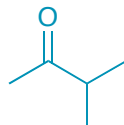
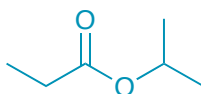


Additional Practice Problems

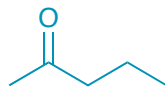
1. Below is the IR and ^1H NMR spectra for an unknown compound with a molecular formula $\text{C}_5\text{H}_{10}\text{O}$. In the ^{13}C NMR, four resonances appear at 210, 45, 22, and 16 ppm. Determine the structure of this molecule.



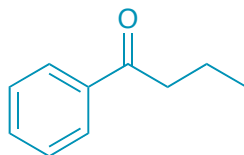
2. A molecule with the formula $\text{C}_6\text{H}_{12}\text{O}_2$ shows a characteristic Infrared absorption at 1735 cm^{-1} and the following NMR spectra. The proton spectra shows the peaks, the number of hydrogens that each resonance integrates for, and the coupling constant (J in Hz). Determine the structure.



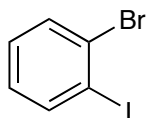
3. A molecule with the formula $\text{C}_5\text{H}_{10}\text{O}$ shows a characteristic Infrared absorption at 1715 cm^{-1} and the following MS and NMR spectra. Determine the structure.



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 ^1H NMR and ^{13}C NMR spectra for this unknown are shown below.

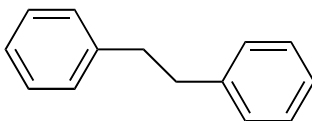


5. The three compounds shown below have very different ^{13}C NMR spectra. Match the structures with the correct spectra.



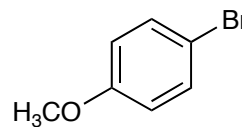
A

Spectrum 1



B

Spectrum 3



C

Spectrum 2