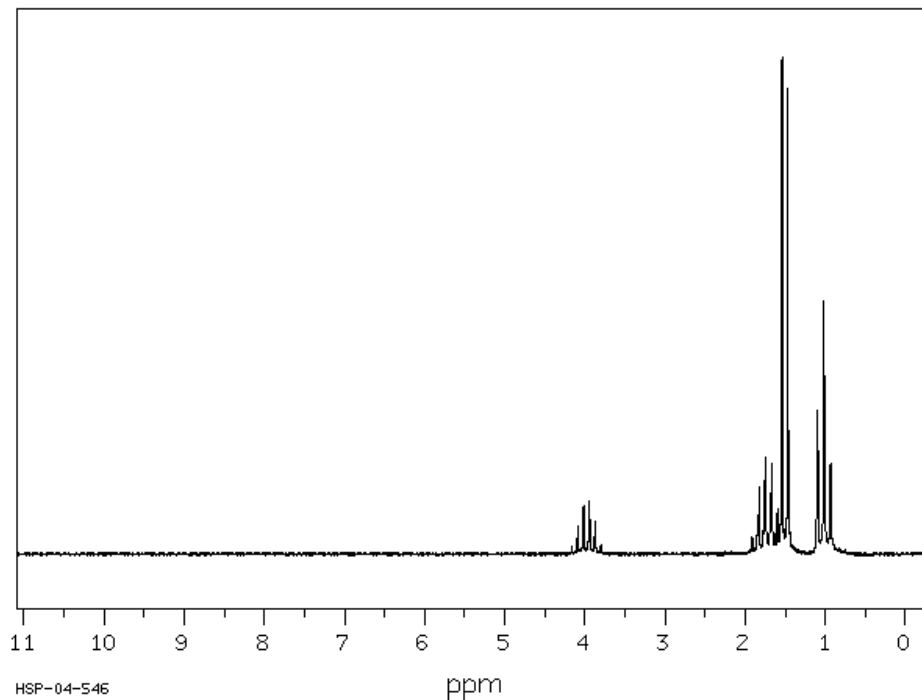


CHM 320 ^1H NMR Review

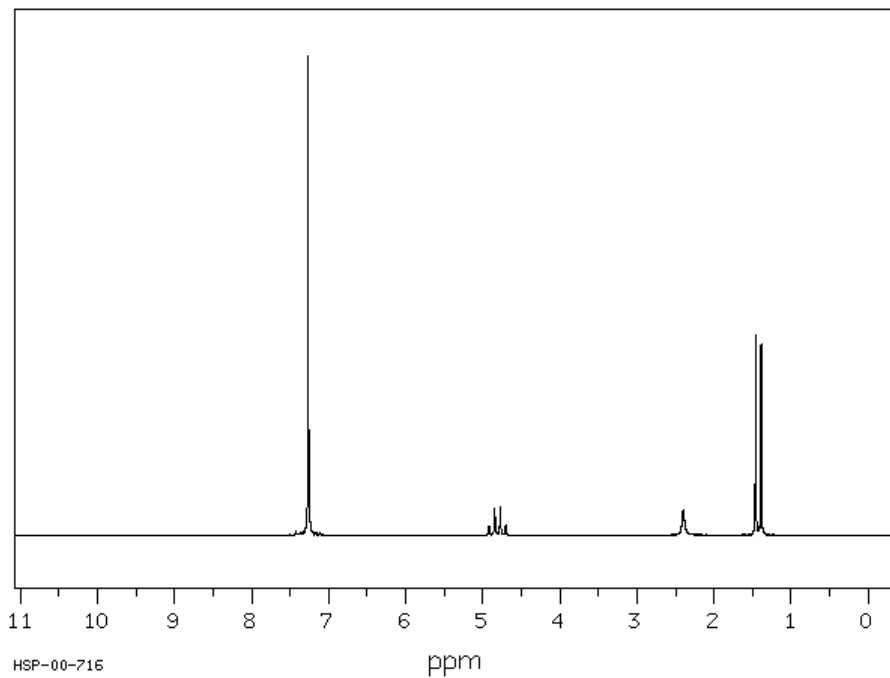
1. Identify compound **A** ($\text{C}_4\text{H}_9\text{Cl}$) that gives rise to the following ^1H NMR spectrum. The integration of the four signals upfield to downfield is 3:3:2:1.



