

Worksheet: Solution Stoichiometry, Dilution

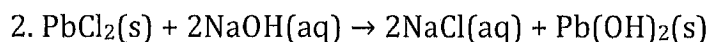
Key

1. Start with 5.0L of 7M acetic acid. Dilute to 20.L, what is new molarity?

$$M_i V_i = M_f V_f$$

$$(5.0)(7) = (20.)(M_f)$$

$$M_f = \boxed{1.75 \text{ M}}$$



79g PbCl_2 , 13M NaOH, how many mL of NaOH will react with PbCl_2 ?

$$79 \text{ g PbCl}_2 \times \frac{1 \text{ mol PbCl}_2}{278.1 \text{ g PbCl}_2} = 0.284 \text{ mol PbCl}_2 \times \frac{2 \text{ mol NaOH}}{1 \text{ mol PbCl}_2} = 0.568 \text{ mol NaOH}$$

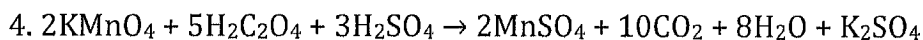
$$\frac{0.568 \text{ mol NaOH}}{13 \text{ M NaOH}} = 0.0437 \text{ L} \times \frac{1000 \text{ mL}}{1 \text{ L}} = \boxed{43.7 \text{ mL NaOH}}$$

3. A bottle of 12.0M HCl has only 35.7mL left in it. What will the HCl concentration be if the solution is diluted to 250.0mL?

$$M_i V_i = M_f V_f$$

$$(12.0)(0.0357) = (M_f)(0.2500)$$

$$M_f = \boxed{1.71 \text{ M}}$$



How many mL of a 0.250M KMnO_4 solution are needed to react completely with

3.225g of oxalic acid?

$$3.225 \text{ g H}_2\text{C}_2\text{O}_4 \times \frac{1 \text{ mol H}_2\text{C}_2\text{O}_4}{90.04 \text{ g H}_2\text{C}_2\text{O}_4} = 0.0358 \text{ mol H}_2\text{C}_2\text{O}_4 \times \frac{2 \text{ mol KMnO}_4}{5 \text{ mol H}_2\text{C}_2\text{O}_4} = 0.0143 \text{ mol KMnO}_4$$

$$\frac{0.0143 \text{ mol KMnO}_4}{0.250 \text{ M}} = 0.0573 \text{ L KMnO}_4 \times \frac{1000 \text{ mL}}{1 \text{ L}} = \boxed{57.3 \text{ mL KMnO}_4}$$