Problem R-10I \((C_{12}H_8Cl_4)\).
270 MHz \(^1H\) NMR Spectrum in CDCl\(_3\).
Source: Ieva Reich 10/30
Problem R-10I (C₁₂H₈Cl₄). You are provided the \(^1\)H NMR spectrum of a compound. Interpret the NMR spectrum, and determine the structure or structures. Use the A, B, etc labels on the spectrum. Show the chemical shift and multiplet structure in the form: 0.0 δ, dtd, J_{AB} = 0.0, 0.0, 0.0 Hz, 1H. You may use first order analysis.

(a) DBE ________

(b) Analyze the multiplets A, B, C. Provide part structure(s) defined by these protons. **Note: Do not attempt to distinguish among the several isomers which are consistent with this pattern.**

A ________________________________________________

B ________________________________________________

C ________________________________________________

(c) Interpret the signals D-H. Provide part structure(s) defined by these protons.

D ________________________________________________

E ________________________________________________

F ________________________________________________

G ________________________________________________

H ________________________________________________

(d) Draw the structure of **R-00F** below. If more than one structure fits the data, draw them, but circle your first choice. Assign the protons (label them with the letters A-H). If any assignments are ambiguous, indicate the basis for your choice.
Problem R-10I \((\text{C}_{12}\text{H}_8\text{Cl}_4)\). You are provided the \(^1\text{H}\) NMR spectrum of a compound. Interpret the NMR spectrum, and determine the structure or structures. Use the A, B, etc labels on the spectrum. Show the chemical shift and multiplet structure in the form: \(0.0 \, \delta, \text{dtd}, J_{AB} = 0.0, 0.0, 0.0 \, \text{Hz}, 1\text{H}\). You may use first order analysis.

(a) DBE

(b) Analyze the multiplets A, B, C. Provide part structure(s) defined by these protons. Note: Do not attempt to distinguish among the several isomers which are consistent with this pattern.

\[
\begin{align*}
\text{A} & : \delta 7.39, \text{d, J} = 8 \, \text{Hz} \quad \text{(J-ortho)} \\
\text{B} & : \delta 7.32, \text{d, J} = 2 \, \text{Hz} \quad \text{(J-meta)} \\
\text{C} & : \delta 7.08, \text{dd, J} = 8, 2 \, \text{Hz} \quad \text{(J-ortho + J-meta)}
\end{align*}
\]

These are aromatic protons and define a 1,2,4-trisubstituted benzene

(c) Interpret the signals D-H. Provide part structure(s) defined by these protons.

\[
\begin{align*}
\text{D} & : \delta 6.04, \text{dd, J} = 9, 2 \, \text{Hz} \\
\text{E} & : \delta 5.79, \text{dd, J} = 10, 4 \, \text{Hz} \\
\text{F} & : \delta 3.78, \text{dddd, J} = 11, 10, 4, 2 \, \text{Hz} \\
\text{G} & : \delta 2.97, \text{dd, J} = 17, 9.5 \, \text{Hz} \\
\text{H} & : \delta 2.78, \text{dd, J} = 17, 11 \, \text{Hz}
\end{align*}
\]

(d) Draw the structure of **R-00F** below. If more than one structure fits the data, draw them, but circle your first choice. Assign the protons (label them with the letters A-H). If any assignments are ambiguous, indicate the basis for your choice.

This question elicited many answers - not a good problem since there are too many hidden carbons.
Problem R-10I (C_{12}H_8Cl_4).

270 MHz $^1$H NMR Spectrum in CDCl$_3$.

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