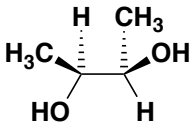
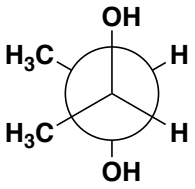
CHE 310 – 002 & 003
Lecture Homework #22

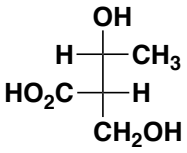
Due Section 002: Wednesday, March 20, 2019, 9:00 am.
Due Section 003: Wednesday, March 20, 2019, 10:00 am.

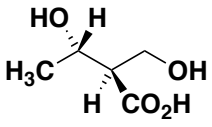
1. Provide structures for the two ^{1}H NMR spectra on the following pages.

2. For each pair of molecules below **fill in the blank** with their relationship. *Choices are* ***identical***, ***conformational isomers, resonance contributors***, ***constitutional isomers***, ***enantiomers, diastereomers,*** *and* ***non-isomeric***









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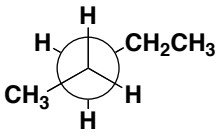

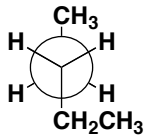

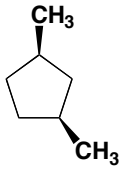

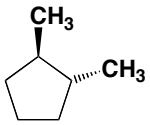

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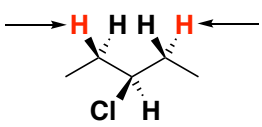
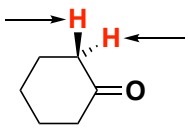
3. This problem is similar to 11.3 in the text book. For each pair of indicated protons **fill in the blank** with their relationship by NMR spectroscopy. *Choices are* ***unrelated, homotopic, enantiotopic*** and ***diastereotopic.***





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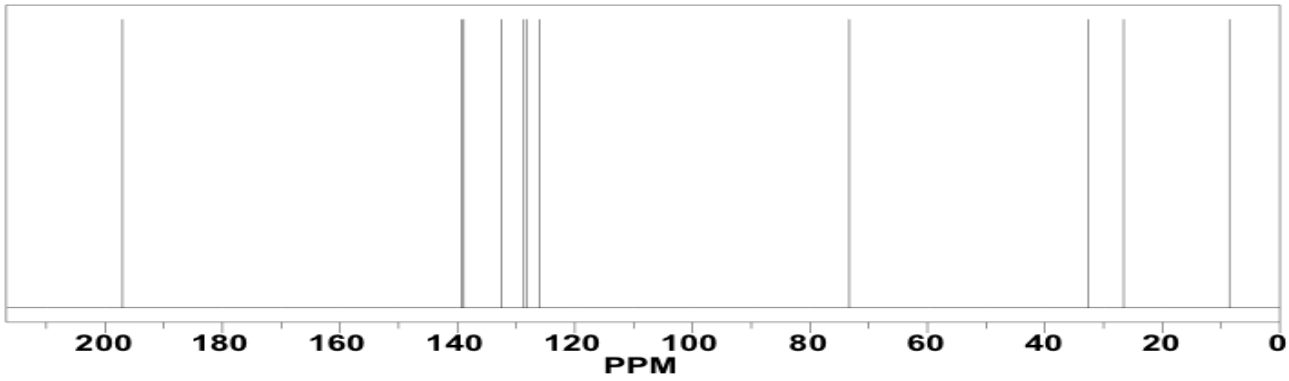
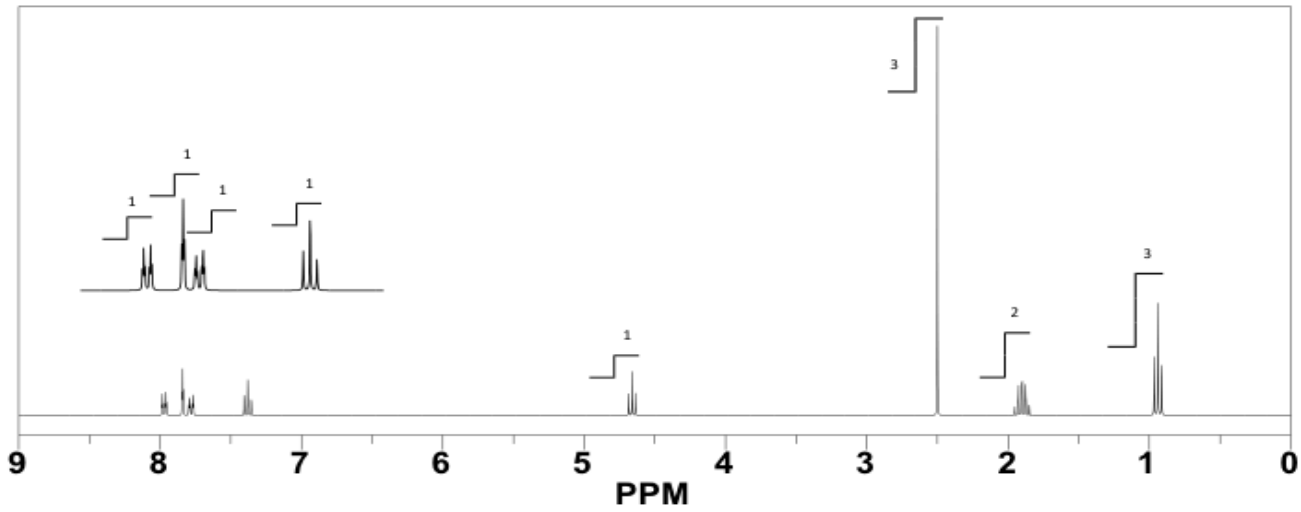
1. The compound with formula **$C_{11}H_{13}OCl$** gave the ^{1}H- and ^{13}C-NMR spectra below
   a. Calculate the degree of unsaturation for this compound
   b. Propose a structure that is consistent with the provided spectroscopic data.
   c. In your final structure label the non-equivalent hydrogens with ***a***, ***b***, ***c***… and write the same letter next to the corresponding peak in the spectrum.



There are 6 carbons between 120 – 140 ppm



2. The compound with formula **$C_{15}H_{20}O$** gave the ^{1}H- and ^{13}C-NMR spectra below.
   a. Calculate the degree of unsaturation for this compound
   b. Propose a structure that is consistent with the provided spectroscopic data.
   c. In your final structure label the non-equivalent hydrogens with ***a***, ***b***, ***c***… and write the same letter next to the corresponding peak in the spectrum.