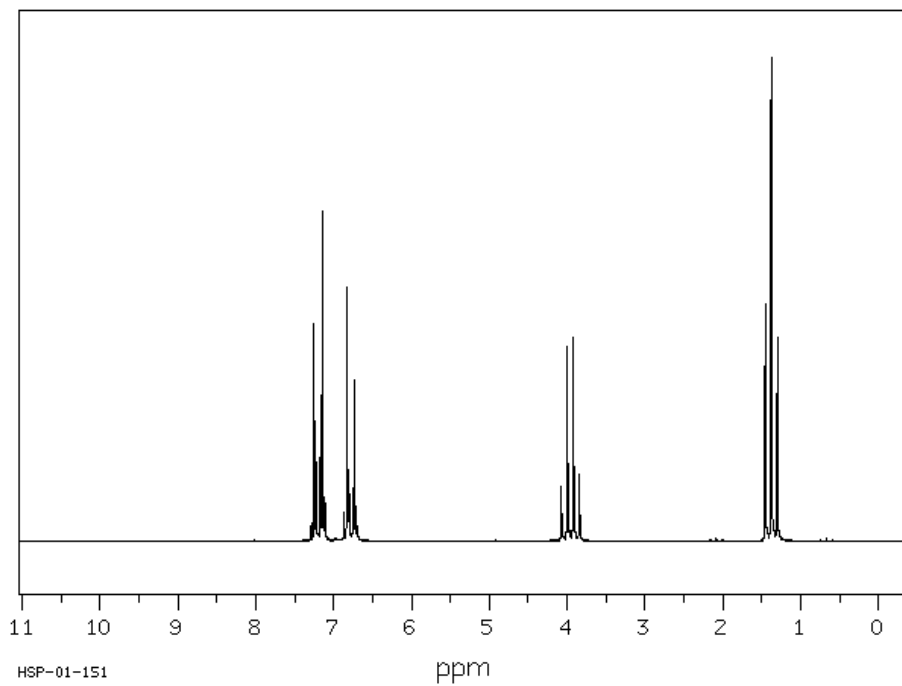
2. Draw a compound that is consistent with the following NMR data:
- a) $\text{C}_4\text{H}_9\text{Br}$, has 3 signals in the ^1H NMR spectrum, 2 doublets and a 9-line multiplet.
 - b) $\text{C}_4\text{H}_8\text{Br}_2$, has 3 signals in ^1H NMR spectrum, a singlet, a triplet and a quartet.
3. Give the structure of a compound with a formula of $\text{C}_4\text{H}_{10}\text{O}_2$ that gives only two singlets in the ^1H NMR spectrum in an integral ratio of 3:2.
4. How many proton signals would you expect to see in the ^1H NMR spectra of the following:
- a) m-bromo nitrobenzene
 - b) 2,4-dimethylpentane
 - c) 1-butene

5. Identify the compounds **A** ($C_8H_{10}O$) and **B** (C_8H_9ClO) that give rise to the two 1H NMR spectra below. Integration for **A**, upfield to downfield: 3:1:1:5; Integration for **B**, upfield to downfield: 3:2:2:2

A

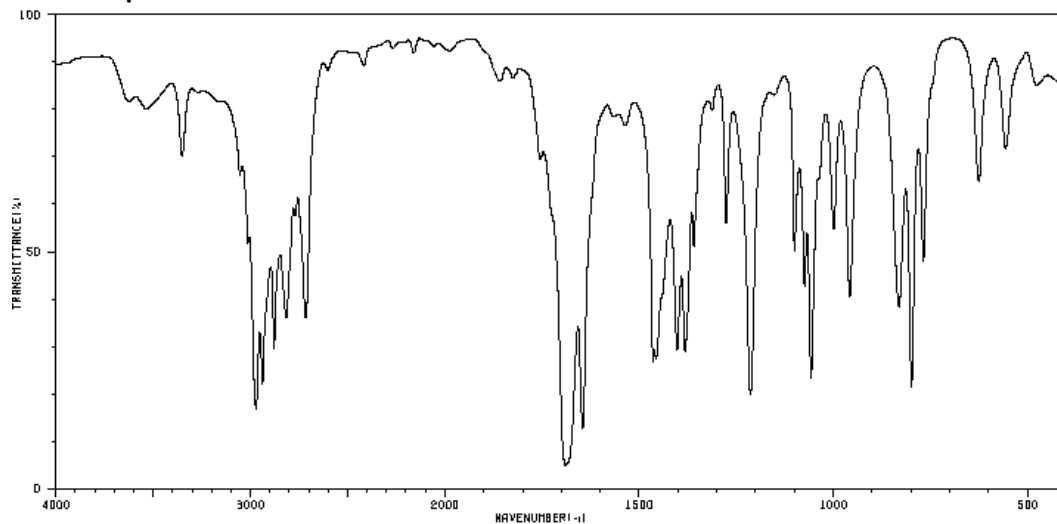


B



6. Identify the compound that gives rise to the following IR and ^1H NMR spectra. Integration of the NMR spectrum upfield to downfield is 3:3:2:1:1. The mass spectrum gives a molecular ion (m^+) at $m/z = 98$. In order to accrue partial credit, show all your thought processes and *put a box around your final structure*.

Infrared spectrum:



^1H NMR spectrum:

