# 1.9.7.2: Practice Solution Concentration

**Exercise 1.9.7.2.1**

How many grams of glucose (molar mass = 180.18 g/mol) are dissolved in 175 mL of a 2.00 M solution?

**Answer**

63.1 g. (0.350 moles)

**Exercise 1.9.7.2.1**

How many mL of 5.25 M HCl solution would be needed to react with 6.00 g of Zn in the reaction below?

$Zn_{(s)} + 2\ HCl_{(aq)} \text{ --> } ZnCl_{2\ (aq)} + H_{2\ (g)}$

**Answer**

35.0 mL (0.0350 L, 0.184 moles)

## Titration Problems

**Exercise 1.9.7.2.1**

You perform the titration below on 12.00 mL of $H_2SO_4$ solution. You find that it takes 26.44 mL of 0.4483 M NaOH to react completely. What is the concentration of the $H_2SO_4$ solution?

$H_2SO_{4\ (aq)} + 2\ NaOH_{(aq)} \rightarrow Na_2SO_{4\ (aq)} + 2\ H_2O_{(l)}$

**Answer**

0.4939 M $H_2SO_4$

You perform the titration below on 20.00 mL of HCl solution. You find that it takes 18.72 mL of 0.3786 M NaOH to react completely. What is the concentration of the HCl solution?

$HCl_{(aq)} + NaOH_{(aq)} \rightarrow NaCl_{(aq)} + H_2O_{(l)}$

**Answer**

0.3544 M HCl

You perform the titration below on 15.00 mL of HCl solution. You find that it takes 26.44 mL of 0.1352 M $Ba(OH)_2$ to react completely. What is the concentration of the HCl solution?

$2\ HCl_{(aq)} + Ba(OH)_{2\ (aq)} \rightarrow BaCl_{2\ (aq)} + 2\ H_2O_{(l)}$

**Answer**

0.4766 M HCl

## Solution Stoichiometry

**Exercise 1.9.7.2.1**

In the reaction below, what volume of 0.7644 M $Pb(NO_3)_2$ solution is needed in order to make 37.06 g $PbCl_2$? (Molar mass of $PbCl_2$ is 278.1 g/mol. NaCl is in excess.)

$Pb(NO_3)_{2\ (aq)} + 2\ NaCl_{(aq)} \rightarrow 2\ NaNO_{3\ (aq)} + PbCl_{2\ (s)}$

**Answer**

174.3 mL (0.1743 L)

In the reaction below, what volume of 0.3805 M $Pb(NO_3)_2$ solution is needed to react with 455.0 mL of 0.6322 M NaCl solution?

$Pb(NO_3)_{2\,(aq)} + 2\ NaCl_{\,(aq)} \rightarrow 2\ NaNO_{3\,(aq)} + PbCl_{2\,(s)}$

**Answer**

378.0 mL (0.3780 L)

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