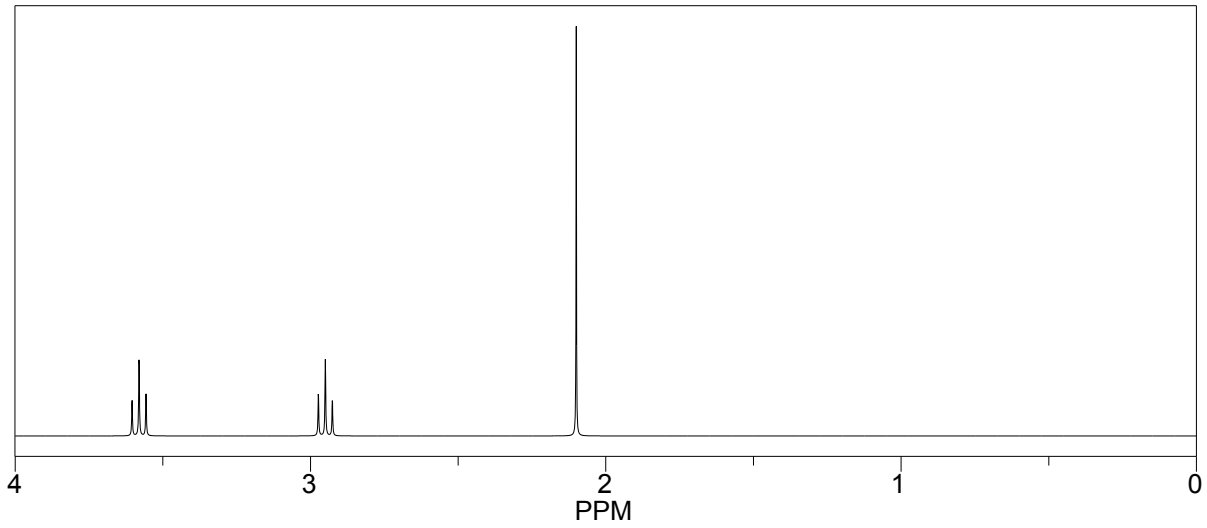
1. A compound with the formula **C_4H_7BrO** gave the ^{1}H- and ^{13}C-NMR spectra below.
   - **Calculate** the degrees of unsaturation for this compound **= _____**
   - **Propose** a structure that is consistent with the provided spectroscopic data.

^{13}C NMR shifts (ppm): 207.7, 47.1, 28.8, 25.9

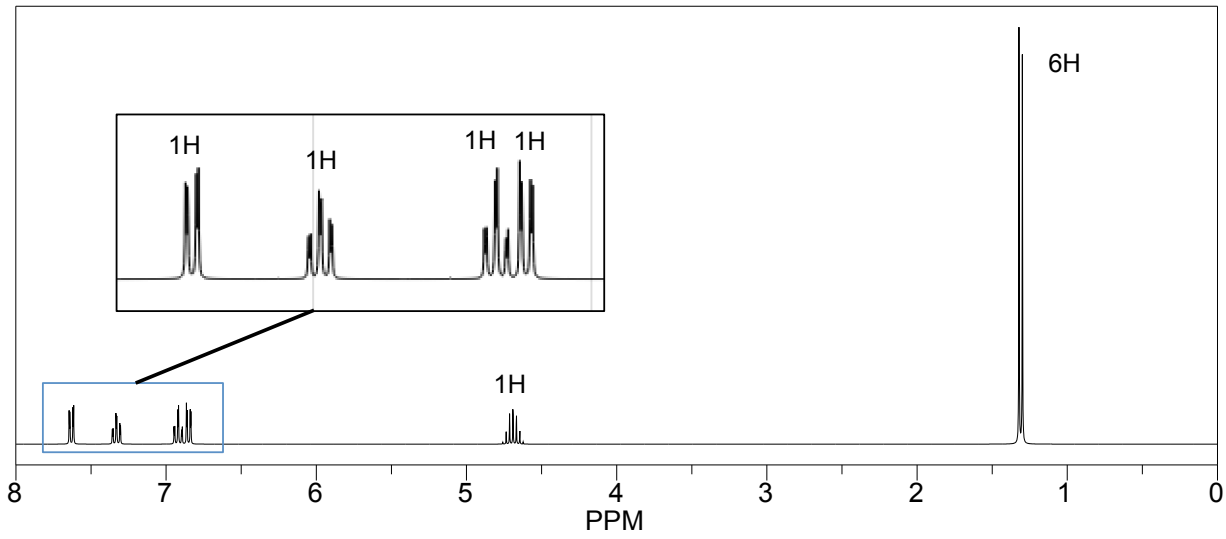


Final Structure:

