Name: Key Date: _____

Directions: Write balanced chemical reactions for the following and then answer the questions.

1. Carbon monoxide reacts with oxygen to produce carbon dioxide. If 56.9g of carbon monoxide reacts with oxygen at STP,
a. How many liters of oxygen are required to react?
b. How many liters of carbon dioxide are produced?

$2CO + O_2 \longrightarrow 2CO_2$

a.) $56.9\ g\ CO \times \frac{1\ mol\ CO}{28.01\ g\ CO} \times \frac{1\ mol\ O_2}{2\ mol\ CO} \times \frac{22.4\ L\ O_2}{1\ mol\ O_2} = 22.8\ L\ O_2$

b.) $56.9\ g\ CO \times \frac{1\ mol\ CO}{28.01\ g\ CO} \times \frac{2\ mol\ CO_2}{2\ mol\ CO} \times \frac{22.4\ L\ CO_2}{1\ mol\ CO_2} = 45.5\ L\ CO_2$

2. If liquid carbon disulfide (CS_2) reacts with 16.3g of oxygen to produce the gases carbon dioxide and sulfur dioxide, what volume of sulfur dioxide is produced?

$CS_2 + 3O_2 \longrightarrow CO_2 + 2SO_2$

$16.3\ g\ O_2 \times \frac{1\ mol\ O_2}{32\ g\ O_2} \times \frac{2\ mol\ SO_2}{3\ mol\ O_2} \times \frac{22.4\ L\ SO_2}{1\ mol\ SO_2} = 7.61\ L\ SO_2$

3. Solid iron (III) hydroxide decomposes to produce iron (III) oxide and water vapor. If 750 mL of water vapor are produced at STP,
a. How many grams of iron (III) hydroxide were used?
b. How many grams of iron (III) oxide were produced?

$2Fe(OH)_3 \longrightarrow Fe_2O_3 + 3H_2O$

$750\ mL\ H_2O = .750\ L$

a.) $.750\ L\ H_2O \times \frac{1\ mol\ H_2O}{22.4\ L\ H_2O} \times \frac{2\ mol\ Fe(OH)_3}{3\ mol\ H_2O} \times \frac{106.8\ g\ Fe(OH)_3}{1\ mol\ Fe(OH)_3}$

$= 2.4\ g\ Fe(OH)_3$

b.) $.750\ L\ H_2O \times \frac{1\ mol\ H_2O}{22.4\ L\ H_2O} \times \frac{1\ mol\ Fe_2O_3}{3\ mol\ H_2O} \times \frac{159.7\ g\ Fe_2O_3}{mol\ Fe_2O_3}$

$= 1.8\ g\ Fe_2O_3$