

Chemistry 500

Spring 2000

Dr. Hunter

Old Exams for Spring 1999

Chemistry 500, First Mid-Term Exam

Spring 1999

Dr. Hunter

Your Name: _____
 last first

Student Number: _____

For all of the questions on the following three pages, make sure you clearly explain your reasoning and show your work. You may use a calculator (you may *not* program information into your calculator) but may not use any other outside materials such as books or notes. If you are unsure of how to interpret any of the questions, please ask me for help. On some of the following questions, you have a choice of which parts to answer. *Circle the letters of the parts you want me to mark.* When you are done, please hand your exam in to me at the front and then either wait quietly in your desk or in the hallway. This exam is scheduled for 40 minutes after which class will resume at 8:30.

Total Grade: /50 (i.e. 25% of the final grade)

1. (15 marks in total) For *three out of four* of the following questions, give a short answer in the space provided. **Clearly show which ones you want me to grade.** Show your reasoning and/or your work.

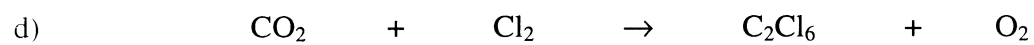
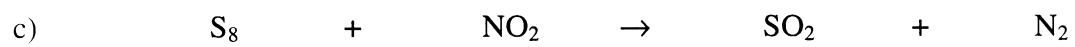
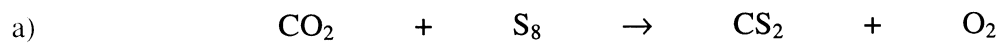
a. Offer an explanation of why the level of NO_x pollution has not decreased significantly in the last 20 years.

b. Which are the major sources of SO_x pollution?

c. Describe the consequences if the oxygen level in the atmosphere were to decrease to one half of its current value.

d. Define the term catalyst and give one example we discussed in class.

2. (20 marks in total) Balance each of the following reactions. Show your work!!!!



3. (15 marks in total) Discuss the major methods used to determine the toxicity of new chemicals. Include in your discussion the major strengths and weaknesses of each.

Chemistry 500, Second Mid-Term Exam

Spring 1999

Dr. Hunter

Your Name: _____
last first

Student Number: _____

For all of the questions on the following three pages, make sure you clearly explain your reasoning and show your work. You may use a calculator (you may *not* program information into your calculator) but may not use any other outside materials such as books or notes. If you are unsure of how to interpret any of the questions, please ask the instructor for help. On some of the following questions, you have a choice of which parts to answer. *Circle the letters of the parts you want marked.* When you are done, please hand your exam in to the instructor at the front, initial the attendance sheet, and then either wait quietly in your desk or in the hallway. This exam is scheduled for 50 minutes after which class will resume at 8:40.

Total Grade: /50 (i.e. 25% of the final grade)

1. (15 marks in total) For *three out of four* of the following questions, give a short answer in the space provided. **Clearly show which ones you want me to grade by circling its letter.** Show your reasoning and/or your work.

a. Clearly describe the structure of a ^{15}N atom including the numbers and natures of its protons, neutrons, and electrons.

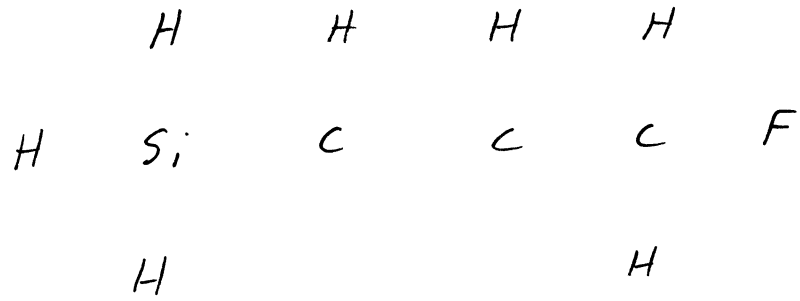
b. Clearly describe what Halons are, what they are used for, and what their environmental role is.

c. Clearly describe what is meant by the wave/particle duality of light.

