Procedure for Titration with Two Burets

Using two burets in a titration allows you to reach the endpoint quickly, and allows for a simple correction if you accidentally overshoot the endpoint.

1. Wash the burets: soap, water, buret brush.
   -Rinse with tap water.
   -Rinse with deionized water.
2. Rinse each buret twice (or 3 times) with about 5 mL of the solution to be used in it. Be sure to run solution through the tip each time.
3. Fill the burets with appropriate solutions. Drain until there are no air bubbles in tip.
4. Before starting, the level of liquid inside must be below the 0 mL mark. Do not waste time trying to make the buret read exactly 0.00 mL- this is totally unnecessary, and it tends to make your reading dishonest!
5. Read both burets to the nearest **0.01 mL** and record the readings. You must interpolate! Use a buret reader (a white piece of paper that has a solid colored line on it): hold it behind and slightly below the meniscus, so that it colors or darkens the meniscus. Read the very bottom of the dark part of the meniscus. Read the same part of the meniscus each time. If the solution is strongly colored, read the top of the meniscus. (Just make sure you read exactly the same part of the meniscus each time!) The first time you read your burets, ask your lab instructor for confirmation. A common mistake that inexperienced students make is to read the burets upside down, which will totally confuse your results.
6. Run acid (or the first solution) into the Erlenmeyer flask first. Use about 20-25 mL of this solution. Add 2-3 drops of indicator, if necessary. Add some deionized water, if necessary.
7. Run base (or the second solution) into the flask, while swirling. Periodically wash down the inner walls of the flask with a squirt from your wash bottle. Keep adding base until the solution changes color.
8. Slowly add more acid (or solution #1) just until the color disappears.
9. Add more base (solution #2), one drop at a time, swirling between drops and washing down the inner walls with deionized water, until 1 drop of base gives a "permanent" color change (that lasts at least 20 seconds). Stop. Read both burets and record the readings. You should now have an initial and a final reading for each buret.
10. If you overshoot the endpoint, or if you aren't sure, add more acid until the solution is colorless, and then slowly add more base, as above, until one drop gives a permanent color change.

When you are done, dump contents of the flask down the sink, and rinse the flask well with deionized water- it can be used again. (It doesn't need to be dry.)

Questions to consider:

- Why rinse burets with the solution to be used in them?
- Why is it OK to add water during the titration?
- What would happen if you forgot to add indicator?
- How would your results be affected if you had an air bubble in the tip which came out during the course of a titration? (Depends)

Procedure for Titration with One Buret

1. Wash the buret: soap, water, buret brush.
   -Rinse with tap water.
   -Rinse with deionized water.
2. Rinse the buret twice (or 3 times) with about 5 mL of the solution to be used in it. Be sure to run solution through the tip each time.
3. Fill the buret with the appropriate solution. Drain until there are no air bubbles in tip.
4. Before starting, the level of liquid inside must be below the 0 mL mark. Do not waste time trying to make the buret read exactly 0.00 mL- this is totally unnecessary, and tends to make your reading dishonest.
5. Read the buret to the nearest **0.01 mL** and record the reading. You must interpolate! Use a buret reader (a white piece of paper that has a solid colored line on it): hold it behind and slightly below the meniscus, so that it colors or darkens the meniscus. Read the very bottom of the dark part of the meniscus. Read the same part of the meniscus each time. If the solution is strongly colored, read the top of the meniscus. (Just make sure you read exactly the same part of the meniscus each time!) The first time you read your burets, ask your lab instructor for confirmation. A common mistake that inexperienced students make is to read the burets upside down, which will totally confuse your results.
6. Place a carefully measured amount of the first reactant into a 250 mL Erlenmeyer flask. It may be in the form of a solution (if so, measure with a pipet) or a solid (if so, weigh carefully, and add enough deionized water so that it completely dissolves). Add 2-3 drops of indicator, if necessary. Add deionized water, if necessary.
7. Run the second reactant from the buret into the flask, while swirling. Periodically wash down the inner walls of the flask with a squirt from your wash bottle. When you think you may be close to the endpoint, slow down. It is best to add the solution one drop at a time, swirling between drops and washing down the inner walls of the flask, near the endpoint. Keep adding until the solution changes color. When 1 drop of the solution gives a "permanent" color change (that lasts at least 20 seconds), stop. Read the buret and record the reading.
8. If you accidentally overshoot the endpoint (if you don't stop within one drop of the color change), you must redo the titration. You should use the results of the first trial to help you estimate when you are close to the endpoint for subsequent trials, so you will know when it is time to slow down.

When you are done, dump the contents of the flask down the sink, and rinse the flask well with deionized water- it can be used again. (It doesn't need to be dry.)

Questions to consider:

- Why rinse burets with the solution to be used in them?
- Why is it OK to add water during the titration?
- What would happen if you forgot to add indicator?
- How would your results be affected if you had an air bubble in the tip which came out during the course of a titration? (Depends)
- Why do you have to start over if you overshoot the endpoint?