“I'm very familiar with the importance of dairy farming in Wisconsin. I've spent the night on a dairy farm here in Wisconsin...”  

- Al Gore

"It's not the governor's role to decide who goes to heaven. I believe that God decides who goes to heaven, not George W. Bush."  

- George W. Bush
1. Name the following compounds using IUPAC nomenclature.

   a. spiro[6.5]dodecane

   -2 for bicyclo, not spiro

   b. trans-5,5-dibromo-2-isobutyl-cyclodecan-1-ol

2. The following compounds are named incorrectly. For each, draw the compound using the incorrect name (3 pts), then name the compound correctly (4 pts).

   a. 4-chloromethyl-3-neopentyl-hexan-3-ol

   -3 for not longest chain or chain without Cl

   longest chain in bold. Correct name: 1-chloro-2,3-diethyl-5,5-dimethyl hexan-3-ol

   b. 3-secbutyl-2-iodo-2-isopropyl-pentane

   -3 for not longest chain or chain without Cl

   longest chain in bold. Correct name: 4-ethyl-3-iodo-2,3,5-trimethyl heptane
3. On the following drawing, circle and identify three different functional groups.

These were right or wrong, 4 points each.

4. The following compound has two basic sites (the N in both nitriles and amines are basic). If you add an H+ to this molecule, there is one site which will give you a resonance stabilized compound. Draw the protonated form (add the H+ to a N) of the compound and draw some resonance structures of this compound (include at least three). Which of the structures you have drawn are major? Minor? Why? Answer these questions as completely as you can.

Major structures have octets on every atom. Minor structures have carbocations, carbons without full octets.

-4 for protonating wrong nitrogen but giving reasonable resonance structures; -1 each time for incorrect formal charge; -4 for missing or entirely incorrect structure; -2 for incorrect reasons for your resonance structures; -1 for not drawing brackets and resonance arrows.
5. In the CART racing series, methanol is used as the fuel. Draw the structure of methanol below. After a car has been fueled in the pits, usually in under 15 seconds (10 if you are good), a pit crew worker sprays the nozzle of the fueling hose with water as they withdraw it from the tank. Knowing what you know about the flammability of alcohol (lab!), tell me why they do this. Give a rational reason why they would use water and not something else.

\[
\begin{array}{c}
H \\
H-C\ddash O\ddash H \\
H
\end{array}
\]

-2 for incorrect # of carbons

The correct answer will include mentioning CH₃OH being soluble in water and discussing dilution and its effect on the flammability.


Remember! Your drawings may not look like mine and they still may be correct!

-4 for not correct chair flips; -1/2 for having bonds to nowhere; -4 for Newman of most stable conformation or Newman of a different compound; -1 for small chair errors (bonds going the wrong way, etc.); -2 for Newman of incorrect chair (mirror image); -6 for no chair of Newman; -3 for cis not trans.
7. What is the relationship between the following pairs of compounds? Choose four of the next five. You choices are: same compound; resonance structure; structural isomer; geometric isomer; or completely different compound.

a. \( \text{H} \quad \text{H} \) and \( \text{H} \quad \text{H} \) geometric

b. \( \text{CH}_2\text{O}^- \) and \( \text{CH}_2\text{O}^- \) structural

c. \( \text{CH}_3\text{CH}_2\text{CHBr} \) and \( \text{CH}_3\text{CH}_2\text{CHBr} \) structural

(different if you counted H's and showed me!)

d. \( \text{cis}-1\text{-cyclobutyl-2-methyl-cyclohexane} \) and \( \text{cis}-1\text{-cyclobutyl-2-methyl-cyclohexane} \) completely different compound (different # of C's)

e. \( \) and \( \) completely different compound (different # of C's)

(3) BONUS: Name any gold medallist in the 2000 Olympic games [if a member of a team, only one team member need be named] (1 pt). What is their home country (1 pt)? In what event, be very specific, did this person medal (1 pt)? any reasonable answer taken.