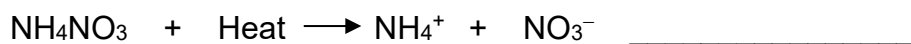
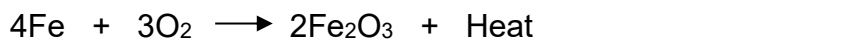


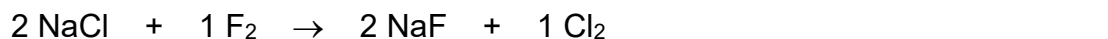
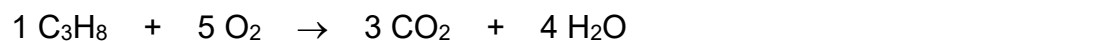
Bonding and Reactions

- Describe the differences in bonding between ionic and covalent compounds.
- Metals _____ electrons and become _____. Nonmetals _____ electrons and become _____.
- What are the oxidation states of the following elements?
 - beryllium
 - oxygen
 - xenon
 - fluorine
- Name 5 signs of a chemical change.
- Name the following compounds:
 - Na_2SO_4
 - P_3N_5
 - $\text{Mg}(\text{OH})_2$
 - Fe_2O_3
 - N_2O_4
- Write the formulas of the following compounds:
 - lithium sulfate
 - calcium phosphate
 - potassium oxide
 - sulfur dioxide
 - dinitrogen trioxide
 - ammonium carbonate
- Balance the following equations:
 $\text{C}_8\text{H}_{18} + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$
 $\text{CaSO}_4 + \text{LiF} \rightarrow \text{CaF}_2 + \text{Li}_2\text{SO}_4$
 $\text{AlF}_3 + \text{Na}_2\text{CO}_3 \rightarrow \text{NaF} + \text{Al}_2(\text{CO}_3)_3$
 $\text{S}_8 + \text{O}_2 \rightarrow \text{SO}_3$

- 8) Classify the following reactions as either exothermic or endothermic.

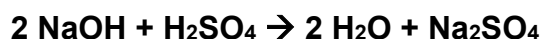


- 9) Types of Reactions – In the space provide, indicate the type of reaction taking place.

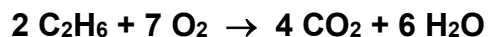


Stoichiometry

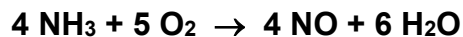
- 10) How many grams of sodium sulfate will be formed if you start with 200 grams of sodium hydroxide and have an excess of sulfuric acid?



- 11) How many moles CO_2 are produced when 30.0 g of C_2H_6 are burned completely?



- 12) What volume of O_2 is required to produce 80.0 L of NO (g)?



Scientific Investigation

- 13) Why can there be only one independent variable in any given experiment?
- 14) Suppose you want to use a flashlight, but when you turn it on, it doesn't work. What would your observation be? What might your hypothesis be? How would you test that hypothesis?
- 15) In an experiment, the control is _____.
- a judgment based on the information obtained
 - the variable that the experimenter plans to change
 - the variable that changes due to changes in the independent variable
 - the standard that is used for comparison
- 16) A student determined that the density of a sample of tin is 8.00 g/mL, when the actual density of tin is 7.28 g/mL. What was the percent error in the student's calculation?

Atomic Structure & Periodic Trends

- 17) A row of elements on the periodic table is called a _____. A column of elements on the periodic table is called a _____.
- 18) Fill in the table for each element below.

Elements	Atomic #	Atomic mass	# of Protons	# of Neutrons	# of Electrons
Ca					
Fe					
Sn					
Br					

- 19) Define the terms Electronegativity and Ionization Energy.

Questions 20 - 23 refer to the set of lettered choices below. Select the one lettered choice that best fits each statement. A choice may be used once, more than once, or not at all.

- (A) alkali metal
- (B) transition metal
- (C) alkaline earth metal
- (D) noble gas

- 20) This type of element is associated with the outer electron configuration p^6 . _____
- 21) This type of element is associated with the outer electron configuration s^1 . _____
- 22) This type of element is associated with the outer electron configuration d^7 . _____
- 23) This type of element is associated with the outer electron configuration s^2 . _____

Equilibrium

- 24) When a reaction is at equilibrium, the rate of the _____ reaction is equal to the rate of the _____ reaction.
- 25) Write the equilibrium expression for the following reaction: $\text{N}_2(\text{g}) + 3 \text{H}_2(\text{g}) \leftrightarrow 2 \text{NH}_3(\text{g})$

Solutions

Calculate the Molarities of the following solutions:

- 26) 2.3 moles of sodium chloride in 0.45 liters of solution.
- 27) 98 grams of sodium hydroxide in 2.2 liters of solution.

