” and “ppm” stand for?
5. What does “weight by difference to get a 0.4 grams sample with a precision of 0.1 mg” mean?
6. Draw a flow chart for this experiment.

Experiment: Gravimetric Determination of Nickel by Homogeneous Precipitation with Dimethylglyoxime

1. What type of glassware or tools will you use in this experiment? (maybe more than one, circle all possible)

Beaker Erlenmeyer Flask Volumetric flask Glass rod

Rubber police

2. What color is the precipitate?

Green Gray Red Blue Black

3. What organic reagent will you add to the nickel solution?

EDTA DMG Water Ammonia Cu

4. What is the pH of the solution?

pH > 7 pH = 7 pH < 7

5. Balance the reaction:



6. Draw a flow chart for this experiment.

Experiment: Acid-Base Titration-Standardization of HCl

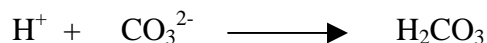
1. What does “standardization of HCl solution” mean?

2. How do you prepare a 1 Liter(L) 0.1 M HCl from a 12 M HCl solution?

3. How many grams of sodium carbonate (Na_2CO_3) do you need to neutralize 40 mL 0.1 M HCl solution?

4. What is the indicator used in the standardization of 0.1 M HCl, ?

5. Balance the reactions:



6. Draw a flow chart for this experiment.

Experiment: Ion Exchange Experiment

1. Use chemical equations to describe a back titration (even though we won't be using it in this experiment.)

2. What is the stoichiometric relationship in this experiment, i.e. one OH^- ion is equal to how many Cl^- ions in the unknown?

3. According to the procedure, how much deionized water do you need to wash the unknown through the column before you do the test for free base?

4. Draw a flow chart for this experiment.

Experiment: Complexometric Titration

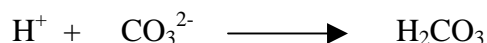
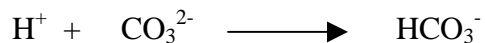
1. Since you learned the theory of back titration in the previous experiment, use an example to describe it. Don't use a chemical equation.
2. What is the pH of the ammonia/ammonium buffer solution?
 $\text{pH} > 7$ $\text{pH} = 7$ $\text{pH} < 7$
3. Why is Erio T usually mixed with NaCl before use?
4. Draw a flow chart for this experiment.

Experiment: The Use of Fluoride Ion Selective Electrode for the Determination of Fluoride in Drinking Water and Unknown Solution

1. How do you prepare a 100 mL 100 ppm F^- solution from a 0.1 M NaF standard solution?
2. Draw a flow chart for this experiment.

Experiment: Acid-Base Titration-Unknown

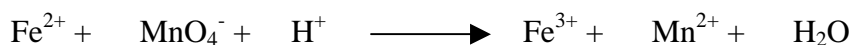
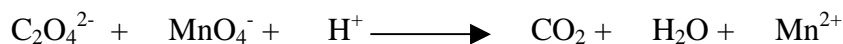
1. What is the equivalence point of an acid-base titration when a pH meter is used?
2. According to the manual, the titration curve shows two breaks when a diprotic acid is used. How many breaks do you see in the titration curve when a monoprotic acid is used?
3. What are the indicators used for the determination of the unknown carbonate?
4. Balance the reactions:



- How do you know the approximate equivalence point when you perform the titration by pH meter in this experiment?
- How do you plan to deliver HCl solution when you perform the titration using a pH meter in this experiment? Assume the first equivalence point for this experiment is around 13.30 mL and follow the suggestions in the manual (page 17?).
- Draw a flow chart for this experiment.

Experiment: Determination of Iron

- How much 0.1 M KMnO₄ stock solution is needed to prepare a 500 mL 0.02 M KMnO₄ solution?
- Balance the reactions:



- How do you prepare 1 liter of 0.9 M H₂SO₄ solution from 18 M H₂SO₄?
- What do you need to add to stannous chloride (SnCl₂) and mercury chloride (HgCl₂)? Use chemical equations to help explain.
- What is the indicator used in this experiment?
- As in the experiment of Acid-Base titration, how do you plan to deliver the KMnO₄ solution assuming the equivalence point from the previous unknown titration is 36.6 mL.
- Draw a flow chart for this experiment.

Experiment: The Spectronic 20 Spectrophotometer & Spectrophotometric Determination of Manganese in Steel

- How many meters equal one nanometer (1 nm)?
- What is the function of the right-hand knob and the left-hand knob in the Spectronic 20 spectrophotometer?

3. According to the manual about the response of the Spectronic 20 spectrophotometer, what data do you determine for the experiment? What information can you find from the manual? What results do you need to calculate?
4. How much 0.02 M KMnO_4 solution do you need to prepare a 250 mL 0.0004 M KMnO_4 solution? According to the manual, the amount of 0.02 M KMnO_4 is required to be more than 10 mL. If the calculated amount is less than 10 mL, what should you do?
5. After finishing the preparation of the solutions, which one do you pick to scan first? What is the scan procedure? Try using the diagram to describe the procedure (don't use words)
6. Balance the reaction:



7. Draw a flow chart for this experiment.