

STOICH. Worksheet 4

a.
$$\frac{16.0 \text{ g Fe}_2\text{O}_3 \left| \frac{1 \text{ mol Fe}_2\text{O}_3}{159.6 \text{ g Fe}_2\text{O}_3} \right| \frac{3 \text{ mol O}_2}{2 \text{ mol Fe}_2\text{O}_3} \left| \frac{22.4 \text{ L O}_2}{1 \text{ mol O}_2} \right.}{=} \boxed{3.37 \text{ L O}_2}$$

b.
$$\frac{10.0 \text{ L O}_2 \left| \frac{1 \text{ mol O}_2}{22.4 \text{ L O}_2} \right| \frac{4 \text{ mol Fe}}{3 \text{ mol O}_2} \left| \frac{55.8 \text{ g Fe}}{1 \text{ mol Fe}} \right.}{=} \boxed{33.2 \text{ g Fe}}$$

c.
$$\frac{6.50 \text{ g Fe} \left| \frac{1 \text{ mol Fe}}{55.8 \text{ g Fe}} \right| \frac{3 \text{ mol O}_2}{4 \text{ mol Fe}} \left| \frac{6.02 \times 10^{23} \text{ molec O}_2}{1 \text{ mol O}_2} \right.}{=} \boxed{5.26 \times 10^{22} \text{ molec. O}_2}$$

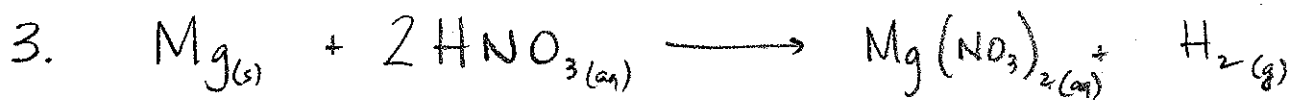
d.
$$\frac{6.43 \times 10^{24} \text{ molec. Fe}_2\text{O}_3 \left| \frac{1 \text{ mol Fe}_2\text{O}_3}{6.02 \times 10^{23} \text{ molec}} \right| \frac{4 \text{ mol Fe}}{2 \text{ mol Fe}_2\text{O}_3} \left| \frac{55.8 \text{ g Fe}}{1 \text{ mol Fe}} \right| \frac{1 \text{ cm}^3 \text{ Fe}}{7.86 \text{ g Fe}}}{=} \boxed{152 \text{ cm}^3 \text{ Fe}}$$

2 a.
$$\frac{15.5 \text{ L NO}_2 \left| \frac{1 \text{ mol NO}_2}{22.4 \text{ L NO}_2} \right| \frac{1 \text{ mol H}_2\text{O}}{3 \text{ mol NO}_2} \left| \frac{18.0 \text{ g H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right.}{=} \boxed{4.15 \text{ g H}_2\text{O}}$$

b.
$$\frac{100.0 \text{ g H}_2\text{O} \left| \frac{1 \text{ mol H}_2\text{O}}{18.0 \text{ g H}_2\text{O}} \right| \frac{1 \text{ mol NO}}{1 \text{ mol H}_2\text{O}} \left| \frac{22.4 \text{ L NO}}{1 \text{ mol NO}} \right.}{=} \boxed{124 \text{ L NO}}$$

c.
$$\frac{42.0 \text{ L NO} \left| \frac{1 \text{ mol NO}}{22.4 \text{ L NO}} \right| \frac{3 \text{ mol NO}_2}{1 \text{ mol NO}} \left| \frac{22.4 \text{ L NO}_2}{1 \text{ mol NO}_2} \right.}{=} \boxed{126 \text{ L NO}_2}$$

