Purpose: To neutralize a HCl solution of unknown concentration and to calculate its
                    concentration from the volume of NaOH used.

Materials: burettes, 250ml Erlenmeyer flask, 100ml beaker
Chemicals: $HCl_{(aq)}$, $NaOH_{(aq)}$, phenolphthalein

Procedure:

1.   From the burette labeled "A" (A = acid), let out some HCl of unknown
            concentration into a waste beaker. This step will get rid of any air bubbles
            from the tip of the instrument.

2.   Add more acid, and make sure that the bottom of the meniscus reads 0.00
            mL. If not, either add more HCl, or pour some out.

3.   Into a clean, dry Erlenmeyer flask, pour out exactly 20.00 mL of acid.

4.   Add 2 drops of phenolphthalein to the 20.00 ml of acid.

5.   From the burette labeled "B" (B = base), let out some NaOH whose
            concentration is 0.10 moles/L into a waste beaker. This step will get rid of
            any air bubbles from the tip of the instrument.

6.   Make sure that the bottom of the meniscus reads 0.00 mL. If not, either
            add more NaOH, or pour some out.

7.   Add the first 10mL of NaOH quickly, but be careful not to add more than
            10.

8.   ***Drop by drop***, and while stirring constantly, slowly add more NaOH until
            the first permanent and ***light pink*** colour appears (it should last for 30
            seconds; after that, it will gradually fade.) Then stop.

9.   Record this important volume of 0.10 M NaOH that's needed to neutralize
            the acid._____

Analysis: Since the ratio in which NaOH and HCl react is 1:1,
(NaOH + HCl → NaCl + H_2O),

we can calculate the HCl's unknown concentration by using

$C_1V_1 = C_2V_2$, where

C_2 = unknown concentration of the HCl
V_2 = HCl's volume
C_1 = NaOH's concentration, and
V_1 = volume of NaOH.

Show calculations:

Conclusion:

Things to include:

- Answer the purpose (don't repeat it).
- How was the purpose accomplished?
- Make sure to include the numerical result.

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