

Chemistry 1500, Dr. Hunter

Summer 2005

Exam # 1 (Group Part)

Name: \_\_\_\_\_, \_\_\_\_\_ Signature: \_\_\_\_\_

Name: \_\_\_\_\_, \_\_\_\_\_ Signature: \_\_\_\_\_

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**Last name****First name**

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You have 30 minutes for the group part of this exam. The twenty points for the group part of this exam correspond to 10% of the 200 points for this course.

Grade /20 (group)

1 (10 points total). Estimate the number of uncooked large eggs in refrigerators within 25 miles of this classroom this morning. Be sure to discuss your assumptions, how you calculated the results, and the estimated accuracy of the result you get.

1 (10 points total). Estimate the total number of gallons of gasoline used in jet airplanes departing from airports in the US during 2004. Be sure to discuss your assumptions, how you calculated the results, and the estimated accuracy of the result you get.



1 (10 points total). Answer 2 out of 3 parts below. Indicate the 2 parts you want me to grade by circling their part numbers.

a. Clearly described the effects on an apple if the oxygen content of the atmosphere were to double.

b. Give the number of significant figures for each of the following clearly describing how you come to this answer. If you wanted to do an accurate calculation, which number would you use (give me your reasoning).

$$2 \times 10^5 \rightarrow$$

$$210,000 \rightarrow$$

$$2.144 \times 10^5 \rightarrow$$

c. Convert the following numbers from scientific notation to conventional numbers or from conventional numbers to scientific notation, as required.

$$3,000 =$$

$$0.004 =$$

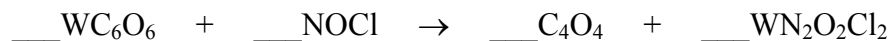
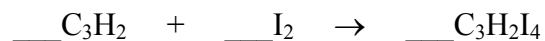
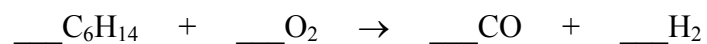
$$2.18 \times 10^{-4} =$$

$$4.14 \times 10^3 =$$

$$34,200 =$$

2 (10 points total). Clearly describe three different methods used to determine the toxicity of a new chemical. Give the strengths and weaknesses of each.

3 (10 points total). Balance each of the following chemical reactions.



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Exam # 2 (Group Part)

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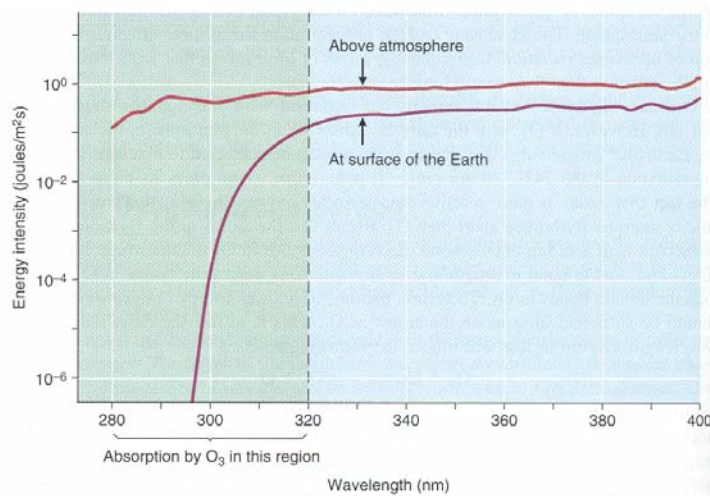
Grade /20 (group)



