

Last Name	First Name	MI
Student ID Number:		Total Score
Circle the name of your TA: MIKE ROB		
Discussion Section – Day: Time:		/ 30

Chem 30A Winter 2005

QUIZ #1 (15 Min)

Weds January 19th

**INTERPRETATION OF THE QUESTIONS IS PART
OF THE EXAM – DO NOT ASK FOR THE
QUESTIONS TO BE EXPLAINED TO YOU**

*****DO NOT OPEN THIS EXAM UNTIL INSTRUCTED TO DO SO*****

Q1 *ONLY Question 1 or Question 2 will be graded* Q2
Put an 'X' in the box of the question you want graded

If you put an 'X' in BOTH boxes, we will grade Question 1

If you put an 'X' in NEITHER box, we will grade Question 1

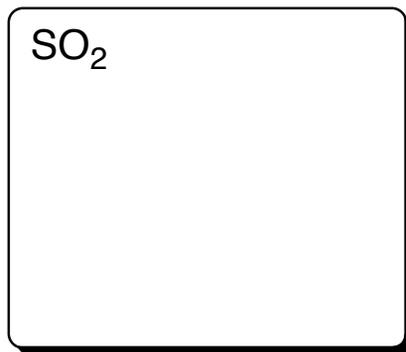
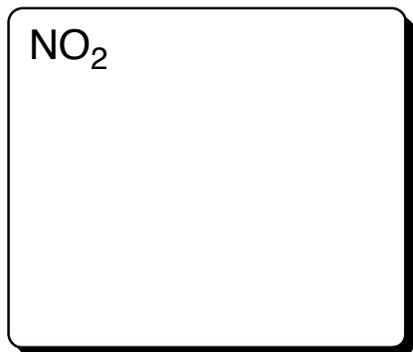
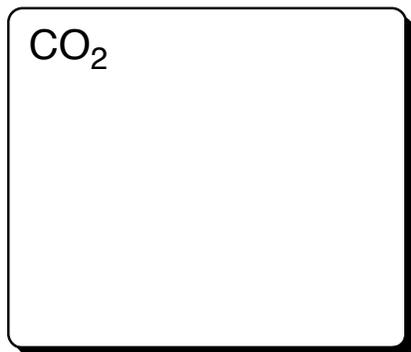
If your choice is ambiguous, we will grade Question 1

*Question 3 WILL be graded and added to your total no matter which other
question you choose to answer*

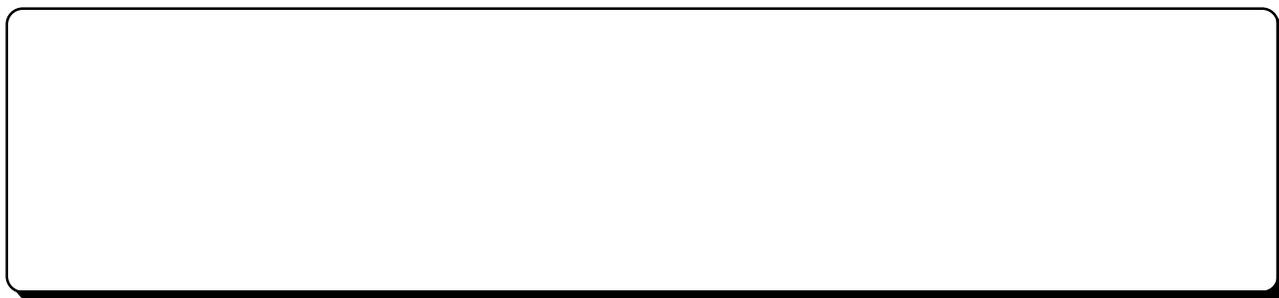
*Truth is incontrovertible, ignorance can
deride it, panic may resent it, malice
may destroy it, but there it is.
- Winston Churchill*

