Name: _____Date:_____

AICE Chemistry – Summer Recap and Review

I. Name or write the formula of the following:

1. Sodium chlorate _____
2. Stannic carbonate _____
3. Hydrobromic acid _____
4. Phosphorus trichloride _____
5. Tungsten (VI) chromate _____
6. dichlorine heptoxide _____
7. silver (I) chloride _____
8. calcium carbonate _____
9. nickel (II) sulfide _____
10. aluminum nitride _____
11. MgC_2O_4 _____
12. $(NH_4)_3PO_3$ _____
13. $HC_2H_3O_2$ _____
14. ICl_3 _____
15. $V_2(SiO_3)_5$ _____
16. CaI_2 _____
17. $Be(OH)_2$ _____
18. $Sn(NO_3)_2$ _____
19. P_2F_3 _____
20. Zn_3P_2 _____

II. State the Type of reaction, Predict, Balance and write the states of the following:

1. $KNO_3 + PbSO_4 \rightarrow$
2. $C_5H_{12} + O_2 \rightarrow$
3. Iron (III) reacts with chlorine gas
4. Silver oxide decomposes
5. $C_4H_8 + O_2 \rightarrow$
6. $Al + N_2 \rightarrow$

III. Mole conversions:

1. How many formula units of sodium bicarbonate are in 62.8 grams of sodium bicarbonate?
2. Convert 46.7 liters of propane at STP into atoms in propane.

IV. Stoichiometry:

1. Determine the theoretical yield of the product in Part II number 3 if 56.7 grams of Iron(III) reacts with excess chlorine gas.
2. Predict the volume of pentane gas that is burned when 3.45×10^{23} molecules of water is produced in Part II number 2.
3. What is the percent yield if 53.46 grams of lead (II)nitrate is produced by 85.93 grams of potassium nitrate reacting with excess lead (II) sulfate.
4. If 56.7 g of propane (C_3H_8) gas burns in 17.9 L of oxygen gas under STP conditions, what mass of water is produced? What is the limiting reactant? How much excess reactant is left over?

V. Empirical versus Molecular Equations:

1. The molar mass of a compound is 30.0 g/mol with an empirical formula of CH_2O, what is the molecular formula?

2. Determine the molecular formula of a compound that is 82.76 % C and the rest is hydrogen if it has a molecular mass of 87.0g/mol.

3. Determine the percent composition of ammonium borate.

VI. Bonding:

1. Draw the Lewis electron structure for each of the following and give the **shape name**, the **bond angle**, the **polarity**, and the **strongest intermolecular force of attraction**.
    a. PF_3
    b. H_2CO
    c. $SiBr_4$
    d. NS_2^{-1}
    e. SiO_2

VII. Gas Laws:

1. What is the volume of a flexible container that starts at STP (for volume too) and changes to a 53.0°C and 108.4 kPa?

2. If 8.53 grams of a diatomic gas has a volume of 7510 mL, a pressure of 546 mmHg and at 20.0 °C, what is the diatomic gas?(Hint: determine the molar mass of the gas)

3. Graph the relationships between temperature, pressure, and volume for a fixed mass of a gas. (Compare two variables per graph.)

VIII. Concentrations:

1. Determine the concentration of a solution that dissolves 456 grams of calcium nitrate in 500.0 mL solution.

2. If the above solution is diluted to 0.88 M solution, what volume of solution will be available? How much water was added to create this solution?

IX. Subatomic Particles:

1. Determine the number of protons, neutrons, and electrons:
   a. Si
   b. Mn
   c. Sr^{+2}
   d. As^{-3}
   e. Eu

2. Write the isotope notation of the following:
   a. $p^+ = 27$ n = 31 $e^- = 27$
   b. $p^+ = 33$ n = 43 $e^- = 36$
   c. $p^+ = 40$ n = 49 $e^- = 38$

3. Write the electron configuration and orbital notation of the following:
   a. Si
   b. Mn
   c. Sr^{+2}
   d. As^{-3}
   e. Eu (noble gas configuration only 😊)

4. How much of Uranium - 239 will be left if the substance contained 542 grams originally and it has been 176 years, if the half-life is 22 years?