

## Problem Set 7

**Problem R-86C** ( $C_{10}H_{10}O_3$ ). From the infrared, proton NMR and carbon NMR spectra provided, determine the structure of R-86C. Whether you arrive at a satisfactory answer or not, answer each part below.

(a) DBE \_\_\_\_\_

(b) Analyze the IR spectrum.

(c) What does the region  $\delta$  7 to  $\delta$  8 in the  $^1H$  NMR spectrum tell you? Draw part structures.

(d) Analyze the  $^{13}C$  NMR spectra. Draw part structures.

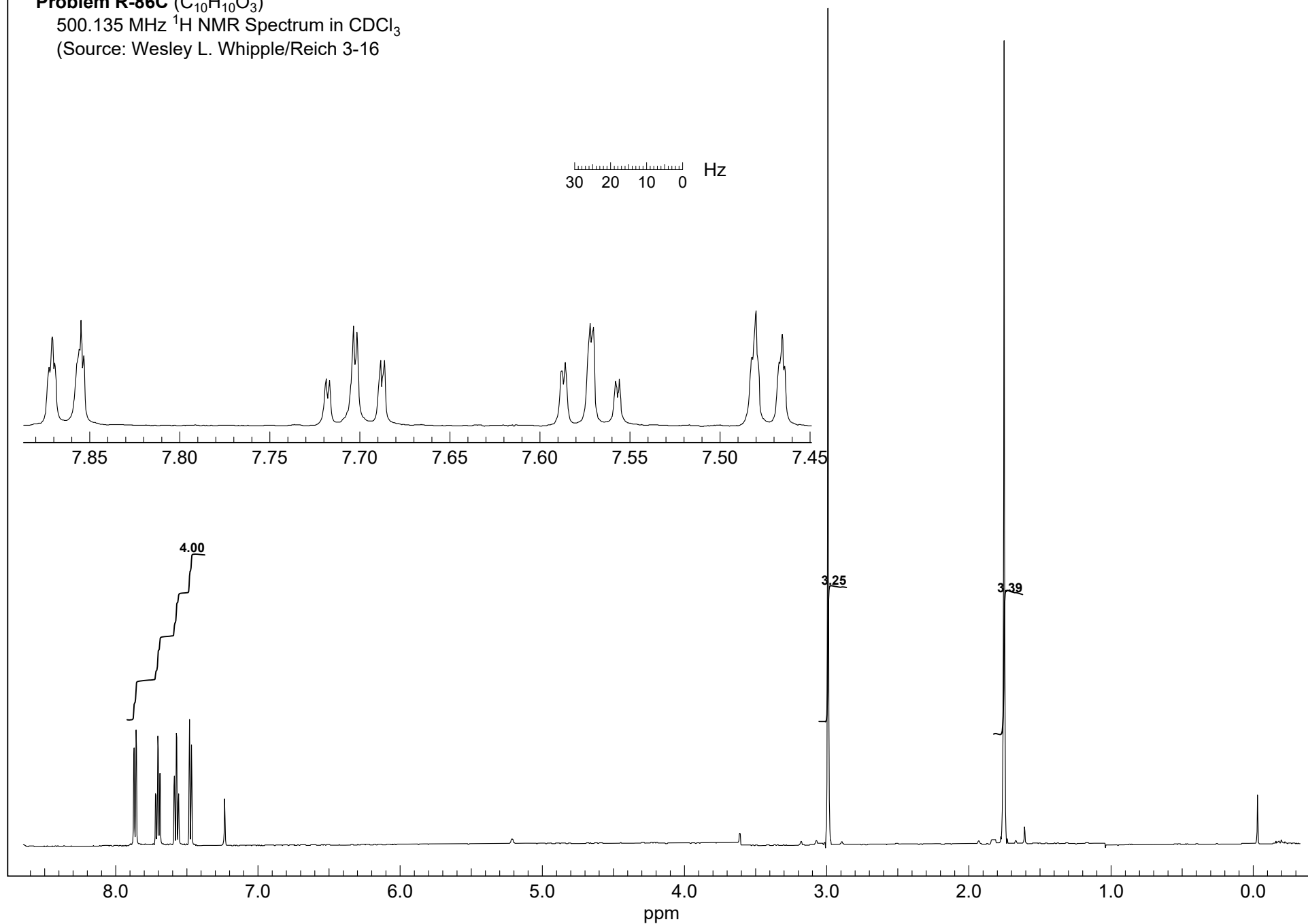
(e) Draw possible structures for R-86C below. Circle your best guess, and label it with as many of the  $^{13}C$  shifts as you can assign.