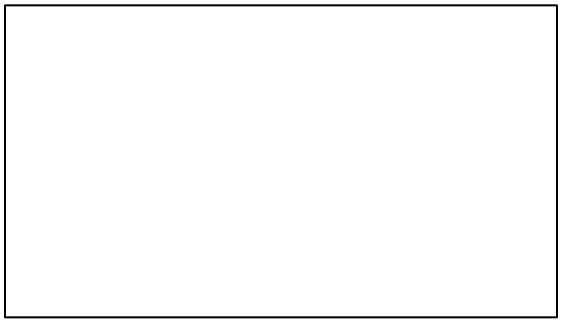
2. A compound with the molecular formula **$C_5H_{12}O_2$** shows 2 singlets in the ^{1}H NMR at 3.30 ppm and 1.21 ppm. The compound shows 3 peaks in the ^{13}C NMR at 118.0, 48.7, and 25.9 ppm. Provide a structure consistent with this data.

3. A compound with the formula **$C_9H_{11}BrO$** gave the ^{1}H- and ^{13}C-NMR spectra below.
   - **Calculate** the degrees of unsaturation for this compound **=** _____
   - **Propose** a structure that is consistent with the provided spectroscopic data.

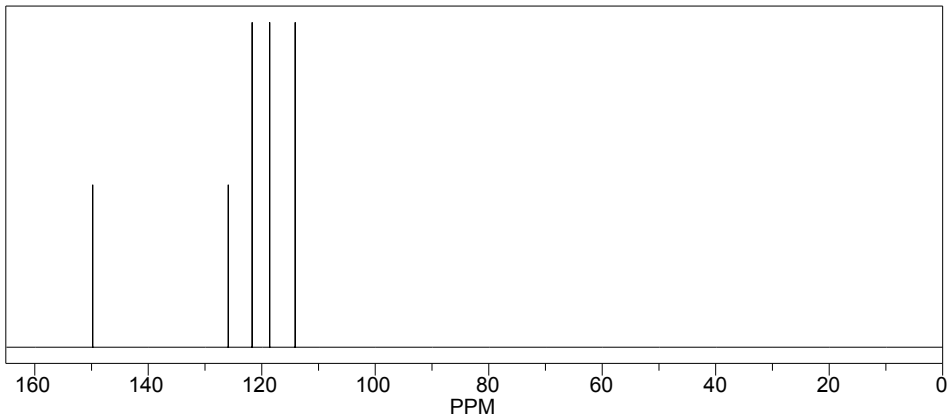
^{13}C NMR shifts (ppm): 153.8, 133.4, 128.3, 122.5, 116.2, 112.3, 75.1, 22.0.



Final Structure:

