**District Assessment Review**

**CLS 3 – Bonding – Ionic and Covalent**
**Determine if the compound is ionic (I) or covalent (C).**
1. SCl2 \_\_**C**\_\_ 3. KOH \_\_**I**\_\_\_

2. CaCO3 \_\_**I**\_\_\_ 4. N2O \_\_\_**C**\_\_

**Draw the Lewis dot structure and determine if the compound is polar or nonpolar.**
5. CH4 H 6. NH3 ..
 H - C - H H - N - H
 H H
 nonpolar polar
**What is the name of each compound?**
7. CuSO4 \_\_\_**copper (II) sulfate**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

8. PCl3 \_\_\_**phosporous trichloride**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

9. NO \_\_\_\_**nitrogen monoxide**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

10. Zn(OH)2 \_\_\_\_**zinc hydroxide**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**What is the formula of each compound?**
11. carbon tetrachloride \_\_**CCl4**\_\_\_ 13. calcium phosphate \_\_**Ca3(PO4)2**\_\_

12. potassium sulfide \_\_**K2S**\_\_\_ 14. lead (IV) oxide \_**PbO2**\_\_\_

**CLS 4 – Equations and Reactions**

**Balance the following equations.**

1. \_**2**\_\_ Al + \_\_**6**\_ HNO3 🡪 \_\_**2**\_ Al(NO3)3 + \_**3**\_\_ H2

2. \_**2**\_\_ ­(NH4)3PO4 + \_**3**\_\_ CuSO4  🡪 \_\_**3**\_ ­(NH4)2SO4 + \_\_**1**\_ Cu3(PO4)2

**Predict the products of the following reactions.**

3. CaBr2 + **2** KOH 🡪 **Ca(OH)2 + 2 KBr**

4. **2** Mg + O2 🡪 **2 MgO**

5. C3H8 + **5** O2 🡪 **4 H2O + 3 CO2**

6. **3** Ba + **2** FeCl3  🡪  **3 BaCl2 + 2 Fe**

**Classify the type of reaction for each of the chemical reactions above.**

 1. \_**Single Replacement**\_\_\_\_\_ 4. \_**Combination**\_\_\_\_\_\_\_\_\_\_\_

 2. \_**Double Replacement**\_\_\_\_\_ 5. \_**Combustion**\_\_\_\_\_\_\_\_\_\_\_\_

 3. \_**Double Rplacement**\_\_\_\_\_\_ 6. \_**Single Replacement**\_\_\_\_\_\_\_

**Write the correct formula reaction and balance the equation.**

7. Fluorine reacts with sodium chloride.
 **F2 + 2 NaCl 2 NaF + Cl2**

8. Potassium iodide reacts with magnesium sulfate.

 **2 KI + MgSO4 K2SO4 + MgI2**

**CLS 5 – Moles & Stoichiometry**

Factor Label

1. Use the following conversion factors to determine how many inches are in 3.76 meters.

 **3.76 m x 100 cm x 1 m = 148 m
 1 m 2.54 cm**

Molar Mass
2. What is the molar mass of Zn(NO3)2? 3. What is the molar mass of oxygen gas?

 **189.40 g/mole O2 = 32 g/mole (diatomic element)**

Percent Error
4. A lab group calculated the density of a sample of aluminum. They found it to have a
 density of 2.37 g/mL. The accepted (theoretical) density of aluminum is 2.70 g/mL.
 What is the percent error?
 **2.70 – 2.37 x 100 = 12.2%
 2.70**

Mole Conversions
5. How many atoms are in 2.13 moles of calcium?
 **2.13 moles Ca x 6.022x1023 atoms = 1.28x1024 atoms Ca
 1 mole**

% Error = Theoretical – Experimental x 100

 Theoretical

1 m = 100 cm
1 in = 2.54 cm

6. How many grams are in 4.67 x 1023molecules of H2O?
  **4.67x1023 molecules x 1 mole \_\_ x 18.02 g = 14.0 g H2O
 6.022x1023 molecules 1 mole**

Stoichiometry
Use the following balanced equation to answer the questions.
 2 Al + 6 HCl 🡪 2 AlCl3 + 3 H2

7. How many moles of HCl need to react to produce 0.760 moles of AlCl3?
 **0.760 moles AlCl3 x 6 moles HCl = 2.28 moles HCl
 2 moles AlCl3**

8. How many grams of H2 are produced if 34.5 grams of Al react?

 **34.5 g Al x 1 mole Al x 3 moles H2 x 2.02 g H2 = 3.87 g H2**

 **26.98 g Al 2 moles Al 1 mole**

**CLS 6 – Gases**1. If the volume of a gas decreases by one half, the pressure of the gas

 will \_\_**increase**\_\_\_\_ by \_\_\_\_\_\_**2**\_\_\_\_\_\_\_.

2. At STP, the temperature is \_\_**273**\_\_\_ K and the pressure is \_**1**\_\_atm.

3. What happens to the movement of particles at absolute zero? \_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_**Theoretically, the particles would stop moving.**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. \_\_\_\_**Gas**\_\_\_\_ particles are compressible because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 \_\_\_\_\_\_\_\_\_\_\_**there is space between the particles**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

5. A sample of gas has a pressure of 825 torr at 45°C. What is the new pressure
 if the temperature decreases to 15°C and the volume stays constant?

 **P2 = P1T2 = (825 torr) x (288K) = 747 torr**

 **T1 318K**

6. A balloon filled with 400. mL of helium gas is at 295 K and 775 torr. If the
 temperature decreases to 275K and the volume is 525 mL, what is the new
 pressure of the helium gas?

 **P2 = P1V1T2 = (775 torr) x (400 mL) x (275 K) = 550 torr
 V2T1 (525 mL ) x (295 K)**

7. A 4.75 L sample of gas is at STP conditions. What is the new volume if the
 temperature is 32°C and the pressure is 1.65 atm?  **V2 = P1V1T2 = (1 atm) x (4.75 L) x (305 K) = 3.22 L**

 **P2T1 (1.65 atm) x (273 K)**

**CLS 7 – Acids & Bases and Solutions**

1. Acid + Base 🡪 \_\_**Water**\_\_ + \_\_**Salt**\_\_\_

2. Determine if the following describes an ACID or a BASE.

 a. contains hydrogen ions \_\_**Acid**\_\_\_\_

 b. contains hydroxide ions \_\_**Base**\_\_\_\_

 c. pH = 10.5 \_\_\_**Base**\_\_\_\_

 d. pH = 4.2 \_\_\_**Acid**\_\_\_\_\_

3. What is the pH of solution of HNO3 with a concentration of 1.0 x 10-2 M?

 **pH = - log[H+] = - log [1.0x10-2] = 2**

4. What is the hydrogen concentration of a solution with a pH of 3.5?

 **[H+] = 10-pH = 10-3.5 = 3.16x10-4 M**

5. 50.0 grams of sucrose is dissolved in water. The volume of the solution is 300 mL.

 a. What is the solute? \_\_**Sucrose**\_\_\_\_\_\_\_\_\_\_\_

 b. What is the solvent? \_\_\_**Water**\_\_\_\_\_\_\_\_\_\_\_\_

6. Calculate the molarity of a solution that has 0.750 moles of NaCl dissolved into
 525 mL of solution.

 **Molarity = moles = 0.750 moles = 1.43 M
 L 0.525 L**

7. How many grams of NaOH are needed to make 250. mL of a 2.00 M solution?

 **0.25 L NaOH x 2.00 moles NaOH x 40 g NaOH = 20 g
 L mole**