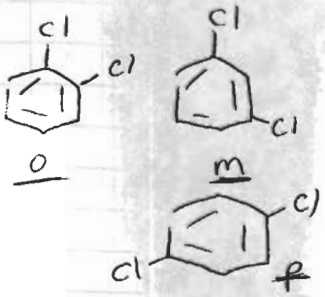
King's Chemistry 122
Spectroscopy Problems Practice

1. Match the following three compounds to their ^{13}C NMR spectrum.

based on # peaks

o-dichlorobenzene → A. δ 127, 129, 131, 135 ppm
m-dichlorobenzene → B. δ 128, 131, 133 ppm
p-dichlorobenzene → C. δ 117, 159 ppm



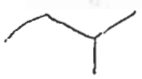
2. Assign a constitutional isomer of C_5H_{12} to each ^{13}C NMR spectrum.
   a. δ 14, 23, 35 ppm
   b. δ 11.7, 22, 31, 32 ppm
   c. δ 28, 32 ppm

3. A and B, isomers of C_4H_9Cl, have two and four peaks, respectively, in their ^{13}C NMR spectra. Draw the structures of A and B.

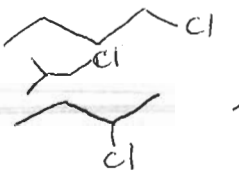
4. An un known compound (C_5H_8O) has a strong absorbance in its IR spectum at 1745 cm^{-1}. Its ^{13}C NMR spectrum has absorbances at δ 23, 38 and 220 ppm. Give the structure of the unknown compound.

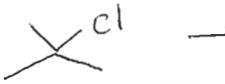
5. The following page gives proton NMR spectra for three isomers of C_4H_9Br. Determine the structure that gave rise to each spectrum.

2.  3 pks (a)

 4 pks (b)

 2 pks (c)

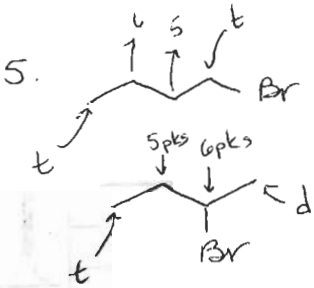
3.  any ~~either~~ could be B

 → A

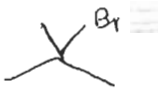
4. 2 units unsat.
IR shows  , most likely cyclic to get symm



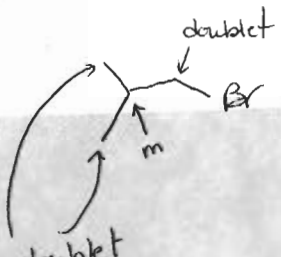
5 ^{13}C signals ✓

5. 

top
bottom

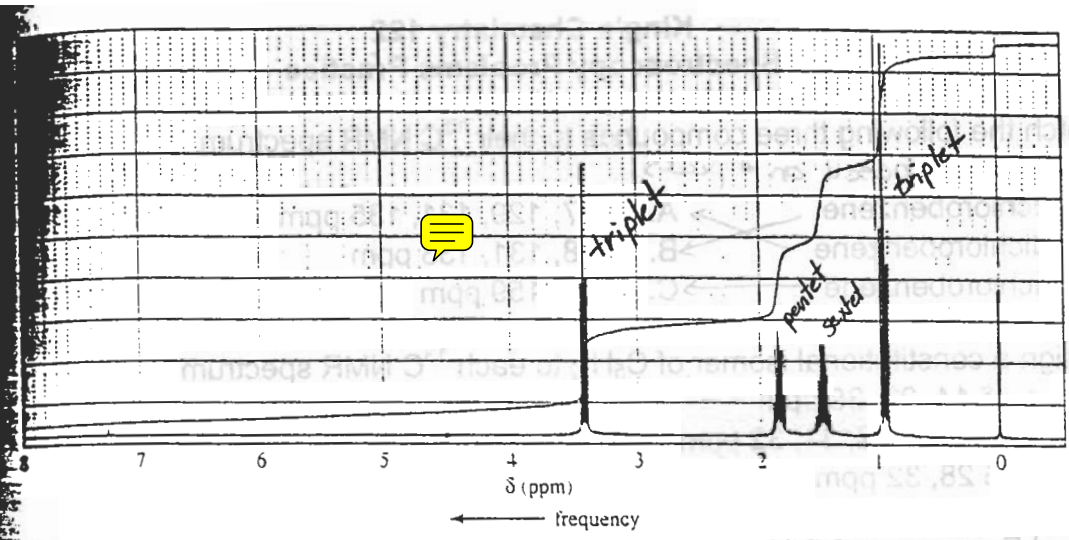


- not show

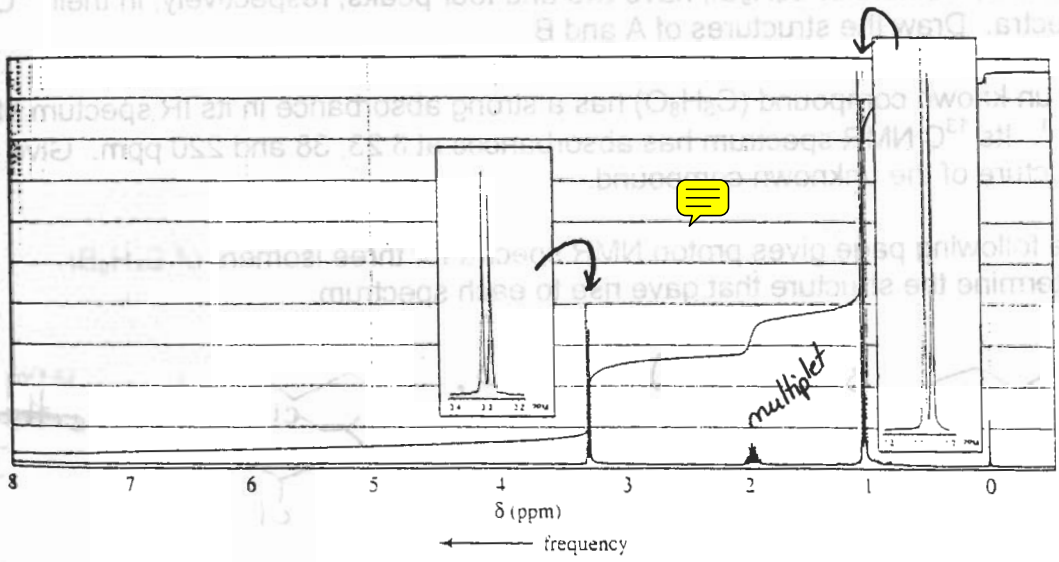


= middle

3 isomers of C_4H_9Br



c.



a.