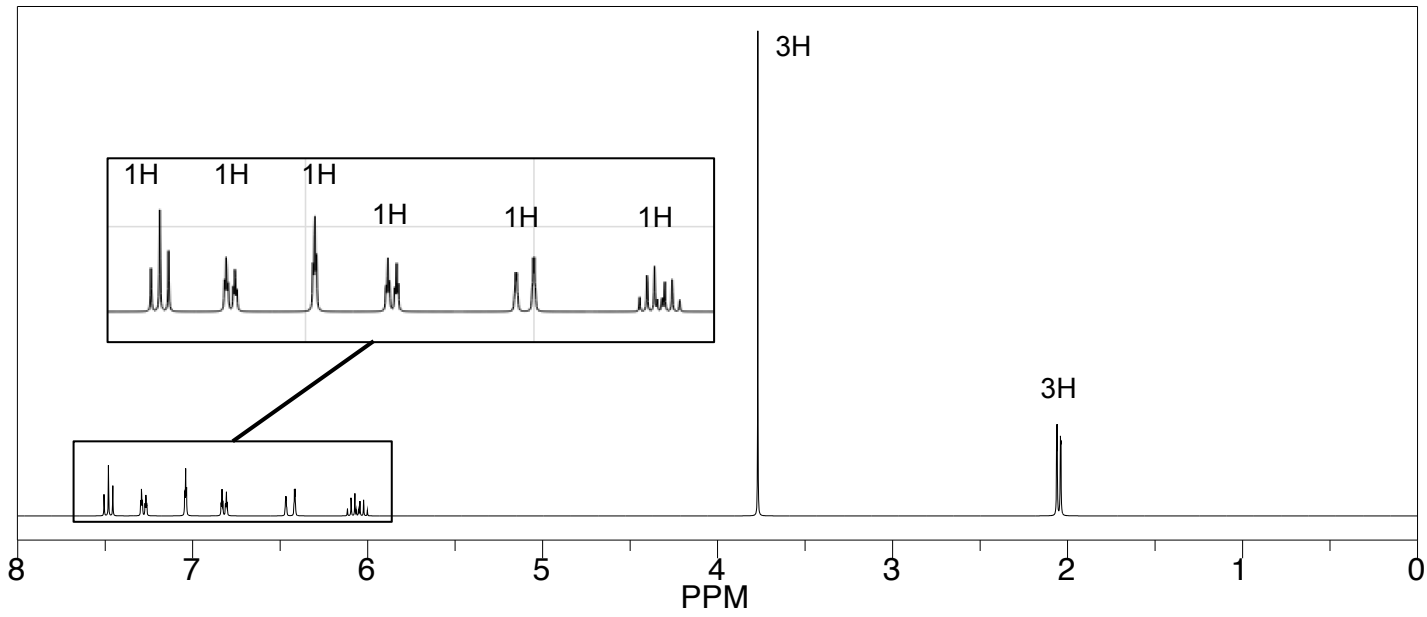


4. A compound with the molecular formula **$C_8H_5N_3$** shows 3 singlets in the ^{1}H NMR at 7.33, 7.25 ppm and 5.28 ppm. The peak at 5.28 ppm disappears upon the addition of D_2O. The ^{13}C NMR data is below. Provide a structure consistent with this data.



5. A compound with the formula **$C_{10}H_{12}O$** gave the ^{1}H- and ^{13}C-NMR spectra below.
   - **Calculate** the degrees of unsaturation for this compound **= _____**
   - **Propose** a structure that is consistent with the provided spectroscopic data.

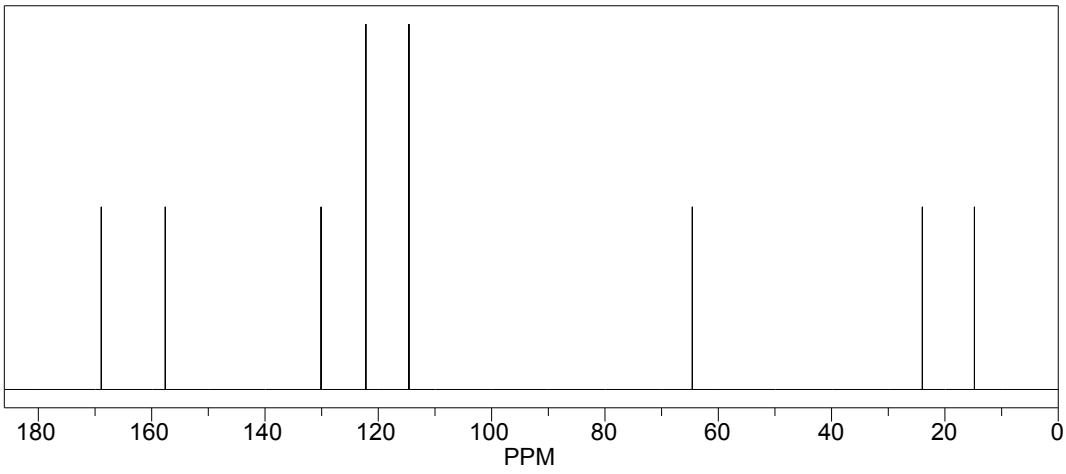
^{13}C NMR shifts (ppm): 160.5, 139.7, 130.5, 129.6, 124.4, 120.8, 113.5, 113.2, 55.8, 18.8