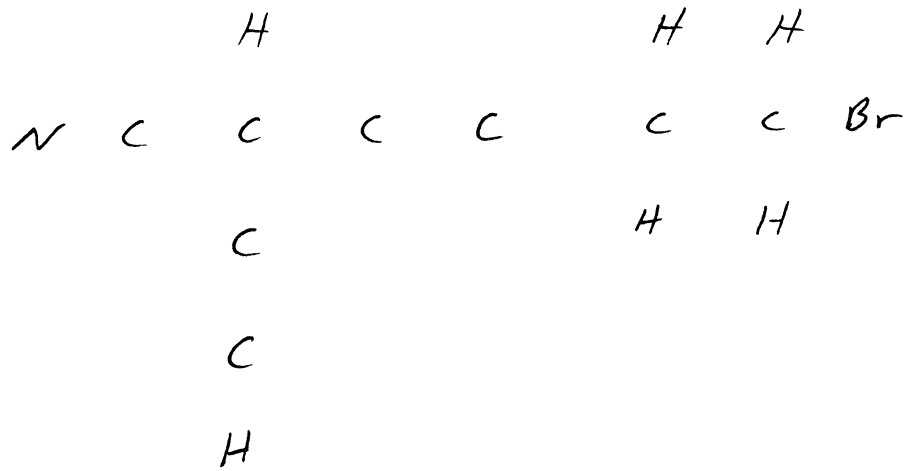
d. Clearly describe the processes by which the CO_2 levels on the earth varies over time spans of millions of years.

2. (15 marks in total) For each of the following molecules, determine the expected number of valence electrons, draw the Lewis structure, count the number of valence electrons on the structure you have drawn, and check if your Lewis structure is correct.

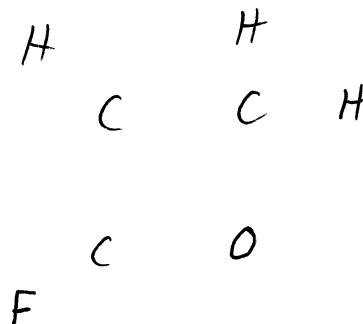
a)



b)



c)



3. (12 marks in total) For each of the following molecular formulae, draw three structural isomers. Be sure that you show all atoms and bonds for each.

a) $C_3H_6O_2$

b) C_6H_7N

4. (8 marks in total) In your answers to question 3, above, identify and name eight different functional groups.

Chemistry 500, Final Exam

Spring 1999

Dr. Hunter

Your Name: _____,
 last first

Student Number: _____

For all of the questions on the following five pages, make sure you clearly explain your reasoning and show your work. You may use a calculator (you may *not* program information into your calculator) but may not use any other outside materials such as books or notes. If you are unsure of how to interpret any of the questions, please ask the instructor for help. On some of the following questions, you have a choice of which parts to answer. *Circle the letters of the parts you want marked.* When you are done, please hand your exam in to the instructor at the front and initial the attendance sheet before you leave.

Total Grade: /100 (i.e. 50% of the final grade)

1. (20 marks in total) For *two out of three* of the following parts, give an answer in the space provided. **Clearly show which ones you want me to grade by circling its letter.** Show your reasoning and/or your work.

a. Clearly explain what is meant by the term “chain reaction” and how this relates to a nuclear power reactor.

b. Draw the basic skeleton structure for the sterol class of molecules and give the names of two types of sterol molecules and the functional groups that distinguish them.

c. Clearly describe the roles of chemists in the process of discovering a new drug and bringing it to market.

2. (20 marks in total) For *two out of three* of the following parts, give an answer in the space provided. **Clearly show which ones you want me to grade by circling its letter.** Show your reasoning and/or your work.

a) Clearly describe the differences between the additives and the polymers in plastics and give three reasons for adding the additives.

b) Clearly describe what is meant by the concept of molecular weight as it applies to polymers.

c) Name and draw the structures of two polymers discussed in class.

3. (20 marks in total) For each of the following molecular formulae in a) and b) below, draw three structural isomers. Be sure that you show all atoms and bonds for each.

a) C_4H_8O

b) C_6H_5Br

c) In your answers above, identify and name six different functional groups.

4. (20 marks in total)

(a) Using words *and pictures*, clearly describe the structure of a ^{12}C atom and its nucleus.

(b) Which isotope would be more radioactive, ^{12}C or ^{14}C ? Give a brief explanation for the difference.

5. (20 points maximum) Give five different sources of methane in the environment. Discuss the role of methane gas in global warming.