

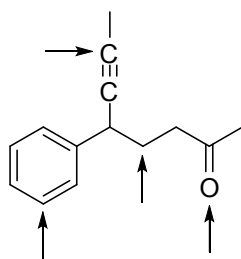
CHM 1321 C
Midterm 1
February 6, 2009

Note: The points are given as a guide and are subject to minor changes.

Last name: _____ First name: _____

Student Number: _____

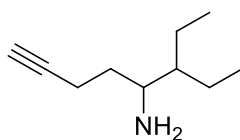
1. Identify the hybridization of the indicated atoms: **(4 points)**



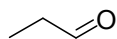
2. Draw the complete Lewis structure for the following molecule: **(2 points)**



3. Name the following molecule using IUPAC nomenclature. **(3 points)**

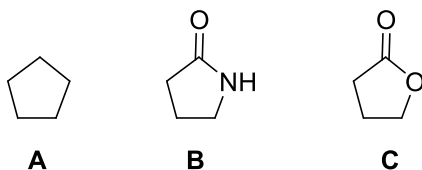


- 4.
- Draw the molecule below using the LCAO method (**4 points**).
 - Label all the orbitals in part a (p, sp, sp², sp³) (**3 points**).
 - Label all the bonds in part a (σ , π) (**3 points**).



5. Why is cyclopropane considered to be a strained ring? (**3 points**)

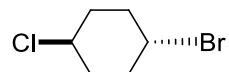
6. Rank the following in order of *decreasing* solubility in water. (2 points)



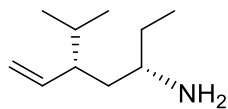
_____ > _____ > _____

7. Give the definition of “diastereomers” and show an example. (3 points)

8. Is the following molecule chiral? Explain clearly how you came to this conclusion. (3 points)

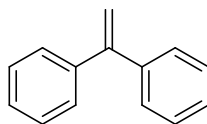
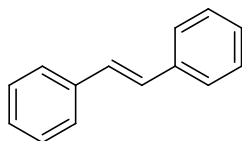


9. For the following molecule (**8 points**)
- Identify the stereocentre(s) with a star (*).
 - Determine the priorities of the substituents around each stereocentre (re-drawing the structure helps).
 - Assign the configuration of the stereocentre(s).



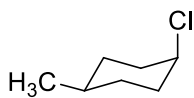
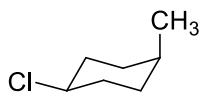
10. Give the relationship (enantiomer, etc...) between each of the following pairs. Be as specific as possible. (**2 points**)

a.



Relationship:

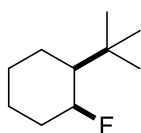
b.



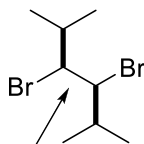
11. Compare the differences between the physical properties of enantiomers and diastereomers? (**4 points**)

12.

- Draw the two chair conformations of the molecule below. Note: you do not have to draw the H's. **(5 points)**
- For each structure, label the substituents as being axial or equatorial. **(2 points)**
- Identify the most stable and least stable conformation. **(1 point)**



13. Consider the Newman projection of the following molecule about the indicated bond.



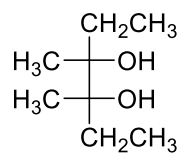
- Draw and name the Newman projection of the least stable conformation **(3 points)**

- Draw and name the Newman projection of the most stable conformation **(3 points)**

14. Draw the following molecules as line structures. **(4 points)**

a. 4-isopropyl-2-methylheptane

b.



BONUS!

Draw the molecule below using the LCAO method. **(2 points)**

