

DATA TABLE

Trial	Initial KMnO_4 volume (mL)	Final KMnO_4 volume (mL)	Initial FeSO_4 volume (mL)	Final FeSO_4 volume (mL)
1				
2				
3				

- Measure approximately 75 mL of 0.0200 M KMnO_4 , and pour it into the appropriately labeled beaker. Obtain approximately 75 mL of FeSO_4 solution, and pour it into the appropriately labeled beaker.
- Rinse one buret three times with a few milliliters of 0.0200 M KMnO_4 from the appropriately labeled beaker. Collect these rinses in the waste beaker. Rinse the other buret three times with small amounts of FeSO_4 solution from the appropriately labeled beaker. Collect these rinses in the waste beaker.
- Set up the burets as instructed by your teacher. Fill one buret with approximately 50 mL of 0.0200 M KMnO_4 from the beaker, and fill the other buret with approximately 50 mL of the FeSO_4 solution from the other beaker.
- With the waste beaker underneath its tip, open the KMnO_4 buret long enough to be sure the buret tip is filled. Repeat the process for the FeSO_4 buret.
- Add 50 mL of distilled water to one of the 125 mL Erlenmeyer flasks, and add one drop of 0.0200 M KMnO_4 to the flask. Set this mixture aside to use as a color standard. It can be compared with the titration mixture to determine the end point.
- Slowly add KMnO_4 from the buret to the FeSO_4 in the flask while swirling the flask. When the color of the solution matches the color standard you prepared in Preparation step 8, record in your data table the final readings of the burets.
- Empty the titration flask into the waste beaker. Repeat the titration procedure in steps 1 and 2 with the flasks labeled “2” and “3.”

CLEANUP AND DISPOSAL

- Dispose of the contents of the waste beaker in the container designated by your teacher. Also, pour the color-standard flask into this container. Wash your hands thoroughly after cleaning up the area and equipment.



ANALYSIS AND INTERPRETATION

- Organizing Ideas:** Write the balanced equation for the redox reaction of FeSO_4 and KMnO_4 .
- Evaluating Data:** Calculate the number of moles of MnO_4^- reduced in each trial.
- Analyzing Information:** Calculate the number of moles of Fe^{2+} oxidized in each trial.
- Applying Conclusions:** Calculate the average concentration (molarity) of the iron(II) sulfate solution.

PROCEDURE

- Record in your data table the initial buret readings for both solutions. Add 10 mL of the hydrated iron(II) sulfate solution, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, to the flask labeled “1.” Add 5 mL of 1 M H_2SO_4 to the FeSO_4 solution in this flask. The acid will help keep the Fe^{2+} ions in the reduced state, which will allow you time to titrate.

EXTENSIONS

- Designing Experiments:** What possible sources of error can you identify with this procedure? If you can think of ways to eliminate them, ask your teacher to approve your plan, and run the procedure again.