

Final Exam Review

Chapter 8-10

Chemistry

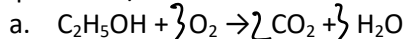
Identify the following symbols

1. (g) gas

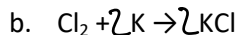
2. (aq) aqueous

3.  $\rightarrow$  produces or yields

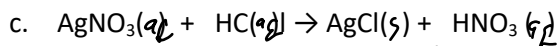
4. Complete and/or balance the reaction, then identify the type(s) of reaction:



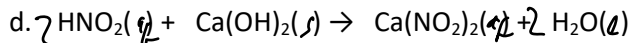
redox  
combustion



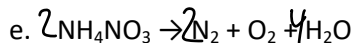
redox  
synthesis



double displacement  
precipitation

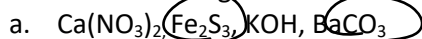


double displacement  
acid-base



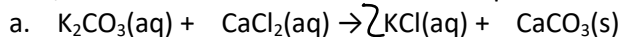
redox  
decomposition

5. Which of the following would be insoluble in water? Why?



sulfides are insoluble except group 1 +  $NH_4^+$   
carbonates

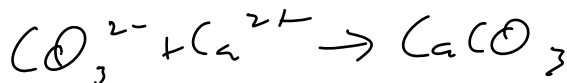
6. Balance, then write the total and net ionic equation:



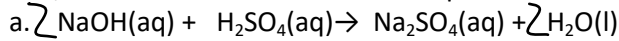
i. Total ionic equation



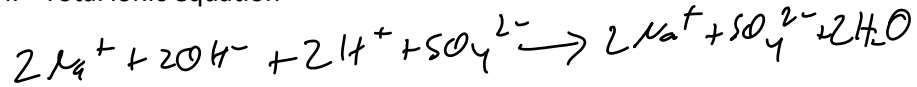
ii. Net ionic equation



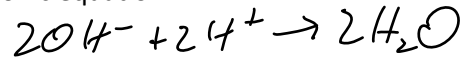
7. Balance, then write total and net ionic equations



i. Total ionic equation

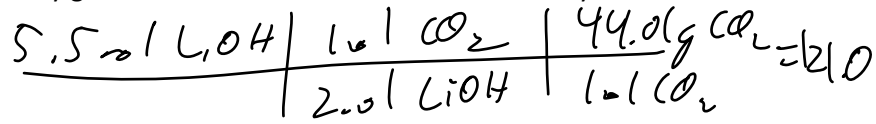


ii. Net ionic equation



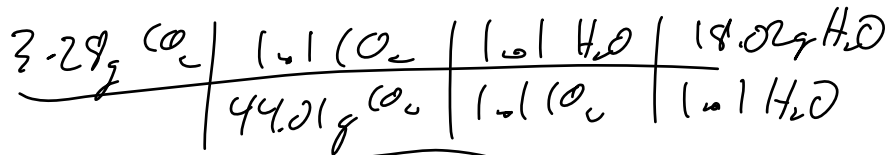
8. Use the reaction:  $2\text{LiOH}(\text{s}) + \text{CO}_2(\text{g}) \rightarrow \text{Li}_2\text{CO}_3(\text{s}) + \text{H}_2\text{O}(\text{l})$

a. How many grams of carbon dioxide can be removed by 5.5 mol LiOH?



120 g

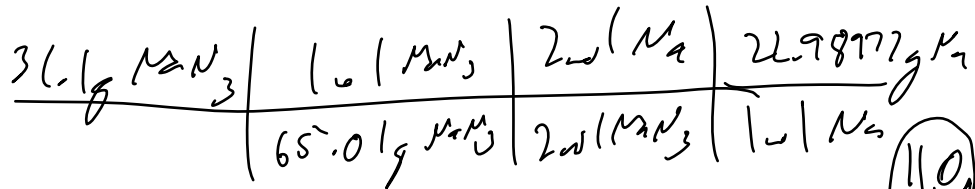
b. How many grams of H<sub>2</sub>O could be made when 3.28 g of CO<sub>2</sub> react?



1.34 g H<sub>2</sub>O

9. Use the equation:  $2\text{NaN}_3(\text{s}) \rightarrow 2\text{Na}(\text{s}) + 3\text{N}_2$

a. How many grams of Na can be made from 31.1 g of NaN<sub>3</sub>?

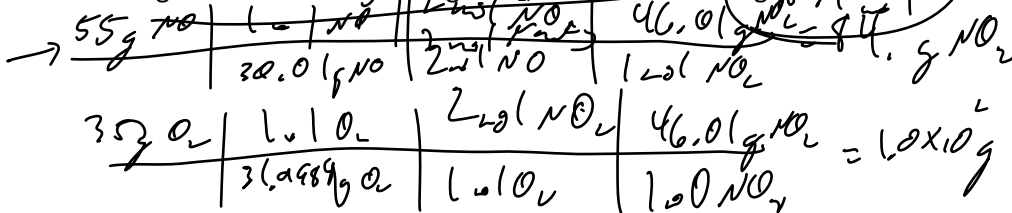


11.0 g

b. How many moles of N<sub>2</sub> can be formed from 2.7 mol NaN<sub>3</sub>?

10. Use the equation:  $2\text{NO}(\text{g}) + \text{O}_2(\text{g}) \rightarrow 2\text{NO}_2(\text{g})$

a. If 55 g of NO is mixed with 35 g of O<sub>2</sub>, what is the limiting reactant?



