

Chemistry 1500, Dr. Hunter

Summer 2007

Exam # 1 (Group Part)

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

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

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

**Last name**

**First name**

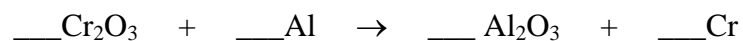
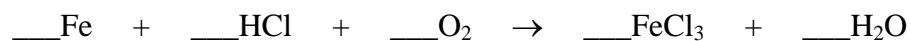
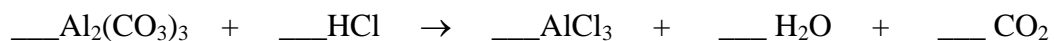
The group portion of this exam has this title page plus one page of questions. Please make sure you have all pages. Place the names (last name first) and signatures of each group member above. *Initial each page of the exam in the top right hand corner* using the initials of the **all** group members so that if your exam pages get separated I can match them to your group.

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You have 15 minutes for the group part of this exam. The twenty five points for the group part of this exam correspond to  $1/16^{\text{th}}$  of the total points for this course. Together, the group and individual parts of this exam are worth  $1/4$  of the total course grade.

Grade /25 (group)

1 (25 points total). Balance each of the following chemical reactions.



Chemistry 1500, Dr. Hunter

Summer 2007

Exam # 1 (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 the first question on this exam (i.e., pages 2 & 3), you are given a choice about which 5 out of the 6 parts to answer. On this question, be sure that you circle the part numbers of those parts you want me to grade. [Note: If you do not clearly indicate your choice, I will count only the first 5 parts towards the grade.]

You have 45 minutes for the individual part of this exam. The seventy five points for the individual part of this exam correspond to  $3/16^{\text{th}}$  of the points for this course. Together, the group and individual parts of this exam are worth  $1/4$  of the total course grade.

Grade /75 (individual)

1 (50 points total, each part is worth a maximum of 10 points). Answer five (5) of the six (6) parts of this question (i.e., on pages 2 & 3, below). Indicate the 5 parts you want me to grade by circling their part numbers.

a. Clearly described the effects on a car if the oxygen content of the atmosphere were to triple.

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).

$2.1 \times 10^5 \rightarrow$

210,000  $\rightarrow$

$2.132 \times 10^5 \rightarrow$

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

3,200 =

0.000,004 =

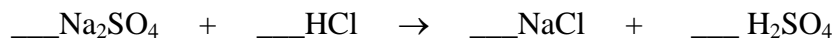
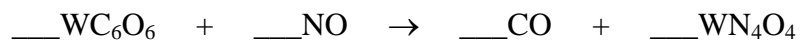
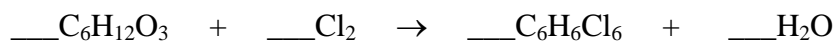
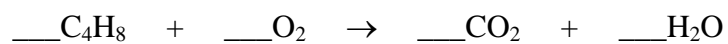
$2.18 \times 10^{-4}$  =

$4.14 \times 10^3$  =

34,200,000,000 =

- d. Describe in detail, one of the methods used to determine the toxicity of a new chemical. Give its strengths and weaknesses.
- e. What is the largest constituent of Air? Discuss its properties and uses.
- f. Calculate the mileage of a car that drives 234 miles using 17 gallons of gas. Show your work.

2 (25 points total). Balance each of the following chemical reactions.



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Exam # 2 (Individual Part (This Exam has no Group Part))

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

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

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

The individual portion of this exam has this title page plus four 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 the first question on this exam (i.e., pages 2 & 3), you are given a choice about which 5 out of the 6 parts to answer. On this question, be sure that you circle the part numbers of those parts you want me to grade. [Note: If you do not clearly indicate your choice, I will count only the first 5 parts towards the grade.]

You have 50 minutes for this exam. The one hundred points for this exam correspond to 1/4<sup>th</sup> of the points for this course.

Grade      /100 (individual)

1 (50 points total, each part is worth a maximum of 10 points). Answer five (5) of the six (6) parts of this question (i.e., on pages 2 & 3, below). Indicate the 5 parts you want me to grade by circling their part numbers.

a. For  $^{31}\text{S}$ , give the total number of protons, neutrons, and electrons and then the number of valence electrons and core electrons. Show your work.

total number of neutrons =

total number of protons =

total number of electrons =

number of valence electrons =

number of core electrons =

b. Clearly describe what an **Isotope** is and give an example of a pair of isotopes.

c. Clearly describe what an **Allotrope** is and give an example of a pair of allotropes.

