

1. Write the stock and classical name where applicable for the following:

	Stock	Classical
a. $V_2O_5$		
b. $Cu_3N_2$		
c. $HF_{(aq)}$		
d. $H_2SeO_{3(aq)}$		
e. $CuCl_2 \cdot 9 H_2O$		
f. $Cu(HSO_4)_2$		
g. $(CH_3COO)_4Pb$		
h. $CCl_4$		

2. Iron (III) oxide solution reacts with nitric acid.

- Write the balanced chemical equation.
- What type of reaction is this?
- Write the total dissociated ionic equation.
- Write the net ionic equation.

3. 3.00 g of magnesium oxide is reacted with 5.00 g of hydrochloric acid.

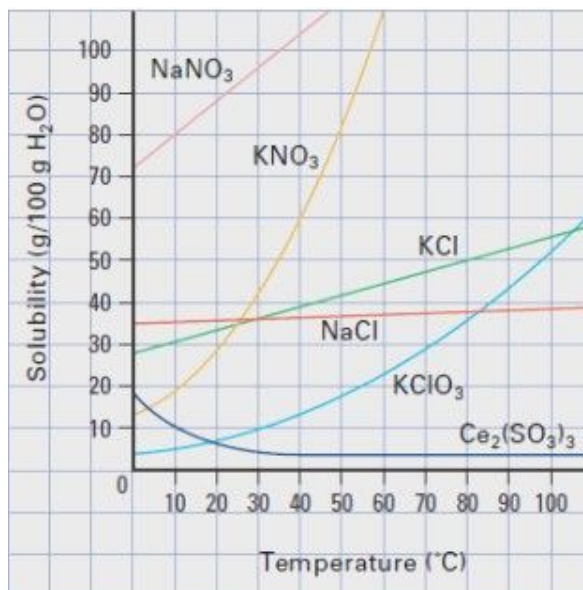
- Write the balanced chemical equation.
- Determine the limiting reagent.
- Calculate the moles of magnesium oxide.
- Calculate the number of molecules in magnesium oxide.
- Calculate the mass of the unused excess reactant.
- Calculate the number of total atoms in magnesium chloride.
- Calculate the percent error and percent yield of magnesium chloride if 2.55 g is actually obtained?

4. Percentage composition

- Calculate the percentage composition of each of the elements in  $C_2H_6O$ .
- What is the empirical formula of a compound with 84% nitrogen and 16% hydrogen?
  - What is the molecular formula if it has a molecular mass of 149g?

5. Explain the difference between dissociation and ionization.

6. Refer to the solubility graph to the right.
- What is the trend in the solubility of  $\text{Ce}_2(\text{SO}_3)_3$ ?  $\text{KCl}$ ?
  - At 40 degrees, is  $\text{KNO}_3$ , with a solubility of 50g/100g  $\text{H}_2\text{O}$ , saturated or unsaturated?
  - If  $\text{NaNO}_3$  is cooled from 40 degrees to 10 degrees celsius, how much residue will precipitate?
  - At 100 degrees Celsius, in 50g of water how much potassium chloride can be held?
  - How much more  $\text{KNO}_3$  can be held in 100g  $\text{H}_2\text{O}$  at 50 degrees celsius than  $\text{KCl}$ ?
  - Which compound is probably a gas? Explain why.



7. 1200 mL of  $1.45\text{mol L}^{-1}$  apple juice is diluted to  $0.988\text{mol L}^{-1}$  for Brenda's birthday party.
- What is the resulting volume of apple juice after dilution?
  - What is the volume of water added?
8. Mr. Einstein would like to test the strength of a solution he has found on the playground. He has a steel rod, aluminum paper clips and a magnesium sharpener. How would he use what he has to determine whether the chemical is strong or weak? Explain using scientific terminology.
9. Arrhenius and Lewis are confused. Arrhenius believes  $\text{HCl}$  is an acid while Lewis does not know. Explain why.
10. The pH of my lemonade is 3.11. Find the pOH, the concentration of  $\text{H}^+$  ions and the concentration of the  $\text{OH}^-$  ions. Determine whether it is acidic or basic.
11. Sulfuric acid is reacted with 298 ml of  $0.566\text{ mol/L}$  sodium hydroxide. If 400 mL of the acid are required for complete neutralization, what is the concentration of the sulfuric acid?

