

Carmen ID KEY Rec. Instr. \_\_\_\_\_  
Two-Digit Section No. \_\_\_\_\_ Lab. Instr. \_\_\_\_\_

1. [10 points] Name the following compounds:

- a)  $(\text{NH}_4)_2\text{CO}_3$  Ammonium carbonate  
b)  $\text{Na}_3\text{N}$  Sodium nitride  
c)  $\text{K}_2\text{O}$  Potassium oxide  
d)  $\text{SO}_3$  Sulfur trioxide  
e)  $\text{Ba}(\text{CN})_2$  Barium cyanide

2. [10 points] What is the molarity of KOH if 25.0 mL of that solution are required to neutralize 0.450 g of  $\text{H}_2\text{C}_2\text{O}_4$ ?

$2(1.008)$   
 $- 2(12.011)$   
 $- 4(15.999)$   


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 $90.034 \text{ g/mole}$   
 ↑  
 molecular wt  
 of  
 $\text{H}_2\text{C}_2\text{O}_4$

$2\text{KOH}(\text{aq}) + \text{H}_2\text{C}_2\text{O}_4(\text{aq}) \rightarrow \text{K}_2\text{C}_2\text{O}_4(\text{aq}) + 2\text{H}_2\text{O}(\text{l})$

$0.450 \text{ g } \text{H}_2\text{C}_2\text{O}_4 \left| \frac{\text{mole } \text{H}_2\text{C}_2\text{O}_4}{90.034 \text{ g}} \right| \frac{2 \text{ mole KOH}}{1 \text{ mole } \text{H}_2\text{C}_2\text{O}_4} \left| \frac{\text{Chem. Eq.}}{\text{mole KOH}} \right| \frac{\text{volume of KOH soln}}{0.0250 \text{ liters}} = 0.3998489 \text{ M}$

↓  
**0.400 M**

m.w. of  $\text{H}_2\text{C}_2\text{O}_4$  ↑  
 moles  $\text{H}_2\text{C}_2\text{O}_4$  ↑  
 Chem. Eq. ↑  
 moles KOH ↑  
 volume of KOH soln ↑

3. [10 points] How many mL of 0.00500 M  $\text{Ba}(\text{OH})_2$  solution is needed to precipitate all the  $\text{SO}_4^{2-}$  from 40.0 mL of a 0.0100 M  $\text{Na}_2\text{SO}_4$  solution?

$\text{Ba}(\text{OH})_2 + \text{Na}_2\text{SO}_4 \rightarrow \text{BaSO}_4(\text{s}) + 2\text{NaOH}(\text{aq})$

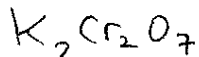
$0.0400 \text{ liter} \left| \frac{0.0100 \text{ moles } \text{Na}_2\text{SO}_4}{\text{liter}} \right| \frac{1 \text{ mole } \text{Ba}(\text{OH})_2}{1 \text{ mole } \text{Na}_2\text{SO}_4} \left| \frac{\text{Chem. Eq.}}{\text{mole } \text{Ba}(\text{OH})_2} \right| \frac{\text{liter}}{0.00500 \text{ moles } \text{Ba}(\text{OH})_2} \left| \frac{1000 \text{ mL}}{\text{liter}} \right| = 80.0 \text{ mL of } 0.00500 \text{ M } \text{Ba}(\text{OH})_2$

moles  $\text{Na}_2\text{SO}_4$  ↑  
 Chem. Eq. ↑  
 moles  $\text{Ba}(\text{OH})_2$  ↑

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1. [10 points] Write formulas for the following compounds:

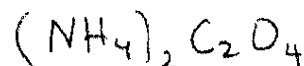
a) potassium dichromate



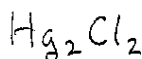
b) hypochlorous acid



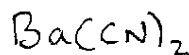
c) ammonium oxalate



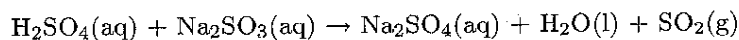
d) mercury(I) chloride



e) barium cyanide



2. [10 points] How many mL of 0.0200 M  $Na_2SO_3$  are required to neutralize 40.0 mL of  $2.00 \times 10^{-2}$  M  $H_2SO_4$ ?

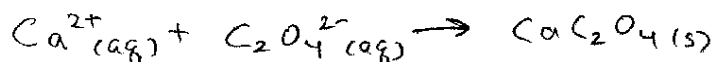


0.0400 L $H_2SO_4$	$2.00 \times 10^{-2}$ moles $H_2SO_4$	1 mole $Na_2SO_3$	liter	1000 mL
	liter	1 mole $H_2SO_4$	$0.0200$ mole $Na_2SO_3$	liter

↑ moles  $H_2SO_4$ 
↑ Chem Eq
↑ moles  $Na_2SO_3$

$$= 40.0 \text{ mL}$$

3. [10 points] What volume of 0.0500 M  $Ca^{2+}(aq)$  solution is required to precipitate all the oxalate ion,  $C_2O_4^{2-}$ , in 0.100 liter of a 0.0750 M  $C_2O_4^{2-}(aq)$  solution?



0.100 liter	$0.0750$ moles $C_2O_4^{2-}$	1 mole $Ca^{2+}$	liter	=	0.150 liters of 0.0500M $Ca^{2+}(aq)$ required
	liter	1 mole $C_2O_4^{2-}$	$0.0500$ moles $Ca^{2+}$		

↑ moles  $C_2O_4^{2-}$ 
↑ Chem Eq