**Problem R-86C** ( $\text{C}_{10}\text{H}_{10}\text{O}_3$ )

500.135 MHz  $^1\text{H}$  NMR Spectrum in  $\text{CDCl}_3$

(Source: Wesley L. Whipple/Reich 3-16)

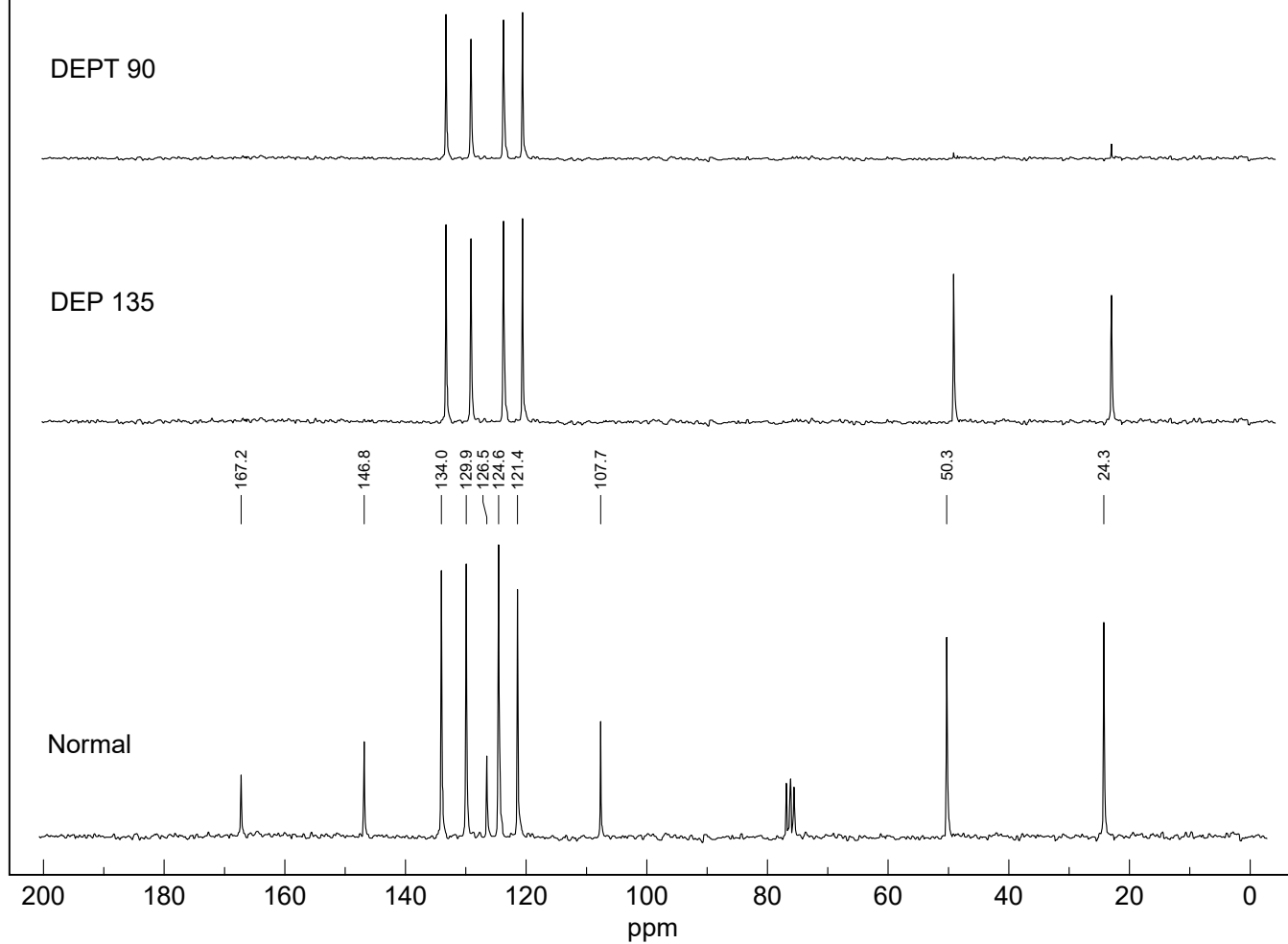
30 20 10 0 Hz



