04a AP Determination of % Fe by Redox Titration (7951989)

| Question	1	2	3	4	5	6	7	8	9

Description
Basic Periodic Table

Instructions
Determination of % Fe by Redox Titration

Introduction: Acid-base titration is used to determine the quantitative relationship between two reacting solutions containing hydrogen ions and hydroxide ions. Titration methods can also be used to determine the amount of other ions in solution if the substance is oxidized or reduced to give a color change. Such a method works well to determine the amount of iron in an iron(II) salt using permanganate because the permanganate ion (MnO_4^-) is purple, but the Mn^{2+} is colorless: (unbalanced)

Fe^{2+} + MnO_4^- (purple) --> Fe^{3+} + Mn^{2+} (colorless)
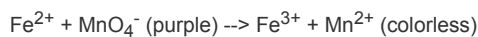
Materials: 250 mL flask, repipet, buret, balance, magnifying glass, index card, unknown Fe^{2+} salt, 0.0200 M $KMnO_4$, 6.0 N H_2SO_4

Objective: To determine the % Fe in an unknown salt.

Procedure:
1. Weigh out between 0.500 - 0.600 g of the unknown iron salt on the electronic balance using a plastic weighing dish. Record the mass. Transfer the salt to a 250 mL erlenmeyer flask.
2. Dissolve the iron salt in about 50 mL of distilled water in the 250 mL erlenmeyer flask. (use the approximate graduations on the flask to measure the 50 mL of water)
3. While wearing goggles, using the repipet, obtain10.0 mL of 6.0 N H_2SO_4 in the flask with the iron salt. Swirl to mix.
4. Titrate with 0.0200 M $KMnO_4$ until a faint pink color persists for 30 seconds. (if a brown precipitate forms, start over and make sure the acid was added) Discard the solution in the sink.
5. Repeat steps 1-4 for 1 careful trial.
6. Rinse the buret with water and leave it upside down with the valve open.
7. Record your data and calculations in the computer.
Data:
Mass of unknown salt:
Rapid Trial_____ Trial 1_____
Volume of $KMnO_4$:
Final Reading_____ Final Reading_____
Initial Reading_____ Initial Reading_____
Rapid Trial _____ Trial 1_____
Questions: (The questions below are in this sequence for a reason.)
1. Write the balanced equation for this reaction. The skeleton equation is written in the introduction. (Acid or base solution?)
2. Calculate the moles of MnO_4- using trial 1. (MnO_4- is 0.0200 M, K^+ is a spectator ion)
3. Calculate the moles of iron in the salt sample. (Hint: you need the balanced equation)

4. Calculate the mass of Fe in the sample.

5. Calculate the % of Fe in the sample using trial 1.

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1.   Question Details   Lab Partners [1837468]   ‑

Enter the name(s) of your lab partner(s). (If you worked by yourself, enter "none").

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2.   Question Details   Objective and procedure summary [3413760]   ‑

Restate the objective in your own words using complete sentences. Summarize the steps in your procedure. (Be sure and include any safety concerns).

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3.   Question Details   Upload Lab Photo [3413757]   ‑

Upload a photo of the lab apparatus with your face in the photo as you perform some part of the lab. Title the image with a unique file name before you upload it.(Maybe use your initials and part of the lab title) [Choose File] no file selected   It must be less than 5 MB in size.

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4.   Question Details   Determination of %Fe by Redox Titration Balance [1743296]   ‑

Write the balanced equation for the reaction in this experiment. (Use the lowest possible coefficients. Omit states-of-matter in your answer.)

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5.   Question Details   Determination of %Fe by Redox Titration [1743290]   _

a. Enter the experimental mass(from the balance) of the unknown salt for trial 1: [4.0]✓ [_____] g

b. Enter the initial reading of the buret for trial 1: [4.0]✓ [_____] mL

c. Enter the final reading of the buret for trail 1: [4.0]✓ [_____] mL

d. Calculate the volume of $KMnO_4$ used in trial 1: [4.0]✓ [_____] mL

e. Calculate the moles of MnO_4^- reacted in trial 1: [4.0]✓ [_____] mol

f. Calculate the moles of Fe in the sample: [4.0]✓ [_____] mol

g. Calculate the mass of Fe in the sample: [4.0]✓ [_____] g

h. Calculate the % of Fe in the sample: [4.0]✓ [_____] %

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6.   Question Details   Percent Error % Fe by Redox Lab [1743603]   _

Enter the percent of Fe in the unknown salt again (same number as question 5h):
[_____] %
You will probably get the red X on this question. The accuracy of your answer determines the number of points deducted.

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7.   Question Details   Observations, Skills utilized and learning [3413764]   _

What observations did you make during the lab? What chemistry concepts, laws, and/or skills were necessary to complete this lab? What did you learn or re-learn? Use complete sentences.

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8.   Question Details   Error discussion [3413763]   _

What are some specific sources of error, and how do they influence the data? Which measurement was the least precise? Does the error make the final value obtained larger or smaller than it should be (give at least one example and trace the steps)? If your calculated percent errors are significant, you must propose valid explanations here.
Instrumental error and human error exist in all experiments, and should not be mentioned as a source of error unless they caused a significant fault. Significant digits and mistakes in calculations are NOT a valid source of error. In writing this section it is sometimes helpful to ask yourself what you would do differently if you were to repeat the experiment and wanted to obtain better precision and accuracy. Use complete sentences.

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9.   Question Details   Upload Calculations (Show Work) [3418656]

Upload a photo of your calculations, showing your work. Make sure your name and the date are written on the page. Title the image with a unique file name before you upload it.(Maybe use your initials and part of the lab title and the word Calcs)

[Choose File] no file selected

Assignment Details

Name (AID): **04a AP Determination of % Fe by Redox Titration (7951989)**   **Feedback Settings**

Submissions Allowed: **5**   Before due date

Category: **Homework**   Question Score

Code: Assignment Score

Locked: **Yes**   Publish Essay Scores

Author: **Ryan, Matt (** mryan@allsaintsschool.org **)**   Question Part Score

Last Saved: **Sep 25, 2016 09:20 PM CDT**   Mark

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                                                                                Key

                                                                                Question Part Score

                                                                                Solution

                                                                                Mark

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