Name: _____

Date: _____ Mods: _____

STOICHIOMETRY TEST REVIEW

SHOW ALL WORK AND STEPS!!!!

1. In the following combustion reaction, how many grams of water are produced when 25.0 g of C_2H_5OH is burned?

$$C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$$
$$25.0g \qquad\qquad xg$$

$$25.0g\ C_2H_5OH \left|\frac{1\ mole\ C_2H_5OH}{46.08g\ C_2H_5OH}\right|\frac{3\ mole\ H_2O}{1\ mole\ C_2H_5OH}\left|\frac{18.02g\ H_2O}{1\ mole\ H_2O}\right| =$$

$29.3g\ H_2O$

2. How much water is produced (in grams) when 20.5 L of NH_3 is reacted?

$$4NH_3 + 5O_2 \rightarrow 4NO_2 + 6H_2O$$
$$20.5L \qquad\qquad xg$$

$$20.5L\ NH_3 \left|\frac{1\ mole\ NH_3}{22.4L\ NH_3}\right|\frac{6\ mole\ H_2O}{4\ mole\ NH_3}\left|\frac{18.02g\ H_2O}{1\ mole\ H_2O}\right| =$$

$24.7g\ H_2O$

3. How much N_2 in grams is needed to react completely with 2.5×10^{24} particles of H_2 in the following reaction?

$$N_2 + 3H_2 \rightarrow 2NH_3$$
$$xg \qquad 2.5\times10^{24}\ part$$

$$2.5\times10^{24}\ part\ H_2 \left|\frac{1\ mole\ H_2}{6.022\times10^{23}\ part\ H_2}\right|\frac{1\ mole\ N_2}{3\ mole\ H_2}\left|\frac{28.02g\ N_2}{1\ mole\ N_2}\right| =$$

$38.8g\ N_2$

4. How many particles of iron is formed when 4.2 L of hydrogen react with hydrogen?

$$3H_2 + Fe_2O_3 \rightarrow 2Fe + 3H_2O$$
$$4.2L \qquad X\ part$$

$$4.2L\ H_2 \left|\frac{1\ mole\ H_2}{22.4L\ H_2}\right|\frac{2\ mole\ Fe}{3\ mole\ H_2}\left|\frac{6.022\times10^{23}\ part\ Fe}{1\ mole\ Fe}\right| =$$

$7.53\times10^{22}\ part\ Fe$

5. Mass of Magnesium Lab

A) Write the balanced equation for the reaction between magnesium and hydrogen chloride:

$$\underset{x\,g}{Mg} + 2HCl \longrightarrow MgCl_2 + \underset{72.2\,mL}{H_2}$$

B) If the reaction is carried out in a eudiometer and the volume of hydrogen gas produced is measured to be 72.2 mL, calculate the mass of the original magnesium:

$$72.2\,mL\,H_2 \left|\frac{1\,L\,H_2}{1000\,mL\,H_2}\right| \left|\frac{1\,mole\,H_2}{22.4\,L\,H_2}\right| \left|\frac{1\,mole\,Mg}{1\,mole\,H_2}\right| \left|\frac{24.31\,g\,Mg}{1\,mole\,Mg}\right| =$$

$$0.07849\,g\,Mg$$

C) If the actual mass the magnesium is ~~0.69~~ 0.069 g, calculate the percent error.

$$\left|\frac{0.069 - 0.0784}{0.069}\right| \times 100 = 13.6\%$$

6. If 36.11 g of KBr react with 22.30 g of Cl_2, determine the limiting reactant by calculating how many grams of Br_2 can be formed.

$$2KBr + Cl_2 \rightarrow 2KCl + Br_2$$

36.11g 22.30g

$$36.11g\ KBr \left| \frac{1\ mole\ KBr}{119.00g\ KBr} \right| \frac{1\ mole\ Br_2}{2\ mole\ KBr} \left| \frac{159.80g\ Br_2}{1\ mole\ Br_2} \right| = 24.2g\ Br_2$$

$$22.30g\ Cl_2 \left| \frac{1\ mole\ Cl_2}{70.9g\ Cl_2} \right| \frac{1\ mole\ Br_2}{1\ mole\ Cl_2} \left| \frac{159.80g\ Br_2}{1\ mole\ Br_2} \right| = 50.3g\ Br_2$$

KBr is the limiting reactant

Calculate the amount of excess reactant.

$$36.11g\ KBr \left| \frac{1\ mole\ KBr}{119.00g\ KBr} \right| \frac{1\ mole\ Cl_2}{2\ mole\ KBr} \left| \frac{70.90g\ Cl_2}{1\ mole\ Cl_2} \right| = 10.76g\ Cl_2$$

$22.30 - 10.76 = 11.54g\ Cl_2$

~~What is the percent yield if 20.41g Br_2 is produced experimentally?~~