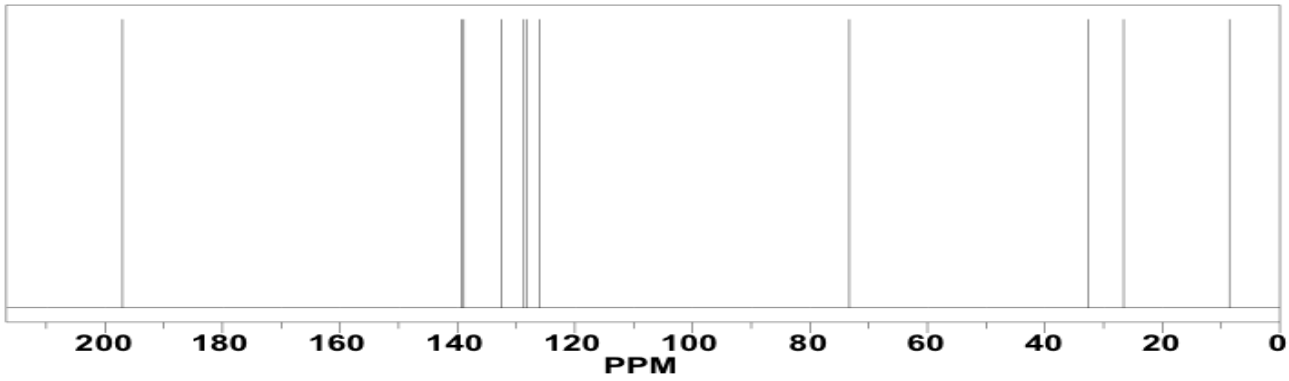
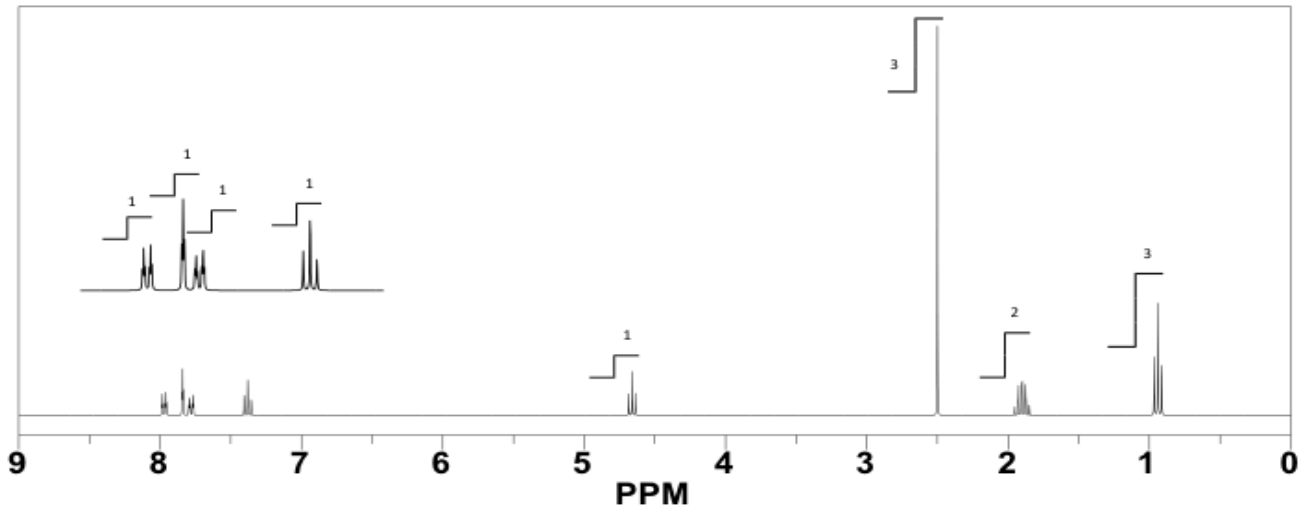
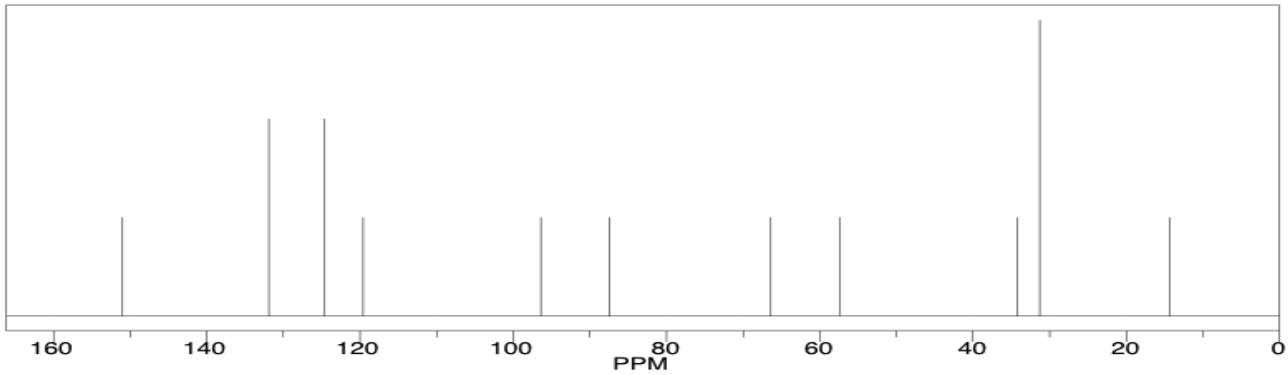
1. The compound with formula **$C_{11}H_{13}OCl$** gave the ^{1}H- and ^{13}C-NMR spectra below
   a. Calculate the degree of unsaturation for this compound
   b. Propose a structure that is consistent with the provided spectroscopic data.
   c. In your final structure label the non-equivalent hydrogens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

