CHE 173
Winter, 2005
Specific Objectives for Quiz 2

1. Understand how to interpret ^{1}H NMR spectra:
   (a) The number of signals present in the spectrum is equal to the number of chemically nonequivalent protons (or groups of protons) in the molecule.
   (b) The chemical shift value (where the signal appears) is directly related to the proton's environment (the more de-shielded, the more downfield)
   (c) The integrated area under each signal is equivalent to the relative number of protons that correspond to that signal.
   (d) The splitting pattern or multiplicity of each signal (in most cases) is directly related to the number of vicinal protons (= N + 1, where N = the number of vicinal protons)
2. Be able to recognize the following "classic" splitting patterns: ethyl, isopropyl, n-propyl, t-butyl, para-disubstituted aromatic ring, monosubstituted aromatic ring.
3. Understand what gives rise to more complex splitting patterns (such as the 3 doublet of doublets observed for a monosubstituted alkene).
4. Understand what a coupling constant is.
5. Understand that protons bonded to oxygen (and sometimes nitrogen) can undergo exchange and the effect that that has on their appearance in a proton NMR spectrum.
6. Understand why cyclohexane gives only one sharp singlet in its proton (and carbon) NMR spectrum.
7. Understand how to interpret ^{13}C NMR spectra, including DEPT and off-resonance decoupled spectra.
8. Given IR, MS, UV-VIS, ^{1}H NMR and ^{13}C NMR spectroscopic data, be able to determine the structure of an organic compound.