LR = NO

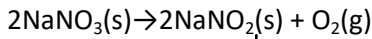
84 g

b. What is the theoretical yield of NO<sub>2</sub>?

c. If 31 g of NO<sub>2</sub> are recovered, what is the percent yield?

$$\frac{31}{84} \times 100 = 37\%$$

11. How many grams of  $\text{NaNO}_2$  will form when 256g  $\text{NaNO}_3$  react? The percent yield is 91%.



256g $\text{NaNO}_3$	1 mol $\text{NaNO}_3$	2 mol $\text{NaNO}_2$	69,00g $\text{NaNO}_2$	= 208g
	84.99g	2 mol $\text{NaNO}_3$	1 mol $\text{NaNO}_2$	

$$\frac{X}{208} \times 100 = 91$$

$$X = 189\text{g}$$

12.  $2\text{AgNO}_3 + \text{NiCl}_2 \rightarrow 2\text{AgCl} + \text{Ni}(\text{NO}_3)_2$

B. How many grams of silver nitrate are required to react with 46.99g of nickel (II) chloride?

46.99g $\text{NiCl}_2$	1 mol $\text{NiCl}_2$	2 mol $\frac{1}{2} \text{AgNO}_3$	169.87g
	129.59g $\text{NiCl}_2$	1 mol $\text{NiCl}_2$	1 mol $\frac{1}{2} \text{AgNO}_3$

$$123.2\text{g}$$

C. If 33.00g of  $\text{AgNO}_3$  react with 33.00g of  $\text{NiCl}_2$  which is the limiting reactant and which is the excess reactant?

$$LR = \text{AgNO}_3$$

33.00g $\text{AgNO}_3$	1 mol $\frac{1}{2} \text{AgNO}_3$	1 mol $\text{Ni}(\text{NO}_3)_2$	182.70g	= 17.75g
	169.87g $\text{AgNO}_3$	2 mol $\text{AgNO}_3$	1 mol $\text{Ni}(\text{NO}_3)_2$	
33.0g $\text{NiCl}_2$	1 mol $\text{NiCl}_2$	1 mol $\text{Ni}(\text{NO}_3)_2$	182.70g	= 46.5g
	129.60g	1 mol $\text{NiCl}_2$	1 mol $\text{Ni}(\text{NO}_3)_2$	

D. If 33.00g of  $\text{AgNO}_3$  react with 33.00g of  $\text{NiCl}_2$ , what is the theoretical yield of the nickel containing product?

13. Which of these would have the highest thermal energy? Explain

- An ice cube at  $-13^\circ\text{C}$
- A cup of water at  $23.1^\circ\text{C}$
- A balloon full of steam at  $110^\circ\text{C}$
- A lake in January at  $1.2^\circ\text{C}$

17.75g  $\text{Ni}(\text{NO}_3)_2$   
 many more particles will give a higher total energy

14. If you touch a stove with your hand, which way will heat flow?

stove  $\rightarrow$  hand

hot  $\rightarrow$  cold

15. If a glass of water ( $C=4.184\text{J/g}^\circ\text{C}$ ) and a block of iron with an equal mass ( $C=0.5\text{J/g}^\circ\text{C}$ ) are placed in an oven, which will be hotter after 5 minutes? Explain

iron - lower specific heat will change temp. faster

16. How much energy is required to raise 55.0g of water from 35.9°C to 99.4°C if the specific heat of water is 4.184J/g°C?

$$q = sm\Delta t$$

$$= (4.184)(55.0)(63.5)$$

$$= 14600 \text{ J}$$

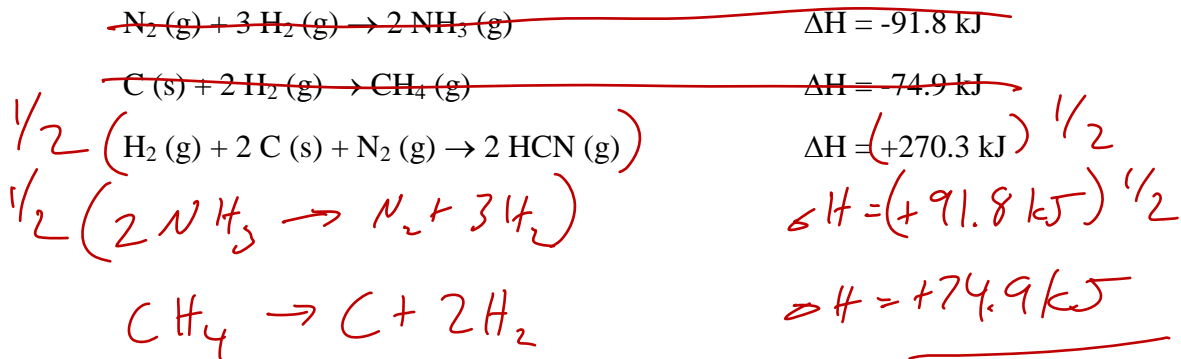
17. What mass of iron is in a sample that requires 4520J of energy to change the temperature from 23°C to 183°C? (specific heat of iron=0.450J/g°C)

$$q = sm\Delta t$$

$$4520 = (0.450)(m)(160)$$

$$m = 62.8 \text{ g}$$

1. Calculate  $\Delta H$  for the reaction  $\text{CH}_4(\text{g}) + \text{NH}_3(\text{g}) \rightarrow \text{HCN}(\text{g}) + 3 \text{H}_2(\text{g})$ , given:



$$\Delta H = 256.0 \text{ kJ}$$

2. Would the following increase or decrease entropy?

- a.  $\text{Mg}(\text{s}) + 2\text{HCl}(\text{aq}) \rightarrow \text{MgCl}_2(\text{aq}) + \text{H}_2(\text{g})$  increase  
 b. water becoming ice decrease

3. Would the following be endothermic or exothermic?

- a. water freezing into ice exothermic  
 b. A reaction becomes warm exothermic