Calculate the volume for this Molar Dilution:

- 28) How many milliliters of 2.55 M NaOH is needed to make 125 mL of 0.75 M NaOH solution?

Gas Laws

- 29) What is temperature and pressure at STP?
- 30) If I have 5.6 L of gas in a piston at a pressure of 1.5 atm and compress the gas until its volume is 4.8 L, what will the new pressure inside the piston be?
- 31) A weather balloon is inflated to a volume of 28.7 L at a pressure of 735 mmHg and a temperature of 32.3 °C. The balloon rises in the atmosphere to an altitude where the pressure is 360 mmHg and the temperature is -16.7 °C. What is volume at this altitude?

Significant Figures

How many significant figures are in each of the following numbers?

- 32) 210 _____ 33) 1021 _____ 34) 0.00120 _____

Solve the following mathematical problems such that the answers have the correct number of significant figures:

- 35) 34.57 grams + 198.016 grams = _____
- 36) 34 grams / 10.1 mL = _____

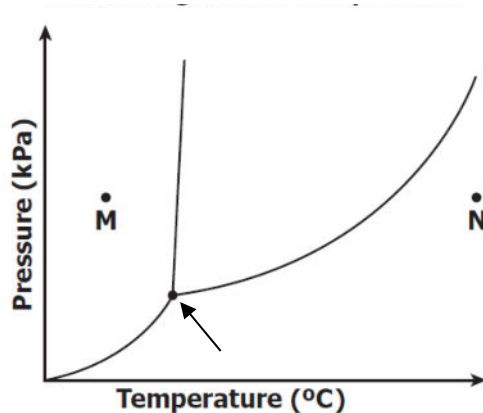
Acids and Bases

- 37) List the criteria for Arrhenius acids and bases.
- 38) Use the Brønsted-Lowry theory to predict the products: $\text{H}_2\text{PO}_4^{-1} + \text{H}_2\text{O} \rightarrow$

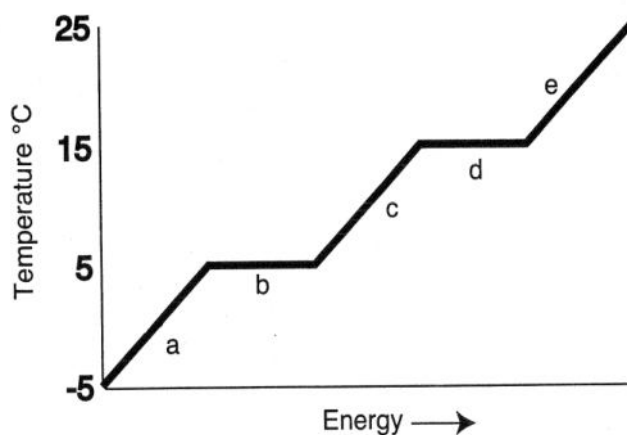
Find the pH of the following solutions:

- 39) A 0.0001 M solution of HCl (hydrochloric acid).
- 40) A solution whose pOH is 12.

Kinetic Molecular Theory and Phases of Matter



- 41) What phase is occurring at M in the above diagram? _____
- 42) What phase exists at N in the above diagram? _____
- 43) What phase change occurs when you change from M to N? _____
- 44) What is happening at the point indicated by the arrow in the above diagram and what is this point called?



- 45) Label a-e on the above Heating Curve.

a.) _____
 b.) _____
 c.) _____

d.) _____
 e.) _____

- 46) A 15.75 g sample of iron absorbs 1086.75 joules of heat energy, as its temperature increases from 25 °C to 175 °C. Calculate the specific heat of the iron sample.
- 47) The heat of fusion for ice at 0 °C is 6.01 kJ/mol. How much heat is required to melt 180 grams of ice?

Organic Chemistry

- 48) Would Margarine contain saturated or unsaturated fatty acids? Explain the difference in saturated and unsaturated fatty acids.
- 49) Name two synthetic polymers. What do we mean when we refer to a polymer as synthetic?
- 50) Name three common organic pharmaceuticals.
- 51) Draw the Lewis structures for C_2H_2 , $\text{CH}_3\text{CH}_2\text{OH}$, and C_6H_6 .