

Answers to questions 1-4

Use 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?



$$100 \text{ g NaCl(s)} = \frac{1 \text{ mole}}{58.44 \text{ g}} \times \frac{1 \text{ mole NaCl}}{1 \text{ mole NaCl}} = \frac{1.711 \text{ mole}}{1 \text{ mole NaCl}} = 1.711 \text{ mole NaCl}$$

2. How much oxygen (in moles) will be needed to prepare 100. g of chlorine from hydrochloric acid? The other products of this reaction are hydrogen chloride and water.



$$100 \text{ g Cl}_2 = \frac{1 \text{ mole}}{70.90 \text{ g}} \times \frac{1 \text{ mole HCl}}{1 \text{ mole Cl}_2} = \frac{1.410 \text{ mole}}{1 \text{ mole HCl}} = 1.410 \text{ mole HCl} \quad \frac{1 \text{ mole O}_2}{2 \text{ mole HCl}}$$

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



$$1000 \text{ g H}_2 = \frac{1 \text{ mole}}{2.016 \text{ g}} \times \frac{1 \text{ mole Zn}}{1 \text{ mole H}_2} = \frac{496.0 \text{ mole}}{1 \text{ mole Zn}} = 496.0 \text{ mole Zn} \quad \frac{1 \text{ mole Zn}}{1 \text{ mole Zn}}$$

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



$$1000 \text{ g O}_2 = \frac{1 \text{ mole}}{31.99 \text{ g}} \times \frac{2 \text{ moles H}_2\text{O}}{1 \text{ mole O}_2} = \frac{619.8 \text{ mole}}{1 \text{ mole H}_2\text{O}} = 619.8 \text{ mole H}_2\text{O}$$