Chem B Final Review

1. Identify the SI Units for each of the following measurement types:

mass	volume
temperature	pressure
energy	quantity
molar mass	specific heat

2. Explain the difference between potential energy, kinetic energy and heat. How is each represented in a chemical reaction?

3. Indicate if ΔH is positive or negative and provide examples to complete the table:

Type of Process	Chemical Process	Physical Process
Endothermic ΔH =		
Exothermic ΔH =		

4. Explain the difference between entropy and enthalpy.

5. What is electronegativity? How does it influence the types of bonds 2 atoms can form with each other?

6. Give examples to complete the table:

Covalent (nonpolar):	Polar Covalent:	Ionic:

7. Predict the ionic compounds formed by each of the following pairs of elements. Then write the electron configuration for each **atom** and **ion** (that means 4 configurations per pair).
    a. Beryllium and Fluorine

    b. Lithium and Oxygen

8. How is molar volume different from molar mass?

9. List and describe the parts of the kinetic molecular theory.

10. What is an ideal gas?

11. List and describe the intermolecular forces.

12. Why doesn't temperature increase or decrease during a phase change?

13. Explain the difference between a dilute solution and an unsaturated solution.

14. Explain the difference between a concentrated solution and a supersaturated solution.

15. What are the reactants of neutralization reactions? What are the products?

16. How does pH change when an acid is mixed with water? Why?

17. Complete the table by predicting the salt formed by each reaction:

	HCl	H_2SO_4	H_3PO_4
KOH			
$Ca(OH)_2$			
$Al(OH)_3$			

18. Review all vocab words from this trimester

Short Answer Review

1. The specific heat capacity of aluminum is 0.89 J/gC. How many Joules of energy are needed to warm 22.50 g of aluminum from 2.00 ◦C to 49.00 ◦C

2. The specific heat capacity of gold is 0.13 J/g °C. How many Joules of energy are needed to warm 2.500 g of gold from 10.0°C to 39.5°C?

5. How much heat is evolved if 24.00 g of methanol (CH_3OH) is burned in excess O2?

The reaction is $2\ CH3OH(l) + 3\ O2(g) \rightarrow 2\ CO2(g) + 4H2O(g)$ $\Delta H = -1453$ kJ

6. For the following table, draw a picture of the this structure and then label it as one of the five shapes we have talked about in class: Linear, Bent, Trigonal Planar, Tetrahedral, Trigonal Pyramidal. Show all lone pairs, and single, double, and triple bonds. (* doesn't follow octet rule)

Compound	Lewis Structure	Shape Name
NH_3		
O_2		
CH_4		
NO_3^-		

7. 5 g of methane (CH_4) has a pressure of 1.34 atm at 120^{o}C. Find the volume occupied by the gas.

8. A sample of helium gas occupies 1.4 L at 29°C and 2.956 atm. What volume will it occupy at 42°C and 2.24atm?

9. You notice a chunk of H_2O that has a mass of 96.0 g and is at a temperature of -27.00 ^oC. How much energy is required to heat the H_2O up to 111.00 ^oC?

10. If you have 12.3 grams of $N_{2(g)}$ at STP, then what is the size of your container holding this gas?

11. What is the pressure in atmospheres of a container of gas at 238 KPa?

$$Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$$

12.You perform the experiment above at STP and when the reaction is finished you end up with 2.8L of 4.6M $MgCl_2$.

a. How much H_2 gas in liters must have been produced?

b. How much Mg metal must you have started with in grams

13. What volume of 2.45 M HF would be needed to neutralize 75.8 mL of 1.37 M LiOH? 4 points

14. Determine the pH and pOH of all of the following:

A. 0.000501 M HCl pH: _____ pOH: _____
B. 4.9 M NaOH pH: _____ pOH: _____
C. 0.0051 M KOH pH: _____ pOH: _____
D. 0.011 M HNO_3 pH: _____ pOH: _____

14. What is the molarity of a 2.25 L solution containing 25 g of LiBr?

15. Determine the mass of the solute in a 8.04 L sample of 1.51 M solution of sucrose and water. Sucrose is $C_{12}H_{22}O_{11}$.

16. If you have solution labeled as 0.53M $NaNO_3$ and you know it contains 23 grams of solute, then what is the volume of this solution?

17. You are preparing a lab for Chemistry class in which you need to create two samples of HCl. The first sample, A, should be 230 mL of 0.5 M HCl. The second sample, Q, should be 110 mL of 4.5 M HCl. Starting with 12 M HCl, find out how much concentrated HCl you would need for each sample.