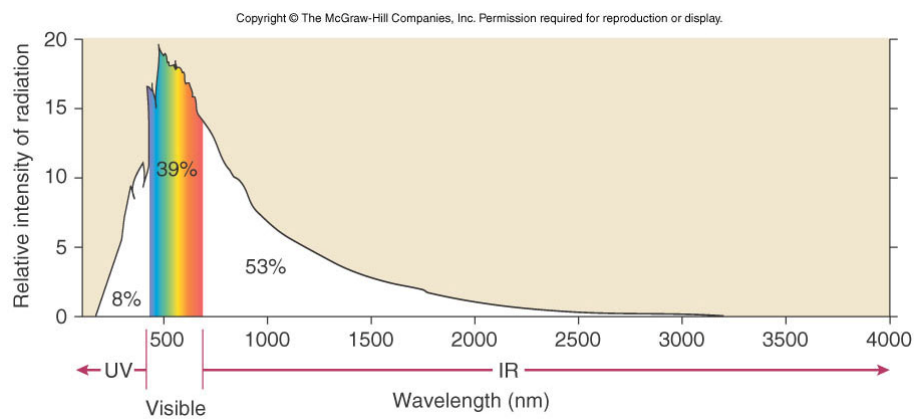


d. Give a clear description of the technique **X-Ray Diffraction/Crystallography** including how it is carried out and what information it tell us.

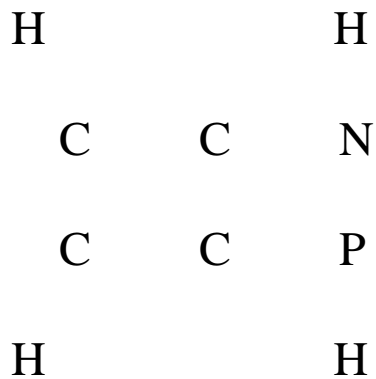
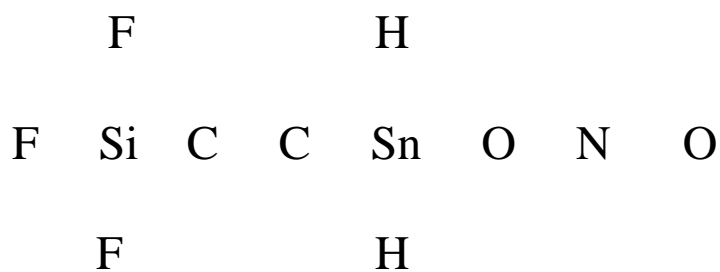
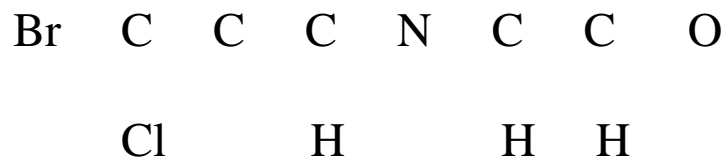
e. Clearly describe what the **Photoelectric Effect** is including how it is related to the nature of light.

f. Clearly describe the nature of the **Ozone Layer** including what it does and what has been happening to it.

2 (25 points total). Fully and clearly explain the origin and scientific importance of the following graphic from the text.



3 (25 points total). For each of the following molecules, draw the Lewis structure and check if your Lewis structure is correct.



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Exam # 3 (Group Part)

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

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

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

**Last name**

**First name**

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Grade /25 (group)

1 (25 points total). Estimate the total number of kilograms of CO<sub>2</sub> produced from the burning of gasoline (use Octane as its formula, C<sub>8</sub>H<sub>18</sub>) by all YSU students, staff, & faculty in their cars during 2006. 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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Exam # 3 (Individual Part)

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

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

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

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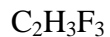
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You have 45 minutes for this exam. The seventy five points for the individual part of this exam correspond to 3/16<sup>th</sup> of the total points for this course. Together, the group and individual parts of this exam are worth 1/4 of the total course grade.

