Quiz 5  
S343 Summer 2008

This quiz contains 21 points and will be scored out of 20 points.

1. (3pts) Label each of the individual protons into equivalent sets (A, B, C…). (In other words, if two protons are equivalent, give them the same letter.)

H

H

H

H

Cl

H

H

H

H

2. (4pts) For the molecule below, give the range of splitting (in Hz) that you would expect to see on a proton NMR spectrum between each of these sets of protons:

\[ J_{AC} = \_\_\_\_\_\_ \text{Hz} \]
\[ J_{BC} = \_\_\_\_\_\_ \text{Hz} \]
\[ J_{DE} = \_\_\_\_\_\_ \text{Hz} \]
\[ J_{FG} = \_\_\_\_\_\_ \text{Hz} \]

3. (4pts) Given these coupling constants, describe the type of signal you would expect to see for each of these protons (singlet, doublet of doublets, etc.). \( J_{BC} = 5 \text{Hz}, J_{CD} = 5 \text{Hz}, J_{DE} = 12 \text{ Hz}, J_{DF} = 16 \text{ Hz}, J_{EF} = 2 \text{Hz}, \) all others 0 Hz)

signal B: ______________________
signal C: ______________________
signal D: ______________________
signal E: ______________________
4. (4pts) Determine the structure of the following aromatic compound with the formula C₆H₅BrO. The peak at 5.6 ppm disappears when the sample is washed with D₂O.
5. (6pts) This NMR spectrum corresponds to one of the compounds below. Mark that compound as “correct structure.” For the other two, describe one way in which the NMR spectrum is inconsistent with the structure.

A. \[\text{OCH}_3\]
\[\text{Cl} \quad \text{CH} = \text{CH} \quad \text{Cl}\]

B. \[\text{Cl} \quad \text{CH} = \text{CH} \quad \text{O}\]

C. \[\text{OCH}_3\]
\[\text{CH} = \text{CH} \quad \text{Cl} \quad \text{Cl}\]