**Worksheet Practice Test: Unit 3**

**A Mole calculations**

1. Change 8.75 moles of H2O to molecules.

**5.27 x 1024 molecules H2O**

2. Change 9.7x1019 atoms Fe to moles.

**1.6 x10-4 mol Fe**

3. Convert 800. g AgNO3 to formula units and then to atoms of O.

**2.83 x1024 FU AgNO3**

**8.50 x 1024 atoms O**

4. Convert 3.8 x 1025 H2 molecules to grams.

**1.3x102g H**

**B Percentage Composition**

5. Calculate the percentage composition of Na2SO4.

**32.4% Na 22.6%S 45.0%O**

**C Molecular Formula and Empirical Formula**

6. Calculate the empirical formula of a compound that is 62.2 % Pb,

8.454 % N, and 28.8 % O. Is this compound ionic or covalent?

**Pb (NO3) 2 ionic**

7. A compound is 42.3 % C, 5.94 % H, 32.9 % N, and 18.8 % O and has a molecular mass of 425.25 g/mol. Calculate the empirical and molecular formula.

**C3H5N2O C15H25N10O5**

**D Stoichiometry**

8. How many grams of O2 are required to consume 100. g Al?

4Al + 302→ 2Al2O3

**88.9g O**

9. How many moles of Al2O3 are produced by the reaction 200. g Al?

4Al + 302 → 2Al2O3

**3.70 moles Al2O3**

10. How many moles Al are required to produce 300. g Al2O3?

4Al + 302 → 2Al2O3

**5.88 moles Al**

11. How many litres of O2 gas are required to produce 100. g Al2O3?

4Al + 302 → 2Al2O3

**32.9 L**

**E Percentage Yiel**d

12. 100. g Al reacts with excess O2 to produce 150. g Al2O3 according to

Calculate the theoretical and percentage yield. 4Al + 302 → 2 Al2O3.

**Theoretical Yield = 189g Al2O3**

**F Limiting Reactants**

13. 20. mol H2 reacts with 8.0 mol O2 to produce H2O. Determine the number of grams reactant in excess and number of grams H2O produced. Identify the limiting reactant.

**8.0 g excess H2 2.9 x 102 g H2O in excess O2 is limiting**

14. 128g of Al reacts with 128g of O2 to produce Al2O3. How many grams of Al2O3 are produced? Determine the mass of the reactant in excess and the limiting reactant.

**Al is limiting 14.1g O2 are in excess 241g Al2O3**

15. 13.6 g of Al reacts with 8.33 g O2 to produce Al2O3.How many grams of Al2O3 are produced? Determine the mass of the reactant in excess and the limiting reactant.

**O2 is limiting 4.23 g Al are in excess 17.7 g of Al2O3 are produced**