SCH 3U Mrs. Warner Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Period \_\_\_ Date \_\_\_/\_\_\_/\_\_\_

Mass-Mass Problems: Stoichiometry

1. If 20.0 g of zinc react with excess hydrochloric acid, how many grams of zinc chloride are produced? \_\_\_\_\_Zn(s) + \_\_\_\_HCl(aq) 🡪 \_\_\_\_ZnCl2(aq) + \_\_\_\_H2(aq)

2. How many grams of chlorine gas must be reacted with excess sodium iodide if 10.0 g of sodium chloride is produced? \_\_\_\_NaI(aq) + \_\_\_Cl2(aq) 🡪 \_\_\_NaCl(aq) + \_\_\_I2(s)

3. How many grams of copper are required to displace 4.00 g of silver nitrate in a single displacement reaction?

4. If excess sulfuric acid reacts with 30.0 g of sodium chloride, how many grams of hydrochloric acid are produced?

5. How many grams of hydrogen can be produced from 8.40 g of aluminum and excess sodium hydroxide? \_\_Al(s) + \_\_NaOH(aq) 🡪 \_\_Na3AlO3(aq) + \_\_H2(aq)

6. How many moles of calcium chloride would be necessary to prepare 94.0 g of calcium

phosphate? \_\_CaCl2(aq) + \_\_Na3PO4(aq) 🡪 \_\_Ca3(PO4)2(s) + \_\_NaCl(aq)

7. Calculate the number of grams of oxygen that could be produced by heating 9.70 g of

potassium chlorate? \_\_KClO3(s) 🡪 \_\_KCl(s) + \_\_O2(g)

Stoichiometry Worksheet Answers

1. If 20.0 g of zinc react with excess hydrochloric acid, how many grams of zinc chloride are

 produced?

 Zn(s) + 2HCl(aq)  ZnCl2(aq) + H2(aq)

g Zn --> mol Zn --> mol ZnCl2 --> g ZnCl2

20 g Zn 1 mol Zn 1mol ZnCl2 136.4 g Zn Cl2 = 41.7 g ZnCl2

 65.4 g Zn 1mol Zn 1 mol ZnCl2

2. How many grams of chlorine gas must be reacted with excess sodium iodide if 10.0 g of

sodium chloride is produced?

2NaI(aq) + Cl2(aq)  2NaCl(aq) + I2(s)

g NaCl --> mol NaCl --> mol Cl2 --> g Cl2

10 g NaCl 1 mol NaCl 1mol Cl2 71.0g Cl2 = 6.07 g Cl2

 58.5 g NaCl 2 mol NaCl 1 mol Cl2

3. How many grams of copper are required to replace 4.00 g of silver nitrate which is dissolved in

 water?

Cu(s) + 2AgNO3(aq)  Cu(NO3)2(aq) + 2Ag(s)

g AgNO3 --> mol AgNO3 --> mol Cu --> g Cu

4.0 g AgNO3 1 mol AgNO3 1mol Cu 63.6 g Cu = 0.75 g Cl2

 169.8g AgNO3 2mol AgNO3 1 mol Cu

4. If excess sulfuric acid reacts with 30.0 g of sodium chloride, how many grams of hydrochloric

acid are produced?

H2SO4(aq) + 2NaCl(aq)  Na2SO4(aq) + 2HCl(aq)

g NaCl --> mol NaCl --> mol HCl --> g HCl

30 g NaCl 1 mol NaCl 1mol HCl 36.5 g HCl = 18.7 g HCl

 58.5 g NaCl 1 mol NaCl 1 mol HCl

5. How many moles of hydrogen can be produced from 8.40 g of aluminum and excess sodium

 hydroxide? How many grams?

2 Al(s) + 6 NaOH(aq)  2 Na3AlO3(aq) + 3 H2(aq)

g Al --> mol Al --> mol H2

8.4 g Al 1 mol Al 3 mol H2 = 0.47 mol H2

 27.0 g Al 2 mol Al

mol H2--> g H2

0.47 mol H2 2.0 g H2 = 0.94 g H2

 1 mol H2

6. How many moles of calcium chloride would be necessary to prepare 94.0 g of calcium

phosphate?

3 CaCl2(aq) + 2 Na3PO4(aq)  1 Ca3(PO4)2(s) + 6 NaCl(aq)

g Ca3(PO4)2--> mol Ca3(PO4)2--> mol CaCl2

94 g Ca3(PO4)2 1 mol Ca3(PO4)2 3 mol CaCl2 = 0.91 mol CaCl2

 310.3 g Ca3(PO4)2 1 mol Ca3(PO4)2

7. Calculate the number of grams of oxygen that could be produced by heating 9.70 g of

potassium chlorate?

2KClO3(s)  2 KCl(s) + 3 O2(g)

g KClO3 --> mol KCl --> mol O2 --> g O2

9.7g KClO3 1 mol KClO3 3 mol O2 32 g O2 = 3.80 g O2

 122.6g KClO3 2 mol KClO3 1 mol O2