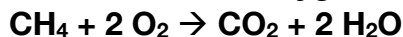


Chemistry B Final Study Guide

Ch.8

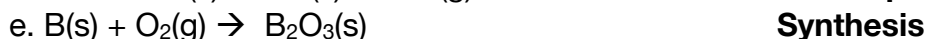
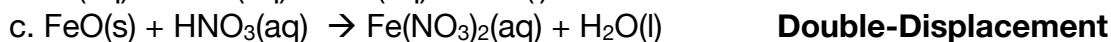
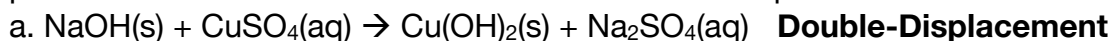
- What is a precipitation reaction? Provide an example. **Two aqueous solutions forming a solid.**
- What is a combustion reaction? Write an equation that illustrates a combustion reaction. **A vigorous and exothermic oxidation-reduction reaction that takes place between certain substances and oxygen.**



- Give an example of a synthesis reaction and of a decomposition reaction.



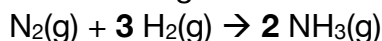
- Classify the reaction represented by each of the following chemical equations in as many ways as possible based sections 8.6 and 8.7. Balance each equation.



- Know the type of reactions listed in sections 8.6 and 8.7.

Ch.9

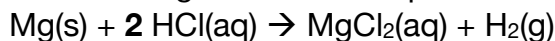
- Considering the reaction represented by the (**unbalanced**) equation



- determine the number of moles of $\text{NH}_3(\text{g})$ that can be produced from the following:



- Considering the reaction represented by the (**unbalanced**) equation



- determine the mass of $\text{H}_2(\text{g})$ that can be produced from the following:



Ch.10

- How is the concept of energy defined? **Ability to do work or produce heat.**

- What does temperature measure? **Average kinetic energy.**

- Convert the temperatures to Kelvin:



- Explain what is meant by the terms exothermic and endothermic. **Exothermic-energy flows out of the system. Endothermic-energy flows into the system.**

- What is meant by the specific heat capacity of a material. **Amount of energy required to change the temperature of 1 gram of a substance by 1°C.**

- Calculate the mass (in grams) of each of the following substances that could be warmed over the indicated temperature range by application of exactly 1.0 kJ of energy.



Ch.13

-Convert 1.20 atm to units of mm Hg, torr, and pascals. **912 mmHG, 912 torr, 121590 Pa**

-What does "STP" stand for? What conditions correspond to STP? **Standard Temperature and pressure. 0°C and 1.00 atm**

- A sample of gas in a 10.0-L container exerts a pressure of 565 mm Hg. Calculate the pressure exerted by the gas if the volume is changed to 15.0 L at constant temperature. **377 mm Hg**

-A sample of gas in a 5.00-L container at 35.0°C is heated at constant pressure to a temperature of 70.0°C at constant pressure. Determine the volume of the heated gas. **5.57 L**

-A 4.50 mol sample of a gas occupies a volume of 34.6 L at a particular temperature and pressure. What volume does 2.50 mol of the gas occupy at these same conditions of pressure and temperature? **19.2 L**

-A sample of gas at 24°C occupies a volume of 3.45 L and exerts a pressure of 2.10 atm. The gas is cooled to -12°C and the pressure is increased to 5.20 atm. Determine the new volume occupied by the gas. **1.21 L**

Ch.14

-Define molar heat of fusion-**energy required to melt 1 mol of substance** and molar heat of vaporization-**energy required to convert 1 mol of substance from liquid to vapor.**

-What is a dipole-dipole attraction? **Bonding in polar molecules due to dipole moments** What is hydrogen bonding? **Dipole bonding in molecules containing Hydrogen.**

-Define London dispersion forces. **Forces that exist between noble gases and nonpolar molecules due to momentary dipole interactions.**

-What is vaporization? **Going from a liquid to a gas.** What is condensation? **Going from a gas to a liquid.**

-How are kinetic energy and temperature related? **Temperature measures the average kinetic energy.**

Ch.15

-Define homogeneous and heterogeneous mixtures. **Homogeneous- all regions are the same in the mixture. Heterogeneous- a mixture with regions of different properties.**

-What factors affect rate of dilution? **Surface area, stirring, temperature.**

-How does concentration affect conductivity of a solution? **Higher concentration causes higher conductivity.**

-What is an electrolyte? **A material that dissolves in water to give a solution that conducts electricity.**

-What is a saturated, unsaturated, and supersaturated solution? **Saturated-a solution that contains as much solute as can be dissolved in that solution. Unsaturated-a solution which more solute can be dissolved than already is dissolved. Supersaturated- a solution that contains more dissolved substance than does a saturated solution.**

-What is molarity? **A concentration measurement in moles per liter.**

-A chemist prepares some standard solutions for use in the lab using 500.0-mL volumetric flasks to contain the solutions. If the following masses of solutes are used, calculate the resulting molarity of each solution.