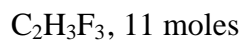
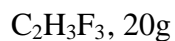
Grade      /75 (individual)

1 (15 points total). Complete both parts of this question.

a. For the following molecule(s), calculate the Molecular Weight and the Elemental Composition.

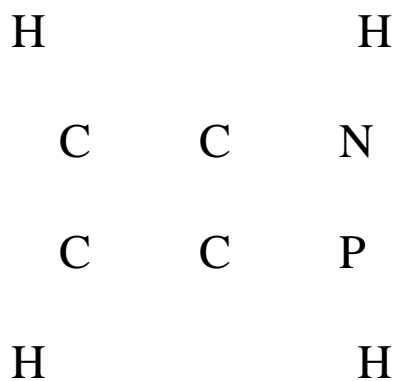
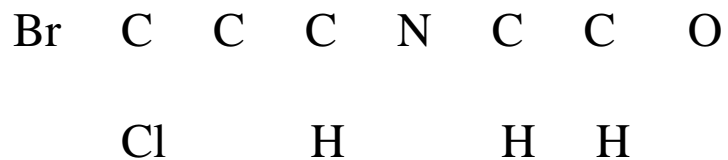


b. For the following molecule(s), determine the number of moles or the weight of the substance, as required.



2 (15 points total). Clearly describe the role of termites in global warming.

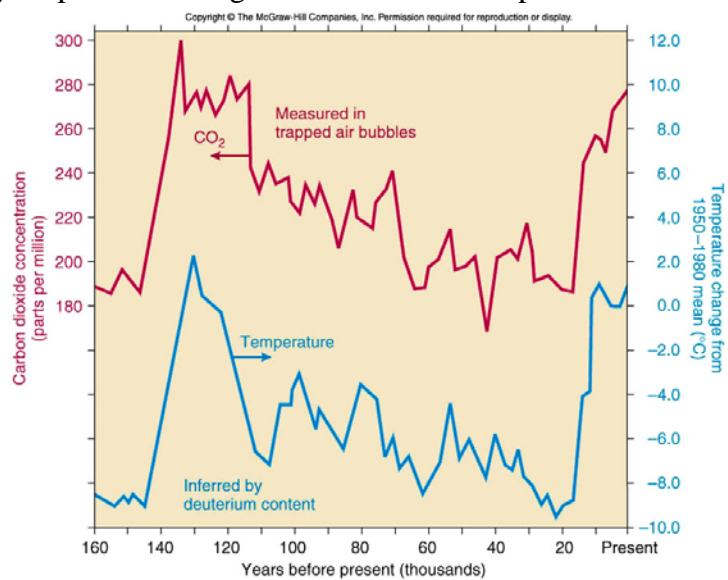
3 (15 points total). For each of the following molecule(s), draw the Lewis structure and then predict the bond lengths and angles.



4 (15 points total). Clearly describe what a Clathrate is and its relationship to global warming



5 (15 points total). Fully and clearly explain the origin and scientific importance of the following graphic from the text.



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Exam # 4 (Group Part)

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

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

**Last name**

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You have 60 minutes for the group part of this exam. The twenty five points for the group part of this exam correspond to  $1/16^{\text{th}}$  of the total points for this course. Together, the group and individual parts of this exam are worth  $1/4$  of the total course grade.

Grade /25 (group)

1 (25 points total). Clearly describe the Coal $\Rightarrow$ Gas $\Rightarrow$ Liquids process. Compare and contrast it to a conventional Coal power plant. Put it in a local context. Relate it to National Security, Energy Supply, and Environmental issues.

Chemistry 1500, Dr. Hunter

Summer 2007

Exam # 4 (Individual Part)

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

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

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

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You have 60 minutes for this exam. The seventy five points for the individual part of this exam correspond to  $3/16^{\text{th}}$  of the total points for this course. Together, the group and individual parts of this exam are worth  $1/4$  of the total course grade.

Grade /75 (individual)

1 (15 points total). Discuss what is meant by the term **Heat Capacity** and give two examples to illustrate your description

2 (10 points total). Discuss what is meant by the term **Activation Energy**. Use a diagram to *help* illustrate your description.

3 (25 points total). Discuss **Coal**, including how it is mined, its structure, and its uses, and how it relates to energy supplies/security and environmental issues.

4 (25 points total). Discuss Petroleum (Oil), including how it is mined, its structure, and its uses, and how it relates to energy supplies/security and environmental issues.