

Answers to questions 1-4

Place separate pieces of paper, and using the 3-step method for molar, solve the following problems. Show all work and units!

1. 100. g of sodium chloride are heated and all the oxygen is liberated. What is the mass of the solid left?



$$100 \text{ g NaClO}_2 \times \frac{1 \text{ mole}}{132.02 \text{ g}} \times \frac{2 \text{ moles NaCl}}{2 \text{ moles NaClO}_2} = \frac{151.45 \text{ g}}{132.02 \text{ g}} = 114.7 \text{ g NaCl}$$

2. How much oxygen gas (O<sub>2</sub>) will be needed to prepare 100. g of chlorine from hydrochloric acid? The other products of this reaction are hydrogen chloride gas and water.



$$100 \text{ g HCl} \times \frac{1 \text{ mole}}{36.46 \text{ g}} \times \frac{1 \text{ mole Cl}_2}{2 \text{ moles HCl}} \times \frac{70.90 \text{ g}}{1 \text{ mole Cl}_2} = 95.8 \text{ g Cl}_2, \quad 167 \text{ g MnCl}_2$$

3. How much zinc will be needed to prepare 1000 grams of hydrogen from sulfuric acid?



$$1000 \text{ g H}_2 \times \frac{1 \text{ mole}}{2.02 \text{ g}} \times \frac{1 \text{ mole Zn}}{1 \text{ mole H}_2} \times \frac{65.38 \text{ g}}{1 \text{ mole Zn}} = 32617 \text{ g Zn}, \quad 100000 \text{ g H}_2\text{SO}_4$$

4. How many grams of water are necessary to give 1000 grams of oxygen by electrolysis?



$$1000 \text{ g O}_2 \times \frac{1 \text{ mole}}{32.00 \text{ g}} \times \frac{2 \text{ moles H}_2\text{O}}{1 \text{ mole O}_2} \times \frac{18.02 \text{ g}}{1 \text{ mole H}_2\text{O}} = 1125 \text{ g H}_2\text{O}$$