Final Exam Review Sheet

NAME Key
MOD 9

1. For the following decide if the characteristic represents a physical property or a chemical property and tell me your reasoning:

   - Water has a density of 1.0 g/mL -
     Why? Physical because measuring it does NOT change the identity
   - Metals are ductile and malleable –
     Why? Physical - no identity change
   - Some metals become dull when exposed to air –
     Why? Chemical - new substance formed (changes identity)
   - Oxygen gas supports the combustion of a fuel –
     Why? Chemical - new substance (change identity)
   - Copper compounds are often blue or green in color –
     Why? Physical - no identity change

2. For the following decide if the change described represents a physical change or a chemical change and tell me your reasoning:

   - Milk turns sour if left unrefrigerated -
     Why? Chemical - new substance formed
   - A piece of paper is torn in half –
     Why? Physical - still paper
   - When vinegar and baking soda are mixed, carbon dioxide gas is formed –
     Why? Chemical - new substance formed
   - An ice cube melts –
     Why? Physical - still water
   - Your car develops rust –
     Why? Chemical - new substance

3. Given the correct formulas Al_2O_3, $SiCl_4$ and $BeCl_2$, predict the correct formulas for compounds containing: (13, 16, 14, 17, 2, 17)

   - Mg and F (2, 17) so ... MgF_2
   - B and S (13, 16) so ... B_2S_3
   - Sn and Cl (14, 17) so ... $SnCl_4$

4. Find the **molar mass** of each substance:

   - the element oxygen, O 16.0 g (look on P.T for O)
   - the compound zinc nitrate $Zn(NO_3)_2$

1	Zn	× 65.4 g	=	65.4
2	N	× 14.0	=	28.0
6	O	× 16.0	=	96.0
				189.4 g

5. If I have one **mole** of H_2O (water), how many **molecules** of water do I have?

6.02×10^{23} molecules

6. How many **moles** are there in 56.4 grams of FeF_3? → 1 Fe × 55.8 = 55.8
3 F × 19.0 = 57.0
112.8 g

$$\frac{1 \text{ mol } FeF_3}{112.8 \text{ g}} = \frac{x \text{ mol}}{56.4 \text{ g}} \qquad x = 0.5 \text{ mol}$$

7. How many **grams** are in 3.3 moles of potassium sulfide, K_2S? → 2 K × 39.1 = 78.2
1 S × 32.1 = 32.1
110.3 g

$$\frac{1 \text{ mol } K_2S}{110.3 \text{ g}} = \frac{3.3 \text{ mol}}{x \text{ g}} \qquad x = \quad \text{g}$$

8. a) Balance the following equation:

$$3\ Mg + 2\ AlCl_3 \rightarrow 3\ MgCl_2 + 2\ Al$$

b) How many moles of each reactant and product are specified by the balanced chemical equation?

3 mol Mg
2 mol $AlCl_3$

3 mol $MgCl_2$
2 mol Al

9. Fill in the table below.

Nuclear Symbol	Name	Protons	Neutrons	Mass Number	Electrons
$^{67}_{31}Ga$	Gallium – 67	31	36	67	31
$^{201}_{81}Tl$	Thallium-201	81	120	201	81
$^{75}_{33}As$	Arsenic – 75	33	42	75	33
$^{208}_{82}Pb$	Lead - 208	82	126	208	82
$^{139}_{56}Ba^{+2}$	Barium - 139	56	83	139	54

10. Write nuclear equations for the following:

a) the alpha decay of polonium-218 (symbol Po)

$$^{218}_{84}Po \rightarrow {}^{4}_{2}\alpha + {}^{214}_{82}Pb$$

b) the beta decay of bismuth-214 (symbol Bi)

$$^{214}_{83}Bi \rightarrow {}^{0}_{-1}\beta + {}^{214}_{84}Po$$

c) the gamma decay of thorium-230 (symbol Th)

$$^{230}_{90}Th \rightarrow {}^{0}_{0}\gamma + {}^{230}_{90}Th$$