**Chemistry I Spring Final Review: Unit 8-9**

**Stoichiometry and Molecular Geometry**

**Unit 8: Stoichiometry**

1) What is the correct balanced equation that shows the decomposition of lithium chloride?

 A) LiCl → Li+ Cl

 B) LiClO3 → LiCl + O3

 C) 2LiCl → 2Li + Cl2

D) 4LiClO3 → Li2O3 + Cl2

2) How many liters of ethane (C2H6) at STP, will react with 8.50 L O2 to form CO2 and water? \* Use mole map!

 2C2H6(g) + 7O2(g) 🡪 4CO2(g) + 6H2O(g)

 A) 15.8 L B) 2.43 L C) 0.687 L D) 45.6 L

3) How many grams of nitric acid are needed to react with 35.0g of iron (III) chloride according to the following equation?

3HNO3 + FeCl3 🡪 Fe(NO3)3 + 6HCl

 A) 13.6 g B) 11.7 g C) 4.53 g D) 40.8 g

4) How many moles of aluminum are needed to react completely with 1.2 mol of FeO?

 2Al(s) + 3FeO(s) 🡪 3Fe(s) + Al2O3(s)

 A) 0.80 mol B) 2.4 mol C) 4.8 mol D) 1.6 mol

5) The reactant that is completely used up and determines how much product can be made is called the \_\_\_\_\_\_\_\_.

 A) limiting reactant B) excess reactant C) percent yield D) theoretical

6) Determine how many grams of calcium is found in 20 grams of calcium chloride. \*Hint: 2 steps!

1. 5.5 g
2. 7.2 g
3. 12.7 g
4. 15.3 g

7) When 15 g of magnesium is burned in 20 g of oxygen, how many grams of magnesium oxide can be produced max? (MM: Mg = 24.31 g/mol, O2 = 32 g/mol, MgO = 40.31 g/mol)

**2Mg (s) + O2 (g) → 2MgO (s)**

1. 24.8 g B) 50.4 g C) 41.5 g D) 63.0 g

8) What is the limiting reactant in the question above?

1. Magnesium B) Oxygen C) Both reactants D)None

9) When a chemist decomposes 4.7 g of lead(II) nitrate by heating, 0.78 g of nitrogen dioxide,NO2, is actually produced in the lab. What is the percent yield of the decomposition reaction?

**2 Pb(NO3)2 (s) → 2 PbO (s) + 4 NO2 (g) + O2 (g)**

*(MM: Pb(NO3)2 = 331.2 g/mol, PbO = 223.2 g/mol, NO2 = 46 g/mol, O2 = 32 g/mol)*

1. 44 %
2. 60 %
3. 67 %
4. 82 %

10) Name the following hydrate: MnSO4•7H2O

1. Manganese (II) sulfate heptahydrate
2. Manganese (II) sulfite septahydrate
3. Magnesium sulfite hexahydrate
4. Manganese (I) sulfate pentahydrate

**Unit 9: Molecular Geometry**

11) Diamonds have many unique properties and are made of carbon chains. What specific type of solid is this macromolecule?

1. polar molecular B) non-polar molecular C) metallic D) covalent network

12) Determine which of the following compounds does not obey the **general octet** rule.

1. CO2 B) Br2 C) CCl4 D) BF3

13) What is the shape of H2O?

 A) linear B) bent C) trigonal pyramidal D) trigonal planar

14) Which represents a polar molecule?

1. C2H6 B) HF C) Cl2 D) CF4

15) Choose the answer that correctly matches the molecule with its corresponding VSEPR shape.

1. oxygen gas --- trigonal planar
2. hydrogen monofluoride --- bent
3. carbon tetrafluoride--- trigonal pyramidal
4. sulfur difluoride --- bent

16) How many shared and unshared electron pairs are found on the central atom of ammonia?

1. 1 shared electron pair, 3 lone pairs
2. 2 shared electron pairs, 2 lone pairs
3. 3 shared electron pairs, 1 lone pair
4. 4 shared electron pairs, 0 lone pair
5. 3 shared electron pairs, 0 lone pair

17) What is the only possible molecular geometry for a compound XY4?

 A) linear B) bent C) trigonal pyramidal D) tetrahedral

18) The VSEPR theory states that electrons tend to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

 A) repel and spread as far from each other as possible

 B) attract and get as close to each other as possible

 C) repel and spread out to form 45 degree angles

 D) attract and form bonds

19) HCN is a \_\_\_\_\_\_\_\_\_\_\_ and has a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ shape.

 A) nonpolar molecule; linear

 B) polar molecule; linear

 C) nonpolar molecule; bent

 D) polar molecule; bent

20) A delocalized “sea of electrons” allows for electrical conductivity and malleability of \_\_ compounds.

1. molecular non-polar
2. metallic
3. ionic
4. covalent network