d.
$$\frac{46.0 \text{ L NO} \left| \frac{1 \text{ mol NO}}{22.4 \text{ L NO}} \right| \frac{1 \text{ mol H}_2\text{O}}{1 \text{ mol NO}} \left| \frac{6.02 \times 10^{23} \text{ molec. H}_2\text{O}}{1 \text{ mol H}_2\text{O}} \right| \frac{2 \text{ atoms H}}{1 \text{ molec. H}_2\text{O}}}{=} \boxed{2.47 \times 10^{24} \text{ atoms H}}$$



$$\frac{40.0 \text{ g Mg} \quad | \quad 1 \text{ mol Mg} \quad | \quad 1 \text{ mol H}_2 \quad | \quad 22.4 \text{ L H}_2}{\quad \quad \quad | \quad 24.3 \text{ g Mg} \quad | \quad 1 \text{ mol Mg} \quad | \quad 1 \text{ mol H}_2} = \boxed{36.9 \text{ L H}_2}$$



$$a. \quad \frac{48.0 \text{ L CO}_2 \quad | \quad 1 \text{ mol CO}_2 \quad | \quad 8 \text{ mol O}_2 \quad | \quad 22.4 \text{ L O}_2}{\quad \quad \quad | \quad 22.4 \text{ L O}_2 \quad | \quad 5 \text{ mol CO}_2 \quad | \quad 1 \text{ mol O}_2} = \boxed{76.8 \text{ L O}_2}$$

$$b. \quad \frac{106 \text{ L CO}_2 \quad | \quad 1 \text{ mol CO}_2 \quad | \quad 6 \text{ mol H}_2\text{O} \quad | \quad 22.4 \text{ L H}_2\text{O}}{\quad \quad \quad | \quad 22.4 \text{ L CO}_2 \quad | \quad 5 \text{ mol CO}_2 \quad | \quad 1 \text{ mol H}_2\text{O}} = \boxed{127 \text{ L H}_2\text{O}}$$

$$c. \quad \frac{80.0 \text{ L CO}_2 \quad | \quad 1 \text{ mol CO}_2 \quad | \quad 1 \text{ mol C}_5\text{H}_{12} \quad | \quad 72.0 \text{ g C}_5\text{H}_{12}}{\quad \quad \quad | \quad 22.4 \text{ L CO}_2 \quad | \quad 5 \text{ mol CO}_2 \quad | \quad 1 \text{ mol C}_5\text{H}_{12}} = \boxed{51.4 \text{ g C}_5\text{H}_{12}}$$



$$i) \quad \frac{30.5 \text{ L O}_2 \quad | \quad 1 \text{ mol O}_2 \quad | \quad 2 \text{ mol HgO} \quad | \quad 216.6 \text{ g HgO}}{\quad \quad \quad | \quad 22.4 \text{ L O}_2 \quad | \quad 1 \text{ mol O}_2 \quad | \quad 1 \text{ mol HgO}} = \boxed{5.90 \times 10^2 \text{ g HgO}}$$

$$ii) \quad \frac{295 \text{ g HgO} \quad | \quad 1 \text{ mol HgO} \quad | \quad 2 \text{ mol Hg} \quad | \quad 200.6 \text{ g Hg} \quad | \quad 1 \text{ cm}^3 \text{ Hg}}{\quad \quad \quad | \quad 216.6 \text{ g HgO} \quad | \quad 2 \text{ mol HgO} \quad | \quad 1 \text{ mol Hg} \quad | \quad 13.6 \text{ g Hg}} = \boxed{20.1 \text{ cm}^3 \text{ Hg}}$$



$$\frac{84.0 \text{ L H}_2 \quad | \quad 1 \text{ mol H}_2 \quad | \quad 1 \text{ mol Mg} \quad | \quad 24.3 \text{ g Mg} \quad | \quad 1 \text{ cm}^3 \text{ Mg}}{\quad \quad \quad | \quad 22.4 \text{ L H}_2 \quad | \quad 1 \text{ mol H}_2 \quad | \quad 1 \text{ mol Mg} \quad | \quad 1.74 \text{ g Mg}} = \boxed{52.4 \text{ cm}^3 \text{ Mg}}$$