**Problem R-86C** ( $C_{10}H_{10}O_3$ )

50 MHz  $^{13}C \{^1H\}$  NMR Spectrum in  $CDCl_3$

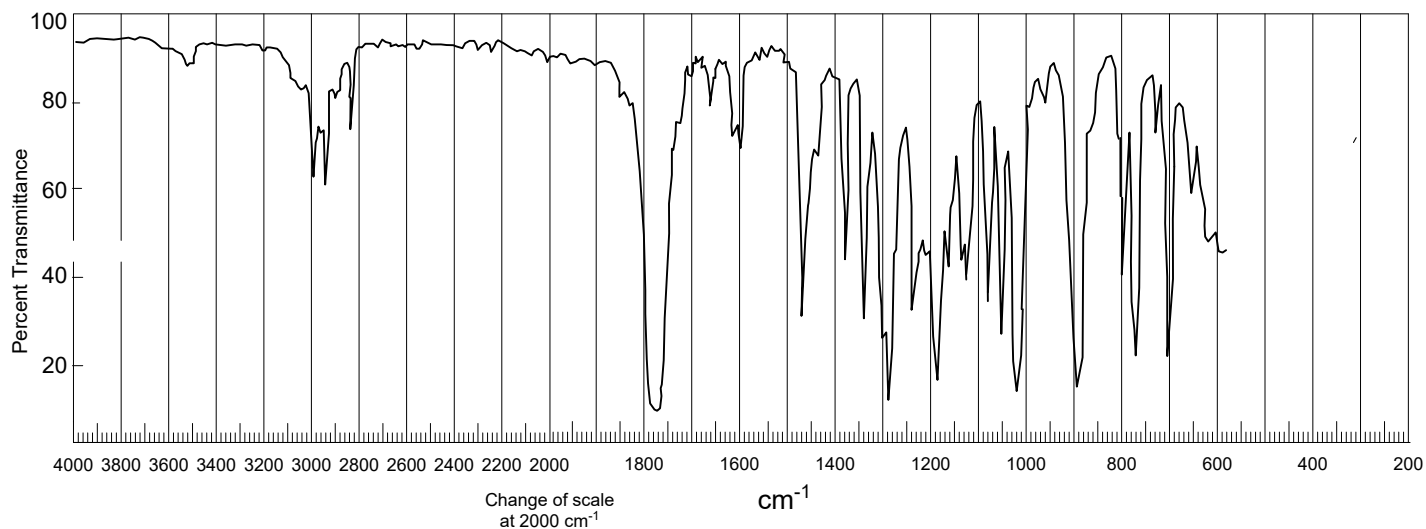
(Source: Wesley L. Whipple/Reich 3-16)



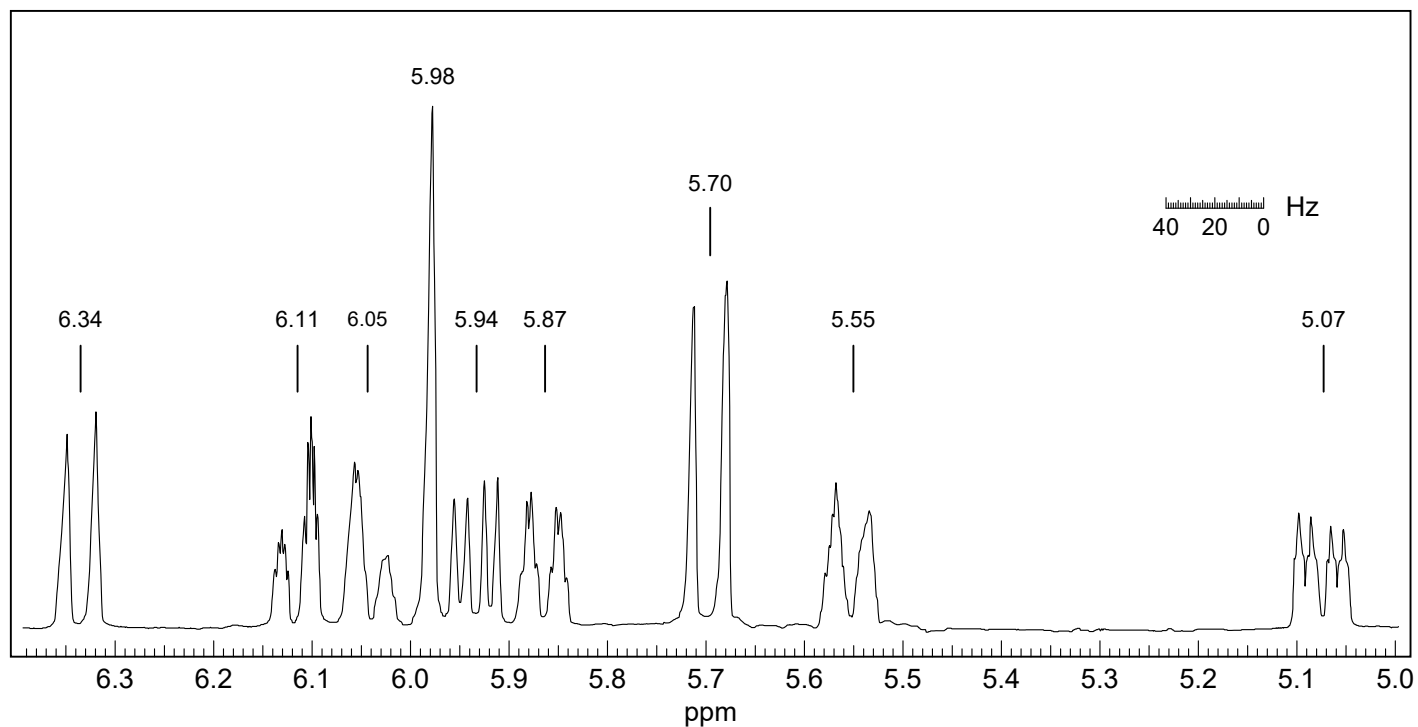
**Problem R-86C** ( $C_{10}H_{10}O_3$ )

