Chemistry 1110 Exam 4 Study Guide

Chapter 10

10.1 Know that unstable nuclei can undergo radioactive decay. Identify alpha particles, beta particles, and/or gamma rays based on physical properties such as charge and mass.

- Master Tutor Section 10.1
- Review Section 10.1 in the Concept Summary
- For practice, do Exercises 10.2, 10.4

10.2 a) Determine the daughter nucleus formed by alpha, beta, gamma, or positron emission, or by electron capture.
b) Complete a given nuclear reaction that is missing a variable.

- Master Tutor Section 10.2
- Review Section 10.2 in the Concept Summary
- Review Examples 10.1-10.3 and Learning Checks 10.1-10.5
- For practice, do Exercises 10.6, 10.8, 10.10, 10.12

10.3 Given the half-life of a radioactive isotope, determine the amount that remains after a specified amount of time. Or, determine the half-life of an isotope when given a beginning and final amount of the isotope after a specified amount of time.

- Master Tutor Section 10.3
- Review Section 10.3 in the Concept Summary
- Review Examples 10.4, 10.5 and Learning Checks 10.6, 10.7
- For practice, do Exercises 10.16, 10.18, 10.20

10.4 Know that exposure to intense short-term radiation can cause radiation sickness or be used to treat cancer. Know and apply properties and characteristics of free radicals. Skip Examples 10.6, 10.8

- Master Tutor Section 10.4
- Review Section 10.4 in the Concept Summary
- Review Example 10.6 and Learning Check 10.8
- For practice, do Exercise 10.21

10.5 You may skip this section. It is not covered in the Tutor or Exam 4.

10.6 Distinguish between "hot" and "cold" spots caused by diagnostic tracers. Know the desired characteristics of diagnostic tracers.

- Master Tutor Section 10.6
- Review Section 10.6 in the Concept Summary
- For practice, do Exercises 10.30, 10.31

10.7 You may skip this section. It is not covered in the Tutor or Exam 4.

10.8 You may skip this section. It is not covered in the Tutor or Exam 4.

10.9 You may skip this section. It is not covered in the Tutor or Exam 4.

Chapter 11

11.1 Distinguish between organic and inorganic compounds.

- Master Tutor Section 11.1
- Review Section 11.1 in the Concept Summary
- For practice, do Exercises 11.4 and 11.5

11.2 Differentiate between organic and inorganic compounds based on the generalities presented in Table 11.1

- Master Tutor Section 11.2
- Review Section 11.2 in the Concept Summary
- Review Learning Checks 11.1 and 11.2
- For practice, do Exercise 11.8

11.3 Identify structural isomers.

- Master Tutor Section 11.3
- Review Section 11.3 in the Concept Summary
- Review Example 11.1 and Learning Check 11.3
- For practice, do Exercises 11.18, 11.20

11.4 and 11.5 Identify alkane structures and determine the number of hydrogen atoms needed to complete a carbon skeleton structure.

- Master Tutor Sections 11.4, 11.5
- Review Sections 11.4, 11.5 in the Concept Summary
- Review Example 11.2 and Learning Checks 11.4, 11.5
- For practice, do Exercises 11.24, 11.28

11.6 Classify an alkane as branched or normal. Identify different conformations of a compound.

- Master Tutor Section 11.6
- Review Section11.6 in the Concept Summary
- Review Example 11.3 and Learning Check 11.6
- For practice, do Exercise 11.30

11.7 a) Identify and name the longest carbon chain in a diagram. Identify and name the alkyl groups methyl-, ethyl-, propyl-, and isopropyl-.
b) Give IUPAC names to alkanes when given a structure, or vice versa.
c) Give the correct IUPAC alkane name when given an incorrect one.

- Master Tutor Section 11.7
- Review Section 11.7 in the Concept Summary
- Review Example 11.4 and Learning Checks 11.7-11.11
- For practice, do Exercises 11.32, 11.33, 11.34, 11.36, 11.42

11.8 Give IUPAC names to cycloalkane when given a structure, or vice versa. Determine the number of hydrogen atoms needed to complete a cycloalkane structure.