## SCH3U Chemistry Review Answers

### 1. Stock, Classical

	Stock	Classical
a. $V_2O_5$	vanadium (V) oxide	-
b. $Cu_3N_2$	copper (II) nitride	cupric nitride
c. $HF_{(aq)}$	hydrofluoric acid	-
d. $H_2SeO_{3(aq)}$	selenic (IV) acid	selenous acid
e. $CuCl_2 \cdot 9 H_2O$	copper (II) chloride nonahydrate	cupric chloride nonahydrate
f. $Cu(HSO_4)_2$	copper (II) hydrogen sulfate	cupric hydrogen sulfate
	copper (II) bisulfate	cupric bisulfate
g. $(CH_3COO)_4Pb$	lead (IV) acetate	plumbic acetate
h. $CCl_4$	carbon (IV) chloride	carbon tetrachloride

### 2. Iron (III) oxide reacts with carbonic acid.

- $Fe_2O_{3(aq)} + 6 HNO_{3(aq)} \rightarrow 2 Fe(NO_3)_{3(aq)} + 3 H_2O_{(l)}$
- Neutralization
- $2 Fe^{3+}_{(aq)} + 3 O^{2-}_{(aq)} + 6 H^{+}_{(aq)} + 6 NO_3^{-}_{(aq)} \rightarrow 2 Fe^{3+}_{(aq)} + 6 NO_3^{-}_{(aq)} + 3 H_2O_{(l)}$
- $2 H^{+}_{(aq)} + O^{2-}_{(aq)} \rightarrow H_2O_{(l)}$

### 3. 3.00 g of magnesium oxide is reacted with 5.00 g of hydrochloric acid.

- $MgO_{(s)} + 2 HCl_{(aq)} \rightarrow Mg(Cl)_{2(aq)} + H_2O_{(l)}$
- $HCl_{(aq)}$
- $n = 0.0744 \text{ mol}$
- $N = 4.48 \times 10^{22} \text{ molecules}$
- $m = 0.237 \text{ g}$
- $1.24 \times 10^{23} \text{ atoms}$
- % error = 37.7 %, % yield = 62.3 %

### 4. Percentage composition

- % C = 52.1%, % H = 13.1%, % O = 34.7%
- $N_3H_8$
  - $N_9H_{24}$

### 5. Dissociation is the separation of ions from an ionic compound due to ion-dipole attraction. Ionization is the creation of ions when a polar covalent compound is dissolved in a polar solvent.

6. Solubility graph
- Solubility decreases as temperature increases in  $\text{Ce}_2(\text{SO}_3)_3$  while solubility increases as temperature increases in KCl.
  - Unsaturated
  - 25 g
  - 28 g
  - About 40 g
  - $\text{Ce}_2(\text{SO}_3)_3$  because the solubility of gases decreases as temperature increases as this is exhibited in the solubility graph.
7. a.  $V=1.74 \text{ L}$   
b. 0.543 L of water was added
8. He would add the magnesium sharpener to the solution. If there is vigorous bubbling, then the solution is strong as 100% of the ions in the solution react with the magnesium. If there is slow bubbling, then the solution is weak as less than 5% of the ions in the solution react with the magnesium.
9. Arrhenius believes HCl is an acid as, according to the Arrhenius definition of acids and bases, produces positive hydrogen ions when dissolved in water. HCl produces one proton when dissolved. Lewis does not know if HCl is an acid or a base because, according to the Lewis definition of acids and bases, an acid is an electron acceptor while a base is an electron donor. HCl, neither positively nor negatively charged does not fit these characteristics.
10.  $\text{pOH}=10.89$ ,  $[\text{OH}^-]=1.29$ ,  $[\text{H}^+]=7.74 \times 10^{-4}$ , acidic
11. 0.211 mol/L