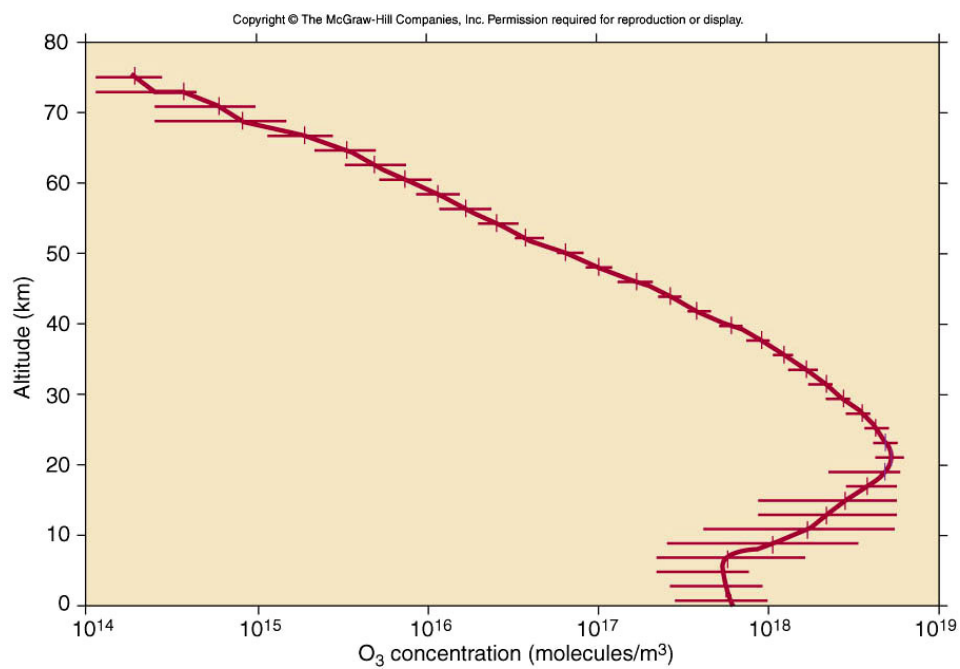
1 (10 points total). Clearly explain the origin and importance of the following graphic from the text.

**Figure 2.5**

Variation of solar energy with wavelength of UV radiation above and below the atmosphere.



1 (10 points total). Clearly explain the origin and importance of the following graphic from the text.





1 (10 points total). Answer 2 out of 3 parts below. Indicate the 2 parts you want me to grade by circling their part numbers.

a. Clearly describe five objects that are made up out of a single element and are found in your home.

b. Give the chemical formula for hydrogen sulfide and then clearly explain why it is added to natural gas.

c. For the following isotope, give the total number of protons, neutrons, and electrons and then the number of valence electrons and core electrons. Show your work.

For  $^{20}\text{N}$

total number of neutrons =

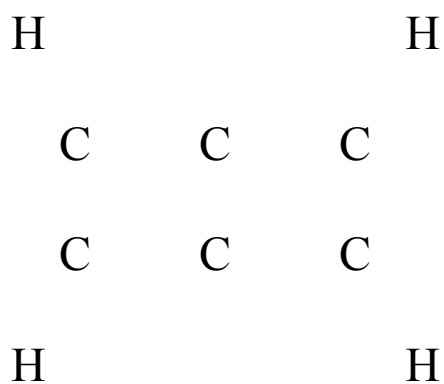
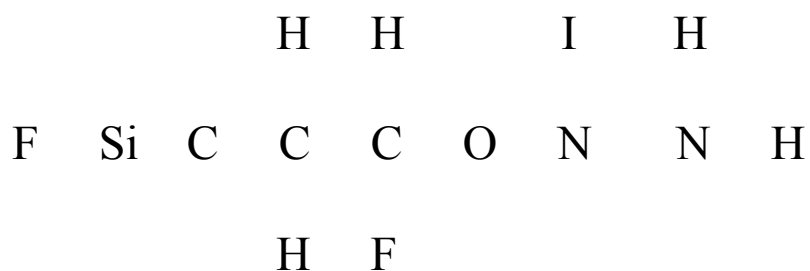
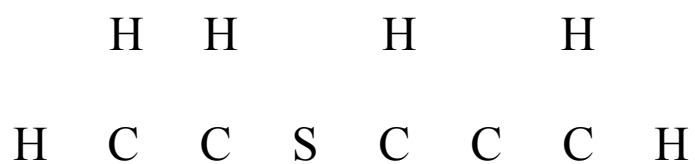
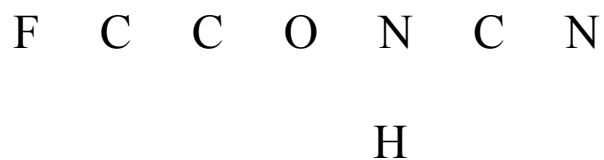
total number of protons =

