## Chemistry 1110 Exam 3 Study Guide

## Chapter 7

7.1 Know and apply the definitions of solution, solvent and solute.

- Master Tutor Section 7.1
- Review Section 7.1 in the Concept Summary
- Review Example 7.1 and Learning Check 7.1
- For practice, do Exercises 7.2, 7.4

7.2 Know and apply the definitions of saturated and unsaturated. Predict how solubility of solids and gases is affected by changes in temperature.

- Master Tutor Section 7.2
- Review Section 7.2 in the Concept Summary
- For practice, do Exercises 7.6, 7.8
- 7.3 Predict solubilities in a general way.
  - Master Tutor Section 7.3
  - Review Section 7.3 in the Concept Summary

7.4 a) Calculate the molarity of a solution given the number of moles of solute dissolved in a given volume (mL or L) of solution.

b) Calculate the molarity of a solution given the amount (grams) and chemical formula of a solute dissolved in a given volume (mL or L) of solution.

c) Calculate the % concentration (w/v, w/w or v/v) of a solution.

- Master Tutor Section 7.4
- Review Section 7.4 in the Concept Summary
- Review Examples 7.4, 7.5 and Learning Checks 7.4, 7.5
- For practice, do Exercises 7.20, 7.22, 7.32, 7.34, 7.38

7.5 a) Calculate the number of moles or grams of solute needed to prepare a given volume and molarity of solution.

b) Calculate the amount of solute needed to prepare a given volume of a % concentration solution. Use  $C_cV_c=C_DV_D$  to calculate dilutions.

- Master Tutor Section 7.5
- Review Section 7.5 in the Concept Summary
- Review Examples 7.6, 7.7 and Learning Check 7.6, 7.7
- For practice, do Exercises 7.42, 7.50

7.6 You may skip this section. It is not covered in the Tutor or Exam 3.

7.7 a) Differentiate between electrolytes and non0electrolytes based on the ionic character of the compounds involved.

b) Know the colligative properties and how changes in concentration affect them, including how it would affect evaporation rates.

c) Predict osmotic flow through a semi-permeable membrane.

- Master Tutor Section 7.7
- Review Section 7.7 in the Concept Summary
- For practice, do Exercises 7.62, 7.63

7.8 a) Know the definition of a colloid and that the Tyndall Effect is used to identify them. Identify characteristics of the dispersing medium and dispersed phase.

b) Know what emulsifying agents do.

- Master Tutor Section 7.8
- Review Section 7.8 in the Concept Summary

7.9 Know what dialysis is and differentiate it from osmosis.

- Master Tutor Section 7.9
- Review Section 7.9 in the Concept Summary
- For practice, do Exercise 7.84

## Chapter 8

8.1 and 8.2 Skip Example 8.1 and Learning Check 8.1 a) identify changes in energy (temperature) and entropy (changes of state, dispersion). Predict spontaneity based on changes in energy and entropy (ie. a decrease in energy with an increase in entropy is always spontaneous)

b) Identify and differentiate between endergonic and exergonic processes. Know and identify what a reaction rate is.

- Master Tutor Sections 8.1, 8.2
- Review Sections 8.1, 8.2 in the Concept Summary
- For practice, do Exercises 8.2, 8.4, 8.8

8.3 Identify characteristics of reaction mechanisms.

- Master Tutor Section 8.3
- Review Section 8.3 in the Concept Summary
- For practice, do Exercise 8.20

8.4 Using energy diagrams, differentiate between endothermic and exothermic reactions. Identify the activation energy and relate it to the likelihood of a reaction occurring.

- Master Tutor Section 8.4
- Review Section 8.4 in the Concept Summary
- For practice, do Exercises 8.23, 8.24

8.5 a) Know the factors (ways) a reaction rate can be affected.

b) Apply the above factors to adjust the rate of a reaction.

c) Know the definition of a catalyst and identify them in a chemical reaction.

- Master Tutor Section 8.5
- Review Section 8.5 in the Concept Summary
- For practice, do Exercises 8.29, 8.34

8.6 Identify characteristics of a reversible reaction reaching equilibrium.

- Master Tutor Section 8.6
- Review Section 8.6 in the Concept Summary
- For practice, do Exercise 8.36

8.7 Identify what the position of an equilibrium is. Skip Examples 8.2,8.3 and Learning Checks 8.2, 8.3

- Master Tutor Section 8.7
- Review Section 8.7 in the Concept Summary

8.8 a) Use LeChatlier's principle to predict the shift in an equilibrium.b) Predict changes in reactants/products concentrations (including observable color changes) using LeChatlier's principle.c) Determine the effect of adding/removing heat or adding a catalyst to an existing equilibrium

- Master Tutor Section 8.8
- Review Section 8.8 in the Concept Summary
- Review Example 8.4 and Learning Check 8.4
- For practice, do Exercises 8.52, 8.54, 8.58

## <mark>Chapter 9</mark>

9.1 Using the definitions of Arrhenius acids and bases, identify the acid/base in a chemical reaction.

- Master Tutor Section 9.1
- Review Section 9.1 in the Concept Summary
- For practice, do Exercise 9.2

9.2 a) Identify a Bronsted acid or base in a chemical reaction, also in reversible reactions.

b) Identify and differentiate between Bronsted acids and bases. Predict the conjugate base formed from a Bronsted acid.

- Master Tutor Section 9.2
- Review Section 9.2 in the Concept Summary
- Review Example 9.1 and Learning Check 9.1
- For practice, do Exercises 9.6, 9.10, 9.12

9.3 You may skip this section. It is not covered in the Tutor or Exam 3.

9.4 a) Recognize that pH neutral conditions arise when  $[H_3O^+] = [OH^-] = 1 \times 10^{-7 \text{ moles}}/\text{liter}$  and give rise to the equation  $[H_3O^+] \times [OH^-] \times 1 \times 10^{-14}$  $M^{\text{moles}2}/\text{liter}^2$ 

b) Using the self-ionization of water equilibrium equation, predict shifts in the equilibrium based on the addition/removal of  $H_3O^+$  or  $OH^-$ 

- Master Tutor Section 9.4
- Review Section 9.4 in the Concept Summary
- Review Example 9.4 and Learning Check 9.4
- For practice, do Exercises 9.28, 9.30

9.5 a) Given the  $[H^+ \text{ of } H_3O^+]$  of a solution, calculate the pH or vice versa. b) Given the  $[OH^-]$  of a solution, calculate the pH or vice versa.

- Master Tutor Section 9.5
- Review Section 9..5 in the Concept Summary
- Review Examples 9..5, 9.6 and Learning Checks 9.5, 9.6
- For practice, do Exercises 9.34, 9.35a, c

9.6 a) Predict reactants or products involved in the 5 characteristic reactions of acids.

b) Create total ionic equations for a reaction involving an acid and identify the spectator ions.

- Master Tutor Section 9.6
- Review Section 9.6 in the Concept Summary
- Review Example 9.8 and Learning Checks 9.10, 9.11
- For practice, do Exercises 9.49, 9.50

9.7 Using total ionic equations, identify the spectator ions, products and final pH of a neutralization reaction.

- Master Tutor Section 9.7
- Review Section 9.7 in the Concept Summary
- Review Learning Check 9.12
- For practice, do Exercise 9.58

9.8 Predict salts produced by a neutralization reaction. Identify the cation and anion of these salts, and whether they came from the acid or the base involved in the reaction.

- Master Tutor Section 9.8
- Review Section 9.8 in the Concept Summary
- Review Example 9.9 and Learning Check 9.13
- For practice, do Exercises 9.62, 9.68

9.9 Differentiate the characteristics of strong acids from mono-, di-, and triprotic acids. Recognize H<sub>3</sub>BO<sub>3</sub> and H<sub>2</sub>CO<sub>3</sub> as weak acids.

- Master Tutor Section 9.9
- Review Section 9.9 in the Concept Summary

9.10 through 9.12 Skip these sections. They are not covered in Exam 3.

9.13 Identify the properties of a buffer and its buffering capacity.

- Master Tutor Section 9.13
- Review Section 9.13 in the Concept Summary