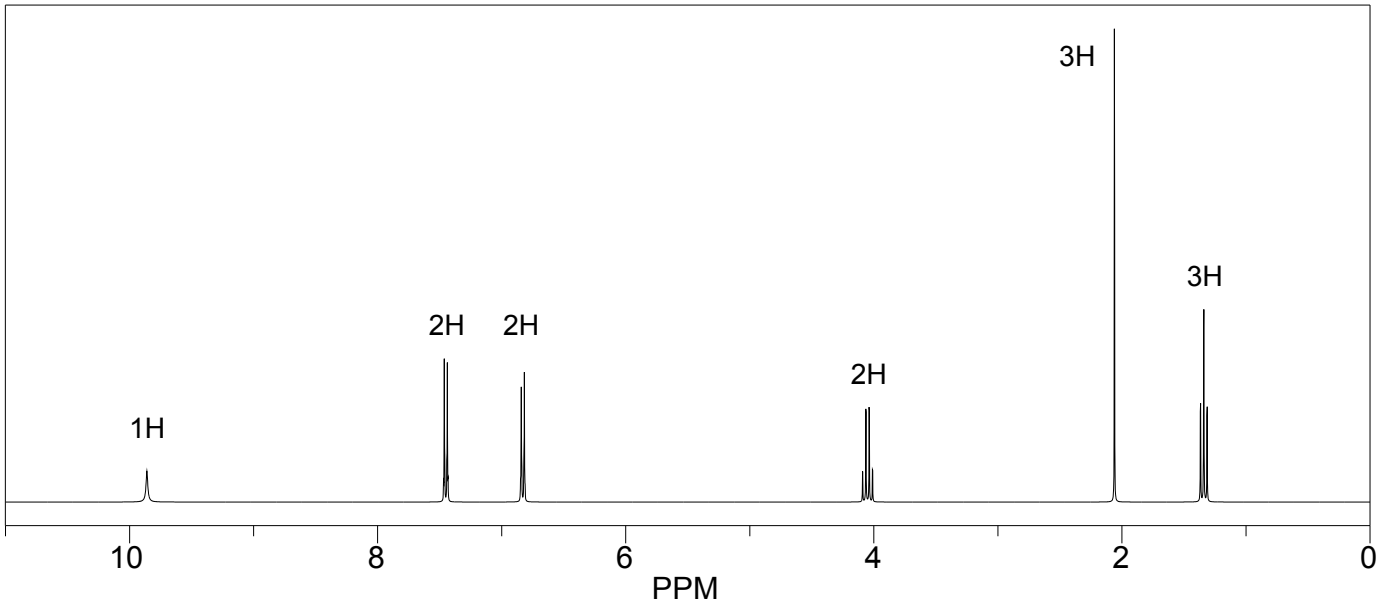


Final Structure:

6. A compound with the molecular formula **C_8H_8** shows 1 singlet in the ^{1}H NMR at 6.44 ppm and 1 peak in the ^{13}C NMR at 131.5 ppm. Provide a structure consistent with this data.

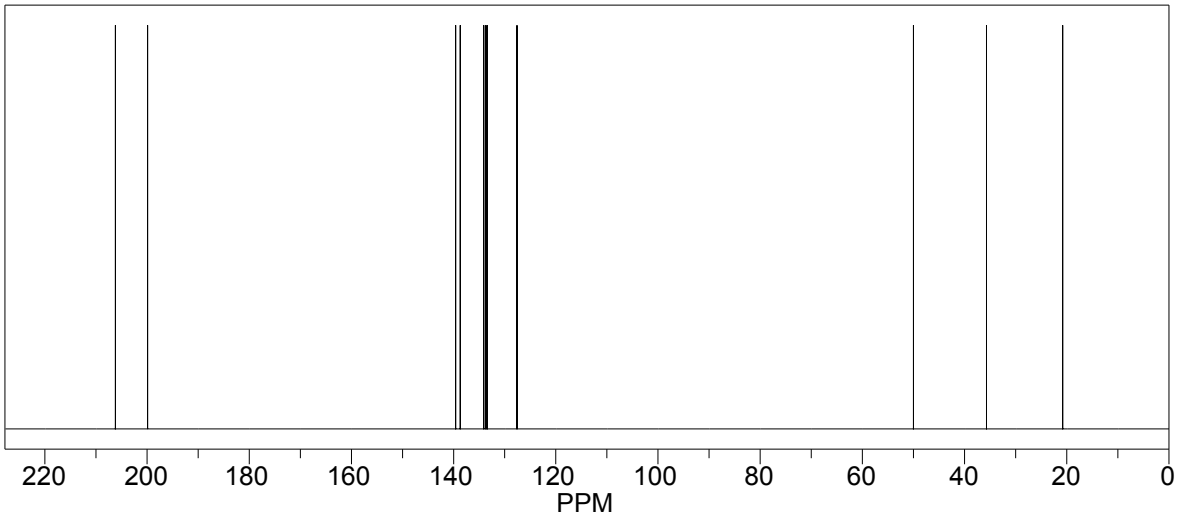
7. A compound with the formula $\mathbf{C_{10}H_{13}NO_2}$ gave the ^{1}H- and ^{13}C-NMR spectra below.
   - **Calculate** the degrees of unsaturation for this compound **= _____**
   - **Propose** a structure that is consistent with the provided spectroscopic data.



