Study guide Unit 7
Chapter 10 and 12

Name _____
Hour _____

Matching: Match the correct vocabulary term to each statement. Write the letter of the correct term on the appropriate line.

1 D	the starting materials in a chemical reaction	a stoichiometry
2 H	a conversion factor made from the coefficients of a balanced chemical equation	b conservation of mass
3 F	the maximum amount of product that is calculated	c mole
4 C	the unit that represents 6.02×10^{23} particles of a Substance	d reactants
5 E	the substance that is completely used up in a chemical reaction	e limiting reagent
6 I	the ratio of how much product is produced in the laboratory compared to how much is calculated, this is expressed as a percentage	f theoretical yield
7 A	the calculations of quantities in a chemical reaction	g excess reagent
8 J	the amount of product formed in a laboratory	h mole ratio
9 G	substance left over after a reaction takes place	i percent yield
10 B	the mass of products is equal to the mass of reactants	j actual yield

Remember all equations must be balanced.
You must show work for complete credit.

10. How many moles of carbon dioxide are there in 96.8 L at STP? Eqn 6

$$96.8\,L \times \frac{1\,mole}{22.4\,L} = 4.32\,mol$$

11. How many moles of He are in 9.34×10^{25} atoms? Eqn 2

$$9.3 \times 10^{25}\,atoms \times \frac{1\,mol}{6.02 \times 10^{23}\,atoms} = 154.4\,mol$$

12. What is the empirical formula for C_4H_{10}? C_2H_5

13. Circle the empirical formulas. (H_2O) H_2O_2 $C_6H_{12}O_8$ (CO_2) C_2H_4 (CO) (CH_3) $(C_{12}H_{22}O_{11})$

14. What is the atomic mass of mercury? Hg 200.59 g/mol

15. What is the molar mass of mercury (II) chloride? $HgCl_2$ Hg: 200.59 = 200.59
Cl_2 · 35.45 = 70.90
271.49 g/mol

16. What is the mass of 13.5 moles of calcium chloride?

$$13.5\,mol\,CaCl_2 \times \frac{110.98\,g}{1\,mole} = 1498.23\,g\,CaCl_2$$

Ca = 40.08 g
Cl_2 · 35.45 = 70.90 g
110.98

Eqn 3

17. Write and balance the following equation: Carbon tetrachloride and ~~hydrogen disulfide~~ dihydrogen sulfide undergo a single replacement reaction to form hydrochloric acid and carbon disulfide.

$CCl_4 + 2H_2S \rightarrow 4HCl + CS_2$

18 How many moles of lithium phosphate are produced when you have 8 moles of lithium sulfate?

8 mol Li_2SO_4 = ? mol Li_3PO_4

$3\ Li_2SO_4 + 2Na_3PO_4 \rightarrow 2\ Li_3PO_4 + 3Na_2SO_4$

8 mol Li_2SO_4 | 2 mol Li_3PO_4 / 3 mol Li_2SO_4 | 5.3 mol Li_3PO_4

19 How many moles of water is needed if you want to produce 0.35 moles of lithium hydroxide?

0.35 mol LiOH = ? mol H_2O

$\_\_\_ Li_2O + \_\_\_ H_2O \rightarrow \underline{2}\ LiOH$

0.35 mol LiOH | 1 mol H_2O / 2 mol LiOH | 0.175 mol H_2O

20 How many moles of aluminum are produced when you have 4.5 grams of aluminum chloride?

4.5 g $AlCl_3$ = ? mol Al

$\underline{2}\ AlCl_3 + \underline{3}\ Ca \rightarrow 2Al + 3CaCl_2$

4.5 g $AlCl_3$ | 1 mol $AlCl_3$ / $\underline{3}\ AlCl_3$ | mol $AlCl_3$

21 How many moles of oxygen is needed to react with 8.0 moles of ammonia?

8.0 mol NH_3 = ? mol O_2

$\underline{4}\ NH_{3(g)} + \underline{7}\ O_{2(g)} \rightarrow \underline{4}\ NO_{2(g)} + \underline{6}\ H_2O_{(g)}$

8.0 mol NH_3 | 7 mol O_2 / 4 mol NH_3 | 14 mol O_2

22 How many grams of CH_3OH are produced if 3.50 moles of hydrogen are reacted with excess CO?

3.50 mol H_2 = ? g CH_3OH

$\_\_\_ CO_{(g)} + \underline{2}\ H_{2(g)} \rightarrow \_\_\_ CH_3OH_{(l)}$

3.50 mol H_2 | 1 mol CH_3OH / 2 mol H_2 | 1.75 mol CH_3OH

1.75 mol CH_3OH | 32.05 g CH_3OH / 1 mol CH_3OH | 18.3 g CH_3OH

C 12.01
H_4 4.04
O 16.00
32.05 g