

Chemistry 500, Second Mid-Term Exam

Spring 2000

Dr. Hunter

Your Name: _____
 last **first**

Student Number¹: _____

For all of the questions on the following 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.* This exam is scheduled in two parts, the first section to be done as a group effort and the second individual section

Group Grade: /10

Individual Grade: /40

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

¹ Note: Your student number is your social security number.

2. (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 their letters.** Show your reasoning and/or your work.

a. Is CO_2 or CH_4 a stronger greenhouse gas per molecule? Explain the reason for this.

b. Discuss the processes by which CO_2 is returned to the atmosphere after it has entered the Geocycle.

c. Clearly explain the roles of the water in an American nuclear reactor.

d. Calculate the molecular weight and elemental composition of a mole of butane (i.e., C_4H_{10}).

3. (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 their letters.** Show your reasoning and/or your work.

a. Determine the number of moles or the weight of the following substances, as required.

N_2 14 grams

H_2O 3 moles

b. List the five factors about fires that kill people indicating their relative importance.

c. Give the number of protons, neutrons, and electrons for each of the following isotopes.

^{238}U

^{56}Fe

d. What are some of the advantages and disadvantages of Wind Energy?

4. (10 marks in total) For *one out of two* of the following questions, give an answer in the space provided. **Clearly show which ones you want me to grade by circling their letters.** Show your reasoning and/or your work.

a. Clearly explain why you can safely put your hands inside of a hot oven for a few seconds but if you touch the racks in the same oven you will be burned almost instantly.

b. Using examples, discuss what is meant by the “rank” of coal and how this relates to the coal’s history.

1. (10 marks in total) Tea, Question: Names of Team Members: _____

Estimate the number of tons of CO₂ produced each year by a model train that burns 5 grams of grain alcohol each hour. This train runs 8 hours per day on week days and 14 hours per day on week ends.