Suggested Problems
Chapter 12 - 13

Problems from your text
12.11, 12.13, 12.18, 12.29, 12.30, 12.34, 12.37, 12.39, 12.48, 12.49.


On the LINKS web page, you can find lots of additional on-line spectroscopy problems.

Additional Practice Problems

1. Below is the IR and $^1$H NMR spectra for an unknown compound with a molecular formula C$_5$H$_{10}$O. In the $^{13}$C NMR, four resonances appear at 210, 45, 22, and 16 ppm. Determine the structure of this molecule.
2. A molecule with the formula $\text{C}_6\text{H}_{12}\text{O}_2$ shows a characteristic Infrared absorption at 1735 cm$^{-1}$ and the following NMR spectra. The proton spectra shows the peaks, the number of hydrogens that each resonance integrates for, and the coupling constant (J in Hz). Determine the structure.

![NMR spectra](image)

3. A molecule with the formula $\text{C}_5\text{H}_{10}\text{O}$ shows a characteristic Infrared absorption at 1715 cm$^{-1}$ and the following MS and NMR spectra. Determine the structure.

![Mass spectrum and NMR spectra](image)
4. Determine the structure for an unknown molecule with a molecular formula of \( \text{C}_{10}\text{H}_{12}\text{O} \). The IR spectra shows a strong absorbance at 1680 cm\(^{-1}\). The \(^1\)H NMR and \(^{13}\)C NMR spectra for this unknown are shown below.
5. The three compounds shown below have very different $^{13}$C NMR spectra. Match the structures with the correct spectra.

![Compounds A, B, and C](image)

![NMR spectra](image)