Last Name ANSWER	First Name KEY	MI
Student ID Number:		Total Score 35 / 30
Circle the name of your TA: SUSAN HEATHER LINH		
Discussion Section – Day:	Time:	

Chem 30A Spring 2005

QUIZ #1A & 1B

(15 Min)

Weds April 13th

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

ONLY ANSWERS WRITTEN IN THE BOXES PROVIDED WILL BE GRADED

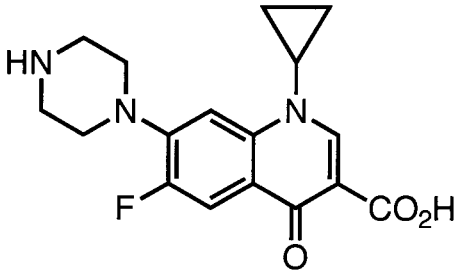
****DO NOT OPEN THIS EXAM UNTIL INSTRUCTED TO DO SO****

Q	1	2	3	Total
X				

Shall in these confines, with a monarch's voice,
Cry 'Havoc!' and let slip the dogs of war;
That this foul deed shall smell above the earth
With carrion men, groaning for burial.

- William Shakespeare

1. The chemical structure of Ciprofloxacin is shown below – what is its molecular formula? (5 pts)

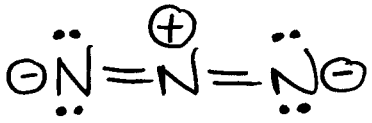


Ciprofloxacin (Cipro)

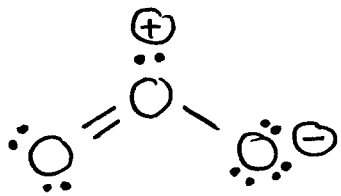
$C_{17}H_{18}N_3O_3F$

2. (a) In the boxes below, draw the structural formulae for the homotriatomic species derived from the elements nitrogen, oxygen and fluorine; in each case, the atom connectivity is X—X—X, i.e., there are no cyclic structures. Include all necessary bonds, lone pairs of electrons (or single unshared electrons if appropriate), and non-zero formal charges. *Hint: in each species, each atom has a full octet.* (4 pts each)

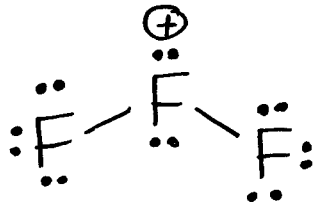
N_3^-



O_3



F_3^+



(b) Predict the X—X—X bond angle in each case. (1 pt each)

N–N–N angle

180°

O–O–O angle

~117°
(less than 120°)

F–F–F angle

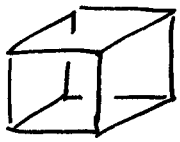
~104°
(like H_2O)

(c) One of the homotriatomic species discussed in this question does not actually exist (the other two do). Suggest which of the three species this is, and why it does not exist? (3 points)

F_3^+ does not exist because removing an electron from an F atom is not a likely prospect – most people argued this based upon electronegativity, but it should really be 'ionisation potential' i.e., an F atom overwhelmingly wants to be F^-, and not F^+

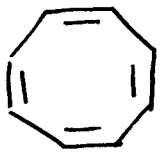
3. There are numerous different molecules with the molecular formula C_8H_8, but there are only 17 constitutional isomers of C_8H_8 in which each carbon atom is bonded to ONE hydrogen atom (13 of these compounds have actually been made). Draw (**using line formulae**) three different molecules with the formula C_8H_8 *in which each carbon is bonded to ONE hydrogen atom,* and in which every carbon atom has a full octet. (4 pts each)

1

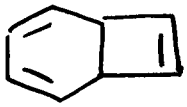


CUBANE

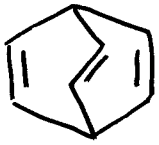
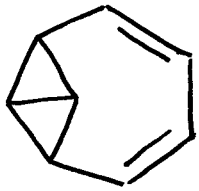
2



3

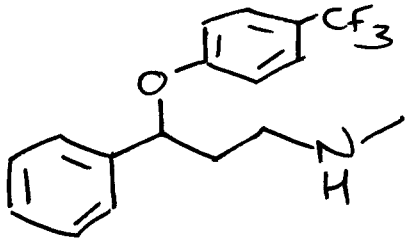


+ others, including:


, 
, 

and more...

ANSWERS TO QUIZ 1B WERE THE SAME, EXCEPT FOR Q1 →



formula is

$C_{17}H_{18}NOF_3$