a. 4.865 g NaCl **M=0.166**

b. 78.91 g AgNO₃ **M=0.928**

-What causes molecules to be polar? **Unequal electronegativities.**

Ch.16

-What are the properties of acids and bases? **Acids-sour, react with metal to produce gas. Bases- bitter, slippery feel.**

-What are the Arrhenius and Bronsted-Lowry definitions of acids and bases? **Arrhenius acid-produce hydrogen ions in aqueous solution. Arrhenius base- produce hydroxide ions in aqueous solutions. Bronsted-Lowry acid- proton donor. Bronsted-Lowry base- proton acceptor.**

-Know what a conjugate acid-base pair is. **A conjugate base is an acid minus a hydrogen ion.**

-What is a buffered solution? **A solution that resists change in pH.**

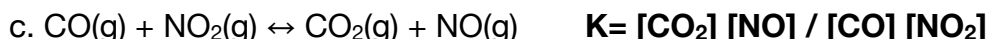
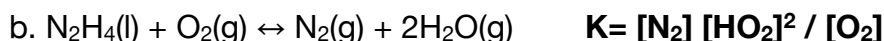
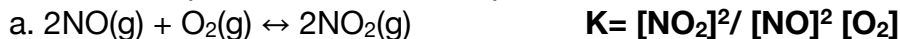
-Calculate the pH and pOH values a 0.00515 M HCl solution. **pH=2.29 pOH=11.71**

Ch.17

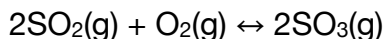
-What do we mean by an equilibrium position? **When the forward and reverse reactions are happening at the same rate.**

-What is a reversible reaction? **A reaction that products react to form its reactants.**

-Write the equilibrium constant expressions for each of the following reactions.



-For the reaction:



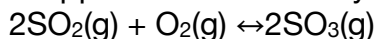
at a particular temperature the equilibrium system contains $[\text{SO}_3(\text{g})] = 0.42 \text{ M}$,

$[\text{SO}_2(\text{g})] = 1.4 \times 10^{-3} \text{ M}$, and $[\text{O}_2(\text{g})] = 4.5 \times 10^{-4} \text{ M}$. Calculate K for the process. **$K=2.0 \times 10^8$**

-Explain the collision model for chemical reactions. How does the collision model account for the observation that higher concentrations and higher temperatures tend to make reactions occur faster? **More collisions will cause a reaction to happen faster and both of these will cause more reactions.**

-What is LeChatelier's Principle? **When a change is imposed on system at equilibrium, the position of the equilibrium shifts in a direction that tends to reduce the effect of that change.**

-Suppose the reaction system:



has already reached equilibrium. Predict the effect of each of the following changes on the position of the equilibrium:

- Additional $\text{SO}_2(\text{g})$ is added to the system. **Shift right.**
- The $\text{SO}_3(\text{g})$ is liquefied and removed from the system. **Shift right.**
- A very efficient catalyst is used. **None**
- The volume of the container is drastically reduced. **Shift right.**

Ch.20

- When a carbon atom is bonded to four other carbon atoms? **Carbon has four valence electrons.**
- What is an alkane, alkene, and alkyne and what suffixes do they have? **Alkane- all single bonds. Alkene- at least one double bond. Alkyne- at least one triple bond.**
- What is a polymer and monomer? **A polymer is a large chain-like molecule built from small molecules called monomers. A monomer is the repeating unit in a polymer.**
- Know how to name alkanes, alkenes, and alkynes.
- What structures define the functional groups of alcohols, esters, and organic acids.

TABLE 22-4

Common Functional Groups Found in Organic Compounds			
General Structure	Group Name	Structural Formula	Example
$R-O-H$	alcohol	$\begin{array}{c} H & H \\ & \\ H-C & -C-O-H \\ & \\ H & H \end{array}$	ethanol
$R-O-R''$	ether	$\begin{array}{c} H & H & & H & H \\ & & & & \\ H-C & -C-O & -C & -C-H \\ & & & & \\ H & H & & H & H \end{array}$	ethoxyethane
$R-\overset{O}{\parallel}C-H$	aldehyde	$\begin{array}{c} O \\ \parallel \\ H-C \\ \\ H \end{array}$	methanal
$R-\overset{O}{\parallel}C-R'$	ketone	$\begin{array}{c} H & O & H \\ & \parallel & \\ H-C & -C & -C-H \\ & & \\ H & & H \end{array}$	propanone
$R-\overset{O}{\parallel}C-OH$	acid	$\begin{array}{c} H & & O \\ & & \parallel \\ H-C & -C & \\ & & \\ H & & OH \end{array}$	ethanoic acid
$R-\overset{O}{\parallel}C-O-R'$	ester	$\begin{array}{c} H & O & & H & H \\ & \parallel & & & \\ H-C & -C-O & -C & -C-H \\ & & & & \\ H & & & H & H \end{array}$	ethyl ethanoate
$R-N\begin{array}{l} H \\ / \\ H \end{array}$	amine	$\begin{array}{c} H & & H \\ & \diagdown & / \\ & C & -N \\ & & \diagdown \\ H & & H \end{array}$	methylamine

* R and R' symbolize the general alkyl hydrocarbon group of the molecule. They may be the same group or different groups.