**Worksheet Practice Test** 2: Unit 3

1. Covert 200. g NaCl to formula units.

**200 g x 1 mole x 6.02 x 1023 FU = 2.06 x 1024 FU**

**58.5 g 1 mole**

2. Convert 5.99 x 1025 H2O molecules to grams.

**5.99 x 1025 H2O molecules x 1 mole x 18.02 g = 1.79 x 103 g H2O**

**6.02 x 1023 molecules 1 mole**

3. A certain mass of CH4 contains 2.00 x 1025 atoms of H. Calculate the mass of CH4.

**2.00 x 1025 atoms H** **x 1 molecule CH4 x 1 mole x 16.04 g = 133 g CH4**

**4 at H 6.02 x 1023 molecules 1 mole**

4. A compound was found to be composed of 6.89 g Si and 5.89 g O. If the molecular mass of the compound is 417 g/mol, what is the molecular formula of the compound?

**6.89 g Si x 1 mole = 0.2452 mole = 1 x 2 = 2**

**28.1 g 0.2452 mole**

**5.89 g O x 1 mole = 0.3681 mole = 1.501 x 2 = 3**

**16.0 g 0.2452 mole**

**Si2O3 104.2 g/mole**

**Si8O12 417 g/mole**

5. 500. g of Fe2O3 are refined to produce 200. g of Fe. Calculate the percentage yield of Fe.

2Fe2O3 + 3C → 4Fe + 3CO2

**500. g Fe2O3 x 1 mole x 4 mole Fe x 55.8 g = 350 g**

**159.6 g** **2 mole Fe2O3** **1 mole**

**Percentage Yield = 200 g x 100% = 57.1 %**

**350 g**

6. 500. g of Fe2O3 are refined to produce Fe at a 78.0 % yield, calculate the actual yield of Fe.

2Fe2O3 + 3C → 4Fe + 3CO2

**500 g Fe2O3 x 1 mole x 4 mole Fe x 55.8 g x 0.780 = 273 g**

**159.6 g 2 mole Fe2O3 1 mole**

7. Calculate the molar mass of Cr2(H20)6(SO4)3.

**500.42 g/mole**

8. Complete the chart:

2 Al + 3 I2 → 2 AlI3

S: 12 mol 15 mol 0

R: **10mol 15mol 10mol**

F: **2 mol 0 10 mol**

9. 12.8 g of Al reacts with 12.8 g of O2 to produce Al2O3. How many grams of Al2O3 are produced? Determine the mass of the reactant in excess and the limiting reactant.

**4Al + 3O2 → 2Al2O3**

**S 0.4741mol 0.4000mol 0**

**R 0.4741 0.3555 mol 0.2371mol**

**F 0 0.0445 mol 0.237mol**

**Limiting Reactant**

**Excess Reactant**