IR Spectrum neat

(Source: Wesley L. Whipple/Reich 3-16)



**Problem R-920 (C<sub>12</sub>H<sub>15</sub>N).** Assign the individual signals of the compound whose 400 MHz <sup>1</sup>H NMR spectrum (CDCl<sub>3</sub>, -10 °C) is given below. Use couplings, chemical shifts and intensities in your analysis. From their analysis, the authors deduced the conformation shown (Otter, A.; Neuenschwander, M.; Kellerhals, H. P. *Magn. Reson. Chem.* **1986**, 24, 353).



δ

6.34 \_\_\_\_

6.11 \_\_\_\_

6.05 \_\_\_\_

5.98 \_\_\_\_

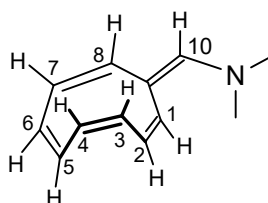
5.94 \_\_\_\_

5.87 \_\_\_\_

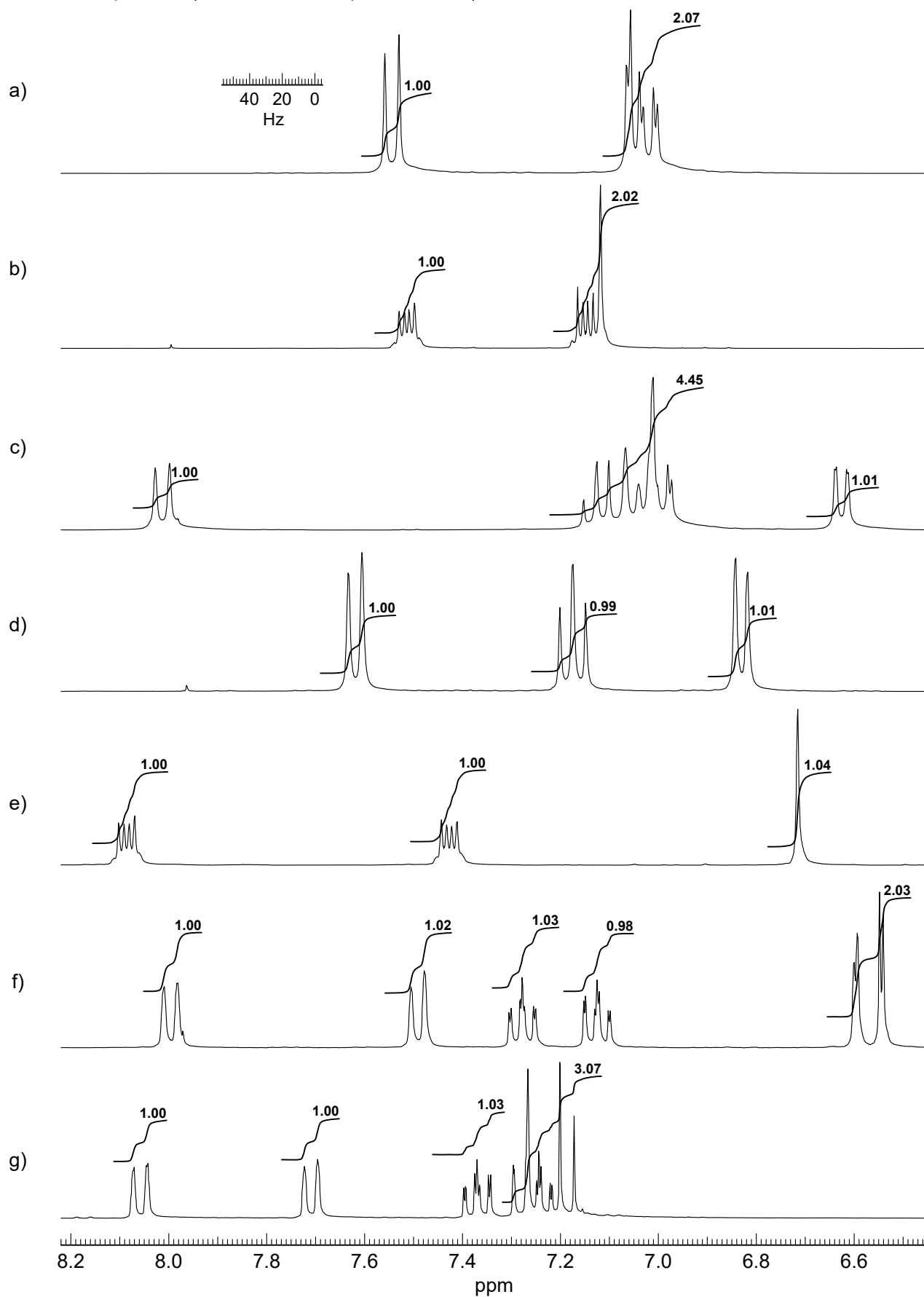
5.70 \_\_\_\_

5.55 \_\_\_\_

5.07 \_\_\_\_

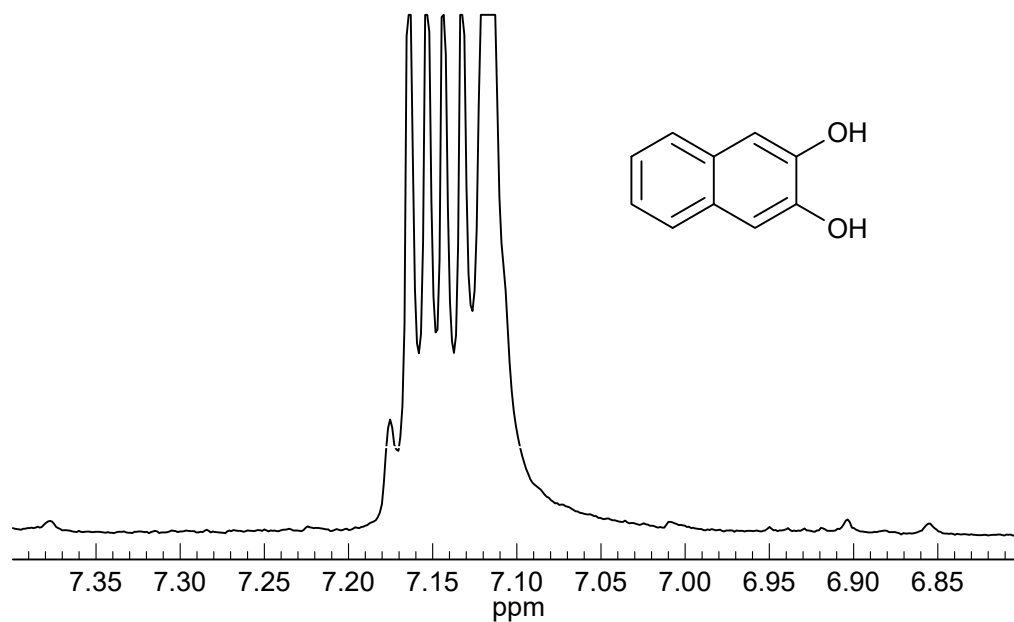


**Problem R-021H.** The partial 300 MHz  $^1\text{H}$  NMR spectra below are a series of dihydroxynaphthalenes. Determine the substitution patterns (Source: Aldrich Spectra Viewer).



**Problem R-021H.** The partial 300 MHz  $^1\text{H}$  NMR spectra below are a series of dihydroxynaphthalenes. Determine the substitution patterns (Source: Aldrich Spectra Viewer).

b)



e)

