Moles / Balancing Practice / Review Name _____ Block ___

Atom counts - List elements and number of each element.

) $CoPO_4$

1 Co
1 P
4 O

2) $Y_2(CO_3)_3$

2 Y
3 C
9 O

Calculate the molar mass of each compound. Show work.

3) $AgBF_4$

$107.87 + 10.81 + (4 \times 19.00) = 194.68$ g/mol

4) $Hg(IO_3)_2$

$200.59 + (2 \times 126.90) + (6 \times 16.00) = 550.39$ g/mol

5, 6) Balance each equation.

1 P_4O_{10} + 6 H_2O → 4 H_3PO_4 4 P 4 16 O 16 12 H 12	1 C_4H_8 + 6 O_2 → 4 CO_2 + 4 H_2O 4 C 4 8 H 8 12 O 12

7. Balance the following reaction, then prove that mass is conserved *(add up total mass for each side of the reaction)*. Show work.

2 VCl_3 + 3 Mg → 2 V + 3 $MgCl_2$

Reactant mass:

2 moles VCl_3 $(2 \times 157.29) = 314.58$ g

3 moles Mg $(3 \times 24.31) = 72.93$ g

Total = 387.51 g

Product Mass:

2 moles V $(2 \times 50.94) = 101.88$ g

3 moles $MgCl_2$ $(3 \times 95.21) = 285.63$ g

Total = 387.51 g

Substance Formula	Molar Mass	Amount in moles	Amount in grams
8) NH_3	17.04 g/mol	2.32 mol	39.5 g
9) Rb_2O	186.94 g/mol	5.35 mol	1001 g
10) CSe_2	171.95 g/mol	1.95 mol	335 g
11) $Co(SCN)_2$	175.09 g/mol	0.46 mol	80.5 g

Mole Ratios

12) How many moles of $MnCl_2$ are produced when you react 2.80 moles of HCl? Show work.

$MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

$$2.80 \text{ mol } HCl \times \left(\frac{1 \text{ mol } MnCl_2}{4 \text{ mol } HCl}\right) = 0.70 \text{ mol } MnCl_2$$

13) If 1.21 moles of C_2H_3N are burned, how many moles of H_2O are released?

$4C_2H_3N + 13O_2 \rightarrow 8CO_2 + 6H_2O + 4NO$

$$1.21 \text{ mol } C_2H_3N \times \frac{6 \text{ mol } H_2O}{4 \text{ mol } C_2H_3N} = 1.815 \text{ mol } H_2O$$

Mass to Mass Stoichiometry

14) If you formed 83.7 g of XeO_3, how many grams of XeF_6 did you start with? Show work.

1 $XeF_6 + 3H_2O \rightarrow 1XeO_3 + 6HF$

a. Convert starting amount to moles. Show work.

XeO_3 molar mass: $179.29 \frac{g}{mol}$

$$83.7 \text{ g } XeO_3 \times \left(\frac{1 \text{ mol } XeO_3}{179.29 \text{ g } XeO_3}\right) = 0.467 \text{ mol } XeO_3$$

(divide by molar mass to get moles)

b. Use a mole ratio to calculate moles of the other substance. Show work.

$$0.467 \text{ mol } XeO_3 \times \left(\frac{1 \text{ mol } XeF_6}{1 \text{ mol } XeO_3}\right) = 0.467 \text{ mol } XeF_6$$

↑ Balanced equation coefficients

c. Convert moles to grams for final answer. Show work.

XeF_6 molar mass: $245.29 \frac{g}{mol}$

$$0.467 \text{ mol } XeF_6 \times \left(\frac{245.29 \text{ g } XeF_6}{1 \text{ mol } XeF_6}\right) = 114.5 \text{ g } XeF_6$$

(multiply by molar mass to get grams)