Quiz 5.1 – Stoichiometry

Name: Key

Question 1 (2 points)

Consider the reaction: $2\,Fe(OH)_3 \longleftrightarrow Fe_2O_3 + 3\,H_2O$

If you decompose exactly 0.500 *g* of $Fe(OH)_3$, how many *g* of each product will be made?

$$0.500\,g\ Fe(OH)_3 \left| \frac{1\ mol\ Fe(OH)_3}{106.87\,g\ Fe(OH)_3} \right| \frac{1\ mol\ Fe_2O_3}{2\ mol\ Fe(OH)_3} \left| \frac{159.69\,g\ Fe_2O_3}{1\ mol\ Fe_2O_3} \right| = 0.374\,g\ Fe_2O_3$$

$$0.500\,g\ Fe(OH)_3 \left| \frac{1\ mol\ Fe(OH)_3}{106.87\,g\ Fe(OH)_3} \right| \frac{3\ mol\ H_2O}{2\ mol\ Fe(OH)_3} \left| \frac{18.02\,g\ H_2O}{1\ mol\ H_2O} \right| = 0.126\,g\ H_2O$$

Question 2 (3 points)

Consider the reaction: $2\,ClO_2 + H_2O \longrightarrow HClO_2 + HClO_3$

If you wanted to synthesize exactly 1.50 *g* of $HClO_3$, how many *g* of each reactant should you use?

$$1.50\,g\ HClO_3 \left| \frac{1\ mol\ HClO_3}{84.46\,g\ HClO_3} \right| \frac{2\ mol\ ClO_2}{1\ mol\ HClO_3} \left| \frac{67.45\,g\ ClO_2}{1\ mol\ ClO_2} \right| = 2.40\,g\ ClO_2$$

$$1.50\,g\ HClO_3 \left| \frac{1\ mol\ HClO_3}{84.46\,g\ HClO_3} \right| \frac{1\ mol\ H_2O}{1\ mol\ HClO_3} \left| \frac{18.02\,g\ H_2O}{1\ mol\ H_2O} \right| = 0.320\,g\ H_2O$$

How many *g* of $HClO_2$ would be produced at the same time?

$$1.50\,g\ HClO_3 \left| \frac{1\ mol\ HClO_3}{84.46\,g\ HClO_3} \right| \frac{1\ mol\ HClO_2}{1\ mol\ HClO_3} \left| \frac{68.46\,g\ HClO_2}{1\ mol\ HClO_2} \right| = 1.22\,g\ HClO_2$$