**Worksheet Stoichiometry**

1. Calculate the number of grams water produced by the complete reaction of 100. g of hydrogen with excess oxygen (theoretical yield). 2H2 + O2 → 2H2O

**100. g H2 x 1 mole x 2 mole H2O x 18.02 g = 892 g H2O**

 **2.02 g 2 mole H2 1 mole**

2. Calculate the mass of carbon required to consume 5.67 g of iron III oxide

 2Fe2O3 + 3C → 4Fe +3CO2

**5.67 g Fe2O3 x 1 mole x 3 mole C x 12.0 g = 0.639 g C**

 **159.6 g 2 mole Fe2O3 1 mole**

3. Calculate the amount of oxygen in grams produced by the reaction of 69.0 g of water.

 2H2O → 2H2 + O2

**69.0 g H2 O x 1 mole x 1 mole O2 x 32.0 g = 61.3 g O2**

 **18.02 g 2 mole H2O 1 mole**

4. Calculate the theoretical yield in grams of Fe produced by the reaction of 5.67 g of

iron III oxide.

 2Fe2O3 + 3C → 4Fe +3CO2

**5.67 g Fe2O3 x 1 mole x 4 mole Fe x 55.8 g = 3.96 g Fe**

 **159.6 g 2 mole Fe2O3 1 mole**

5. Calculate the number of moles CO2 produced by the reaction of 8.45 g of C.

 2Fe2O3 + 3C → 4Fe +3CO2

**8.45 g C x 1 mole x 3 moles CO2 = 0.704 moles CO2**

 **12.0 g 3 mole C**

6. Calculate the number of Fe atoms consumed in the reaction if 100. g of Fe2O3 react.

 2Fe2O3 + 3C + 235 KJ → 4Fe +3CO2

**100. g Fe2O3 x 1 mole x 4 mole Fe x 6.02 x 1023 at = 7.54 x 1023 at Fe**

 **159.6 g 2 mole Fe2O3 1 mole**

7. Calculate the number of grams water produced by the complete reaction of 14.5 g of oxygen (theoretical yield).

 2H2 + O2 → 2H2O

**14.5 g O2 x 1 mole x 2 mole H2O x 18.02 g = 16.3 g H2O**

 **32.0 g 1 mole O2 1 mole**

8. Calculate the mass of carbon required to produce 5.67 g of iron.

 2Fe2O3 + 3C → 4Fe +3CO2

**5.67 g Fe x 1 mole x 3 mole C x 12.0 g = 0.915 g C**

 **55.8 g 4 mole Fe 1 mole**

9. Calculate the amount of oxygen in grams produced by the reaction of 125 g of water.

 2H2O → 2H2 + O2

**125 g H2O x 1 mole x 1 moleO2 x 32.0 g = 111 g O2**

 **18.02 g 2 mole H2O 1 mole**

10. Calculate the theoretical yield in grams of CO2 produced by the reaction of 15.6 g of iron III oxide.

 2Fe2O3 + 3C → 4Fe +3CO2

**15.6 g Fe2O3 x 1 mole x 3 mole CO2 x 44.0 g = 6.45 g CO2**

 **159.6 g 2 mole Fe2O3 1 mole**

11. Calculate the number of molecules of CO2 produced by the reaction of 2.45g of

iron III oxide.

 2Fe2O3 + 3C → 4Fe +3CO2

**2.45 g Fe2O3 x 1 mole x 3 mole CO2 x 6.02 x 1023 molecules = 1.39 x 1022 molecules CO2**

 **159.6 g 2 mole Fe2O3 1 mole**