Q	1	2	3	Total
X				

1. (a) In the boxes below, draw the structural formulae for the dioxides of carbon, nitrogen, and sulfur; in each case, the atom connectivity is O—X—O. Include all necessary bonds, lone pairs of electrons (or single unshared electrons if appropriate), and non-zero formal charges. (4 pts each)



(b) Which of these molecules has an O—X—O bond angle of 180°? Briefly explain your answer. (2 pts)



(c) Which of these molecules has the smallest O—X—O bond angle? Briefly explain your answer. (8 pts)

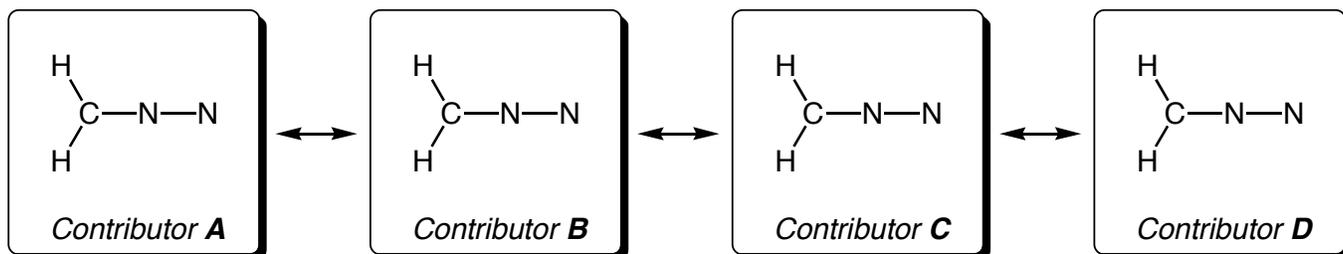


(d) One of these molecules is very reactive, and is observed to dimerize (two molecules join together) to form a new species with the formula X₂O₄. Which of the molecules above does this, what is the structural formula of the new species, and more importantly, why does this happen? (8 pts)

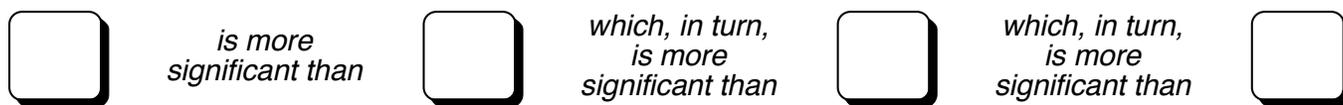


2. Diazomethane is a yellow gas at room temperature that may explode violently if heated: its molecular formula is CH_2N_2 .

(a) It is possible to draw many different resonance structures for diazomethane in which no atom bears a charge greater than plus or minus one (i.e., no doubly charged atoms). By drawing in extra bonds (i.e., turning single bonds into multiple bonds), lone pairs of electrons, and non-zero formal charges where necessary, complete the structures of four of these contributors, such that in two of your structures, all of the octets are filled, and in the other two, some octets are not completely filled. (5 pts each)

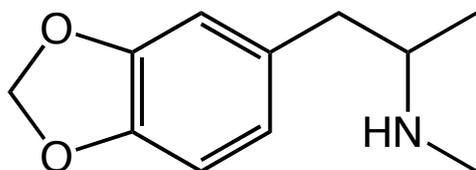


(b) The different resonance structures for diazomethane do not contribute equally to the overall resonance hybrid. By writing the appropriate letters in the boxes below, rank the contributors that you have drawn above (A, B, C, and D), from the most significant to the least significant. *To receive any credit for this part of the question, your structures in part (a) must be correct, so make sure you have them right.* (2 pts)



(c) Briefly justify your choices for part (b) in the box below. *Same deal here, to get any credit here, your answers to parts (a) and (b) must be correct.* (8 pts)

3. The chemical structure of the drug 'Ecstasy' is shown below – what is its molecular formula? (5 pts)



3,4-methylene-dioxymethamphetamine (MDMA)