total number of electrons =

number of valence electrons =

number of core electrons =

2 (20 points total). For each of the following molecules, draw the Lewis structure and check if your Lewis structure is correct.



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Final Exam (Group Part)

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You have one hour for the group part of this exam. The forty points for the group part of this exam correspond to 20% of the 200 points for this course.

Grade /40 (group)

1 (20 points total). Describe in detail the process by which a solid object burns. Use one or more diagram(s) to help illustrate your answer. Include in your description a discussion of how this is related to two ways a material can be made less flammable.

2 (20 points total). Estimate the total number of kilograms of CO<sub>2</sub> produced and O<sub>2</sub> consumed from the burning of ethanol (C<sub>2</sub>H<sub>6</sub>O) in cars in the US during 2004. Be sure to discuss your assumptions, how you calculated the results, and the estimated accuracy of the results you get in detail.



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Final Exam (Individual Part)

Name: \_\_\_\_\_  
                                **Last name**                                **First name**

Student Number (your social security number): \_\_\_\_\_

Signature: \_\_\_\_\_

The individual portion of this exam has this title page plus three pages of questions. Please make sure you have all pages. Place your name (last name first) and your student number (or your Social Security number, as you prefer) in the spaces above and sign on the line. *Initial each page of the exam in the top right hand corner* so that if your exam pages get separated I can match them to you.

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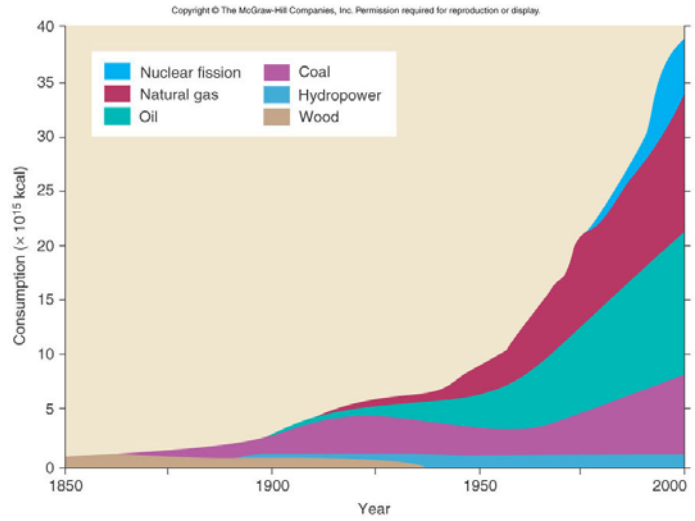
On some questions on this exam, you are given a choice about which 2 out of 3 parts to answer. On these questions, be sure that you circle the part numbers of those parts you want me to grade. [Note: If you do not indicate your choice, I will count only the first 2 parts towards the grade.]

You have two hours for the individual part of this exam. The sixty points for the individual part of this exam correspond to 30% of the 200 overall points for this course.

Grade     /60 (individual) ⇒



2 (20 points total). Using the following graph from our text to help support your answer, clearly explain the nature and history of coal use in the US. Be sure to include in your discussion the structure of coal and the two main methods by which it is mined.



3 (20 points total). For each of the following molecules, draw the Lewis structure and check if your Lewis structure is correct. Indicate the bond angles around those atoms having stars (i.e., \*) next to them and indicate all short (s) and medium (m) length bonds.

