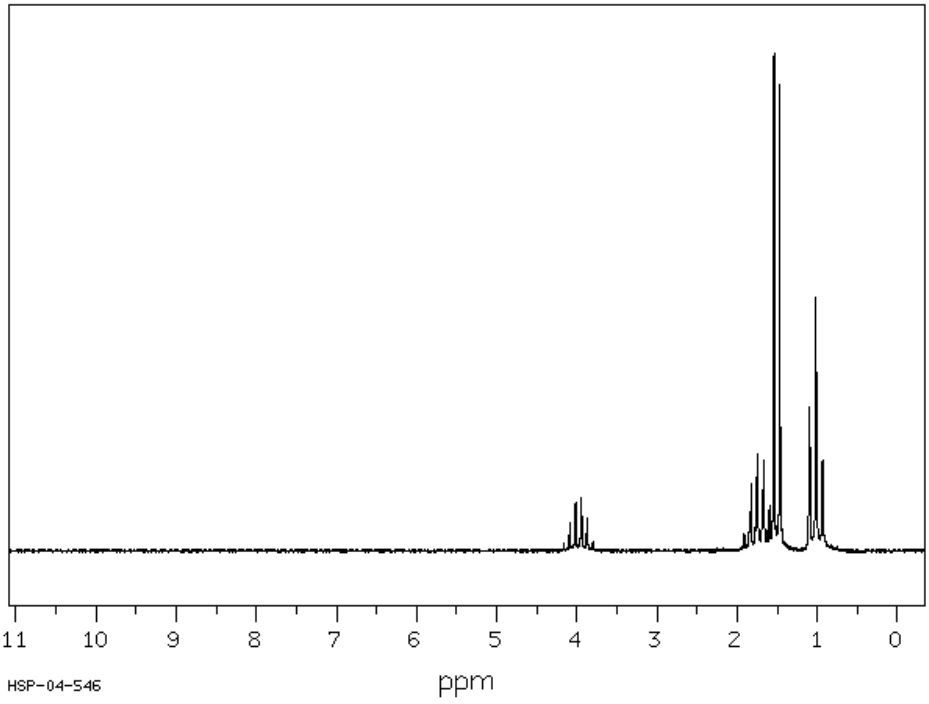
## CHM 202 NMR Problems

1. Identify compound **A** ($C_4H_9Cl$) 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) $C_4H_9Br$, has 3 signals in the 1H NMR spectrum, 2 doublets and a 9-line multiplet.

   b) $C_4H_8Br_2$, has 3 signals in $^1H$ NMR spectrum, a singlet, a triplet and a quartet.

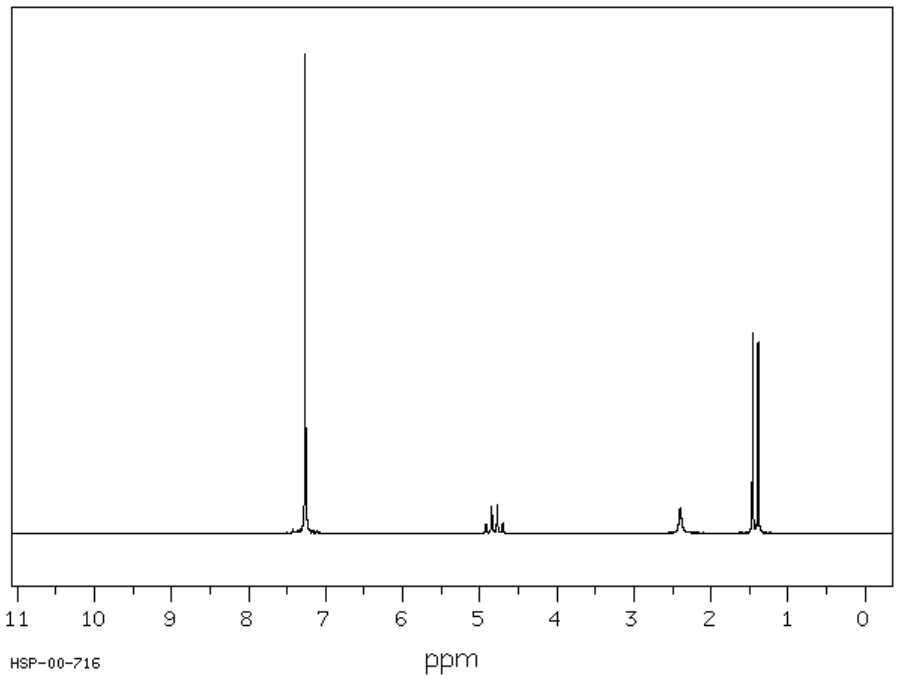
3. Give the structure of a compound with a formula of $C_4H_{10}O_2$ that gives only two singlets in the $^1H$ NMR spectrum in an integral ratio of 3:2.

4. For the link that follows, click on "Problems" and choose a problem from the matrix. You can click on the C-13, $^1H$ NMR, IR and mass spectra. The formula is given. In the proton spectra, click on the peaks to expand them. Suggested problems 1,3,27,46,50,62,64.

http://www.nd.edu/%7Esmithgrp/structure/workbook.html

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**