- Master Tutor Section 11.8
- Review Section 11.8 in the Concept Summary
- Review Example 11.5 and Learning Check 11.12
- For practice, do Exercises 11.44, 11.46, 11.48

11.9 Determine if a compound can exhibit geometric isomerism and identify it as cis- or trans-.

- Master Tutor Section 11.9
- Review Section 11.9 in the Concept Summary
- Review Example 11.6 and Learning Check 11.13
- For practice, do Exercises 11.52, 11.54

11.10 Know alkanes are non-polar, hydrophobic, and less dense than water and cannot hydrogen bond. Know boiling points increase as the number of carbon increase in an alkane and that methane, ethane, propane and butane are gases at room temperature.

- Master Tutor Section 11.10
- Review Section 11.10 in the Concept Summary
- For practice, do Exercise 11.56

11.11 Know that, except for combustion, alkanes are basically uncreative. Identify CO_2 and H_2O as the products of complete combustion, and CO and H_2O as the products of incomplete combustion.

Given the number of moles of an alkane or cycloalkane, calculate the number of moles of CO_2 or H_2O produced by complete combustion.

- Master Tutor Section 11.11
- Review Section 1.11 in the Concept Summary
- For practice, do Exercises 11.60, 11.62

Remember to place the Key Reactions on your exam note sheet.

Chapter 12

12.1 a) Identify alkenes, alkynes and aromatics as unsaturated hydrocarbons. Determine the number of hydrogen atoms needed to complete an alkene structure.
b) Give the IUPAC name for an alkene or cycloalkene structure.

- Master Tutor Section 12.1
- Review Section 12.1 in the Concept Summary
- Review Examples 12.1, 12.2 and Learning Checks 12.1, 12.2
- For practice, do Exercises 12.4, 12.6, 12.12

12.2 Given an alkene name or structure, determine if geometric isomerism can occur. Identify cis-and trans- isomers.

- Master Tutor Section 12.2
- Review Section 12.2 in the Concept Summary
- Review Example 12.3 and Learning Check 12.3
- For practice, do Exercises 12.18, 12.20

12.3 a) Know alkanes and alkenes are not soluble in water but are soluble in hexane. They are also less dense than water. Know the names and products of the addition reactions that alkenes can undergo (ie. Hydration produces an alcohol, halogenation produces alkyl halides)
b) Predict reactants or products from an alkene halogenation reaction.
c) Using Markovnikov's Rule, predict the major product formed by the addition of a halogen containing acid (H-X) to an alkene.

d) Know what reactants and catalysts are needed for alkene hydrogenation and alkene hydration reactions. Predict the major products formed by these reactions, using Markovnikov's Rule for hydration.

- Master Tutor Section 12.3
- Review Section 12.3 in the Concept Summary
- Review Example 12.4 and Learning Checks 12.4-12.7
- For practice, do Exercises 12.26, 12.28

12.4 Recognize a C=C monomer is needed to make an addition polymer. Predict which monomer is needed to make a polymer and vice versa.

- Master Tutor Section 12.4
- Review Section 12.4 in the Concept Summary
- Review Learning Check 12.8
- For practice, do Exercise 12.32

12.5 Identify alkyne structures or formulas. Give IUPAC names for alkynes. Predict the number of hydrogen atoms necessary to complete an alkyne structure. Recognize the importance of acetylene as an alkyne.

- Master Tutor Section 12.5
- Review Section 12.5 in the Concept Summary
- Review Learning Check 12.9
- For practice, do Exercise 12.42

12.6 Differentiate between aliphatic and aromatic hydrocarbons. Recognize that each carbon in a benzene ring can only have 1 substituent attached to it.

- Master Tutor Section 12.6
- Review Section 12.6 in the Concept Summary

- For practice, do Exercise 12.48

12,7 Give IUPAC names for benzene containing compounds. May include common names of aniline, toluene, or phenol. If a benzene ring is part of a more complex hydrocarbon, name it as a phenyl-group.

- Master Tutor Section 12.7
- Review Section 12.7 in the Concept Summary
- Review Example 12.5 and Learning Check 12.10
- For practice, do Exercises 12.52, 12.54, 12.56, 12.60

12.8 Know that aromatics are hydrophobic and can be used as solvents (benzene), and are found in amino acids and vitamins. Identify polycyclic aromatics and know they are hydrophobic and carcinogenic.

- Master Tutor Section 12.8
- Review Section 12.8 in the Concept Summary
- For practice, do Exercises 12.65, 12.66

Remember to place the Key Reactions on your exam note sheet.