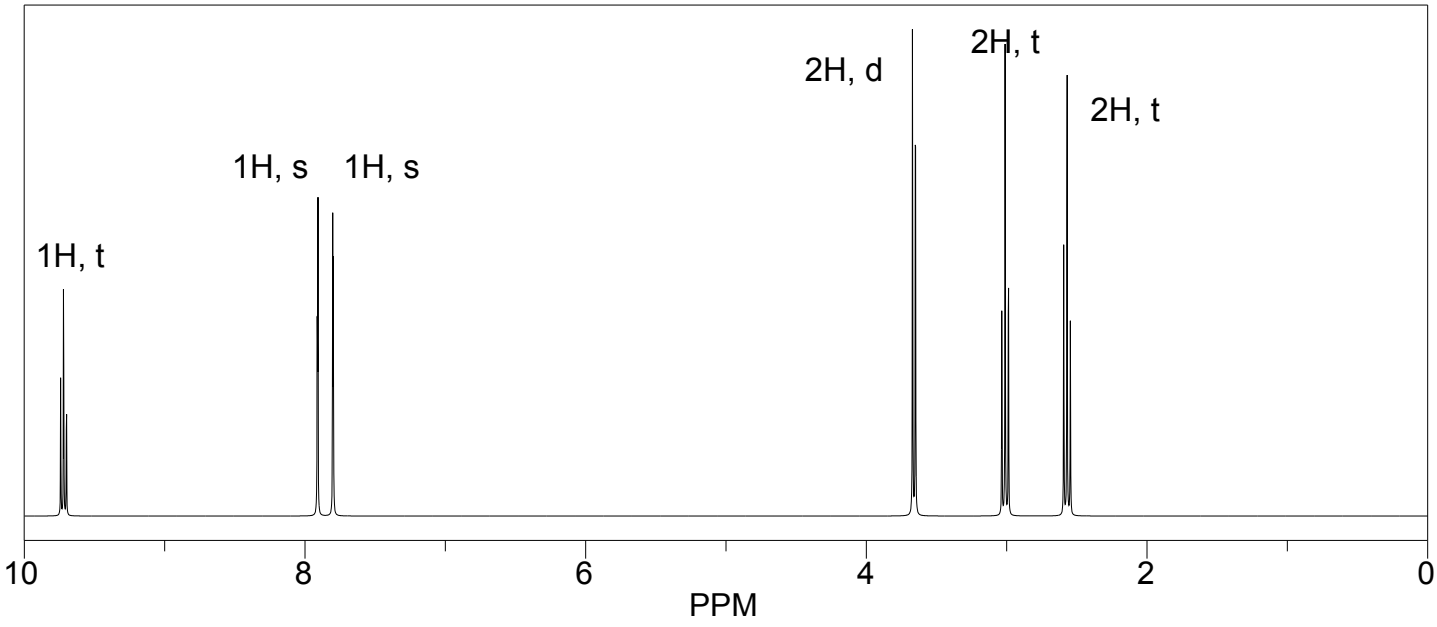


Final Structure:

8. A compound with the formula $\mathbf{C_{11}H_9ClO_2}$ gave the ^{1}H- and ^{13}C-NMR spectra below.
   - **Calculate** the degrees of unsaturation for this compound **= _____**
   - **Propose** a structure that is consistent with the provided spectroscopic data.



There are 6 peaks between 120-140 ppm.



Final Structure: