

# Stoichiometry Practice

(Old exam questions)

name: SOLUTIONS

- 1) A camp opens every year with a simple fireworks demonstration. Black powder is used as the active ingredient.

The balanced chemical equation for the reaction is:



If 20.0 g of carbon are used, what mass of  $\text{K}_2\text{S}$  will be produced in the reaction?

$$\begin{array}{cc} 3 \text{ mole} & 1 \text{ mole} \\ m = n \cdot M & m = n \cdot M \\ m = 3(12) & m = 1(110) \\ m = \cancel{36} \text{ g} & m = 110 \text{ g} \\ 20 \text{ g} & x \end{array}$$

$\underline{\underline{x = 61.4 \text{ g}}}$

- 2) The following equation shows the reaction between aluminum sulfate and calcium hydroxide. How many moles of aluminum hydroxide are produced if 15.4 moles of Calcium hydroxide react with aluminum sulfate?

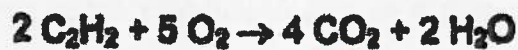


$$\begin{array}{cc} 3 \text{ moles} & 2 \text{ moles} \\ 15.4 \text{ moles} & x \end{array}$$

$\underline{\underline{x = 10.27 \text{ moles}}}$

- 3) A welder has to cut a metal door with her acetylene ( $C_2H_2$ ) torch.

The following chemical equation represents the combustion of acetylene:



How many moles of  $CO_2$  will be released into the atmosphere if the welder uses 12 kg of acetylene to cut the metal door?

$$\begin{array}{l} 2 \text{ moles} \\ m = n \cdot M \\ m = 2(26) \\ m = 52g \\ 12000g \end{array} \quad \begin{array}{l} 4 \text{ moles} \\ m = n \cdot M \\ m = 4(44) \\ m = 176g \\ x \end{array}$$

$$x = 40615.4g$$

$$n = \frac{m}{M}$$

$$n = \frac{40615.4}{44} = 923 \text{ moles}$$

- 4) Barium chloride,  $BaCl_2$ , is used in fireworks to produce a bright green color. Gary tried to produce  $BaCl_2$  by reacting hydrochloric acid,  $HCl$ , with barium hydroxide,  $Ba(OH)_2$ , according to the chemical reaction below.



Gary used 100.0 mL of a  $HCl$  solution and obtained 7.8 g of  $BaCl_2$ .

What was the molar concentration of the  $HCl$  solution used in this reaction?

$$\begin{array}{l} ① \quad 2 \text{ moles} \\ m = n \cdot M \\ m = 2(36.5) \\ m = 73g \\ x \end{array} \quad \begin{array}{l} 1 \text{ mole} \\ m = n \cdot M \\ m = 1(208.3) \\ m = 208.3g \\ 7.8g \end{array}$$

$$x = 2.73g HCl$$

$$② \quad n = \frac{m}{M}$$

$$n = \frac{2.73}{36.5}$$

$$n = 0.075 \text{ moles}$$

$$③ \quad C = \frac{n}{V}$$

$$C = \frac{0.075 \text{ moles}}{0.1 L}$$

$$C = 0.75 \text{ mol/L}$$