

EXP. NUMBER 1	EXPERIMENT/SUBJECT Qualitative Volumetric Analysis	DATE [REDACTED]	01
NAME [REDACTED]	LAB PARTNER	LOCKER/DESK NO.	COURSE & SECTION NO. L69 Chem 1A03

### Pre-Lab Questions

- i)  $1349 \times 8320 / 2338 = 4.80 \times 10^3$
- ii)  $24.3 - 9.25 + 0.328 = 1.54 \times 10^1$
- iii)  $6.78 \times 10^{-3} \text{ M} \times 23 \text{ mL} =$   
 $6.78 \times 10^{-3} \text{ M} \times 0.023 \text{ L} = 1.6 \times 10^{-4} \text{ mol}$

2. A 15.00 mL stock sample of HI is diluted to 65 mL. If 18.23 mL of 0.1231 M NaOH was required to reach equivalence point, what is the concentration of the stock HI solution?

At equivalence point, moles NaOH = moles HI

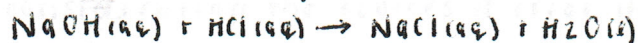
$$\text{Moles NaOH} = 0.01823 \text{ L} \times 0.1231 \text{ M} = 2.244 \times 10^{-3} \text{ mol NaOH}$$

$\therefore 2.244 \times 10^{-3} \text{ mol HI in } 15.00 \text{ mL}$

$$[\text{HI}] = \frac{2.244 \times 10^{-3} \text{ mol}}{0.01500 \text{ L}}$$

$$= 0.1496 \text{ M}$$

Purpose: To determine the concentration of an unknown NaOH solution using a stock, calibrated solution of HCl; to learn how to properly use volumetric analysis as a qualitative technique.



Procedure: The experiment was carried out as described in experiment one of the chemistry 1A03, 1E03 and 1A03 Laboratory Manual.

Observations:  $[\text{HCl}] = 0.2656 \text{ M}$

10.00 mL of HCl per titration.  
 $= 2.656 \times 10^{-3} \text{ mol HCl}$

Measurement	Titration #1	Titration #2	Titration #3
Initial Buret Reading (mL)	0.70	0.65	3.10
Final Buret Reading (mL)	26.50	26.80	28.30
Volume NaOH Used (mL)	25.80	26.15	25.20
Molarity NaOH (M)	0.1029	0.1016	0.1054

### Sample Calculations:

$$\begin{aligned} \text{Moles HCl} &= \text{Volume HCl} \times \text{Molarity HCl} \\ &= 10.00 \text{ mL} \times 0.2656 \text{ M} \\ &= 0.0100 \text{ L} \times 0.2656 \text{ M} \\ &= 2.656 \times 10^{-3} \text{ moles HCl} \end{aligned}$$

$$\begin{aligned} \text{Moles HCl} &= \text{Moles NaOH at Equivalence Point} \\ &= 2.656 \times 10^{-3} \text{ moles NaOH} \end{aligned}$$

$$\begin{aligned} \text{Molarity NaOH} &= \frac{\text{Moles NaOH}}{\text{Volume NaOH}} \\ &= \frac{2.656 \times 10^{-3} \text{ mol}}{0.0259 \text{ L}} \\ &= 0.1029 \text{ M} \end{aligned}$$

$$\begin{aligned} \text{Mean Molarity NaOH} &= \frac{0.1029 + 0.1016 + 0.1054}{3} \\ &= 0.1033 \text{ M} \end{aligned}$$

Conclusion: The average / mean molarity of NaOH was 0.1033 M.

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