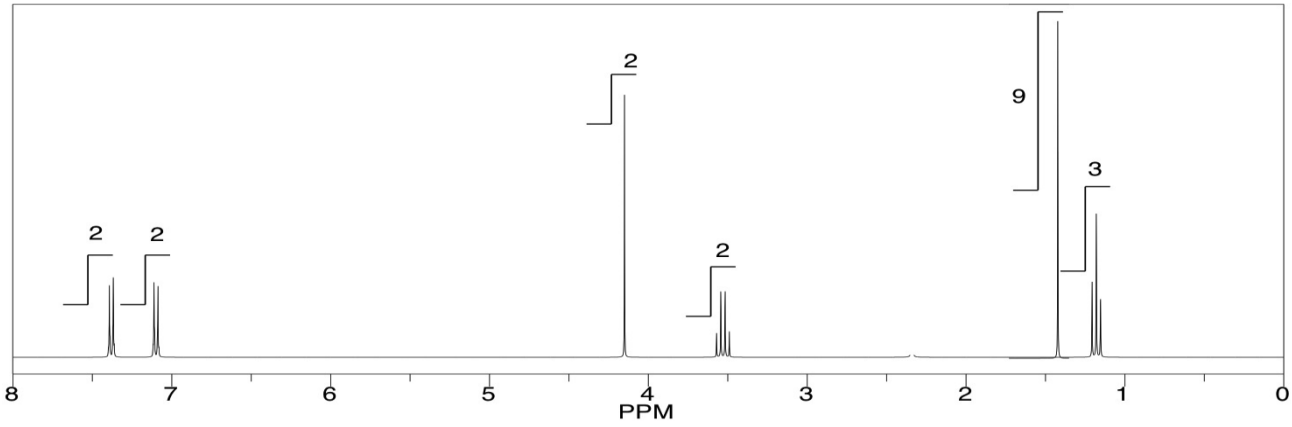


There are 6 carbons between 120 – 140 ppm



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.



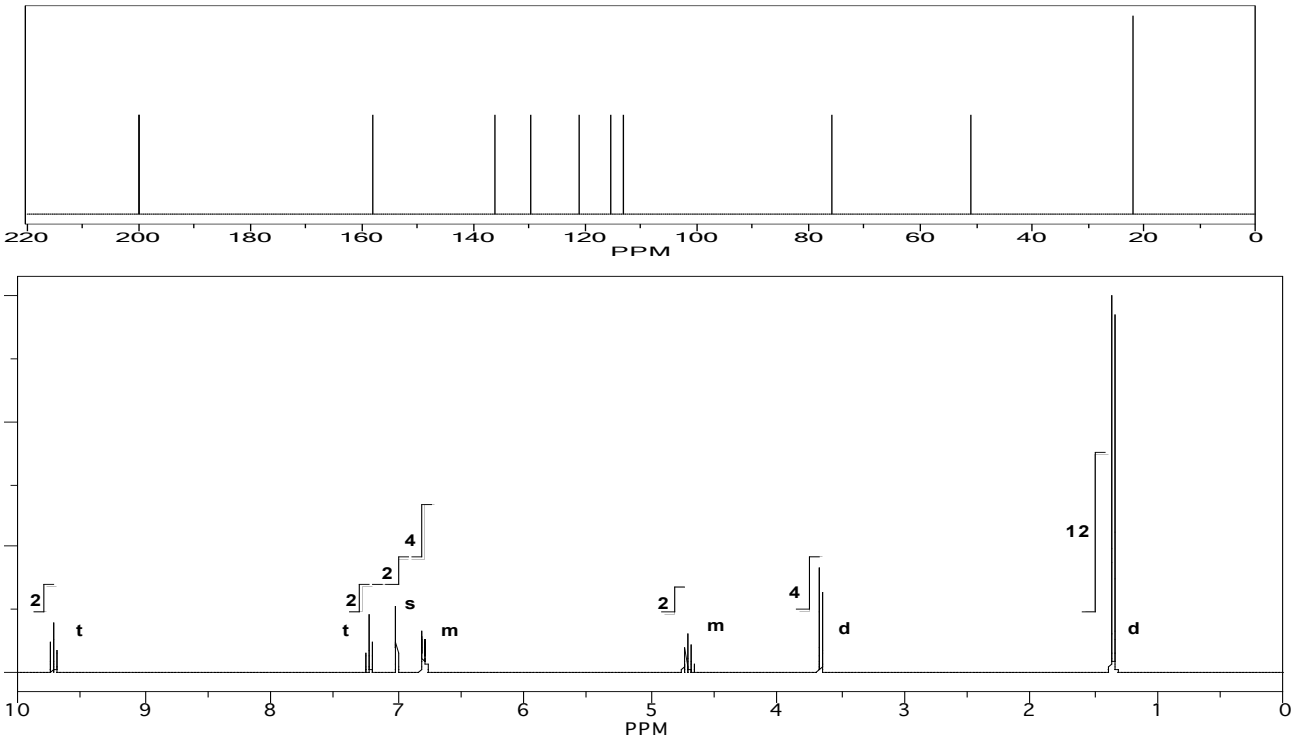


3. The compound with formula $\mathbf{C_{11}H_{14}O_2}$ gave the ^{1}H- and ^{13}C-NMR spectra below

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.



4. The compound with formula $\mathbf{C_9H_{12}O}$ gave ^{1}H-NMR 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.