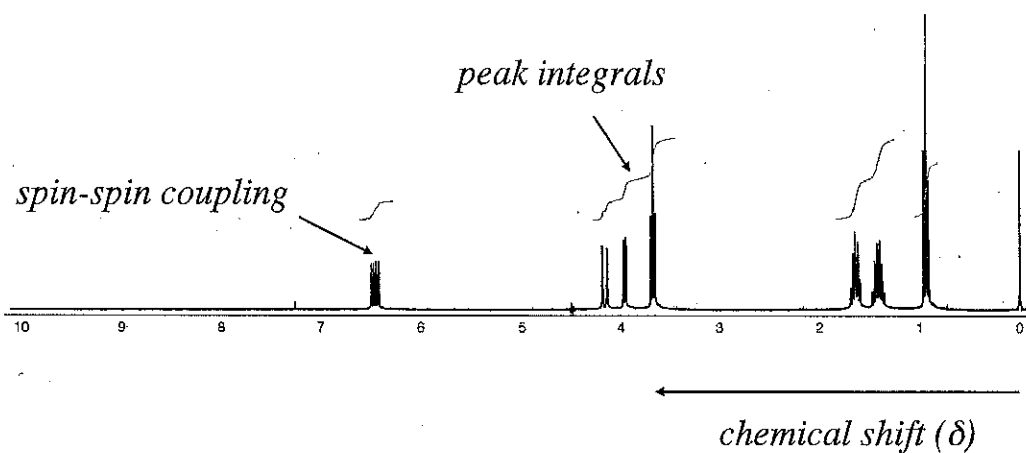


- Proton ( $^1\text{H}$ ) Nuclear Magnetic Resonance (NMR) Spectroscopy



2

- E.M. Purcell, Nobel Prize 1952

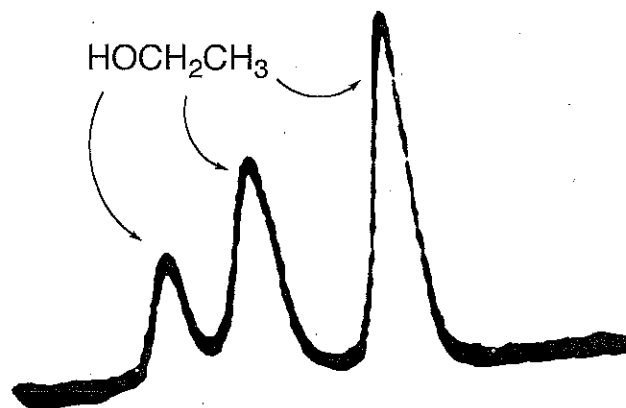
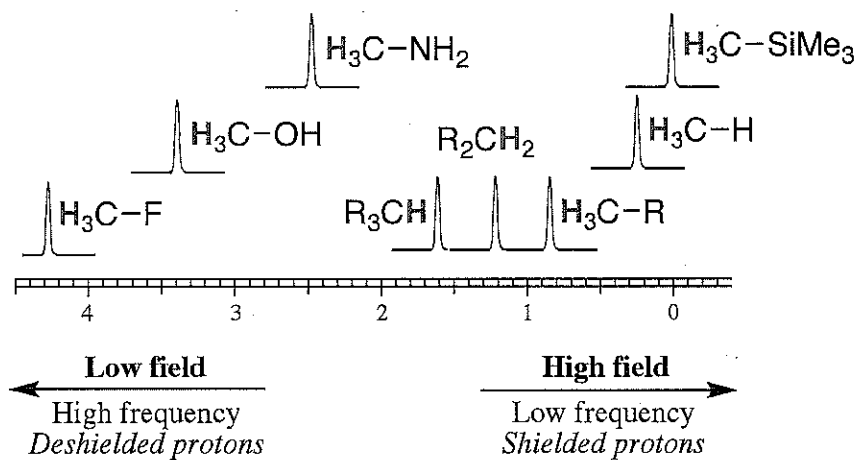


Fig. 6. The proton resonance in ethyl alcohol, observed with high resolution. The three lines arise from the  $\text{CH}_2$  hydrogens, from the  $\text{CH}_3$  hydrogens, and from the OH hydrogen, respectively.

low field downfield  $\xrightarrow{\quad\quad\quad} B_0 \xrightarrow{\quad\quad\quad}$  high field upfield

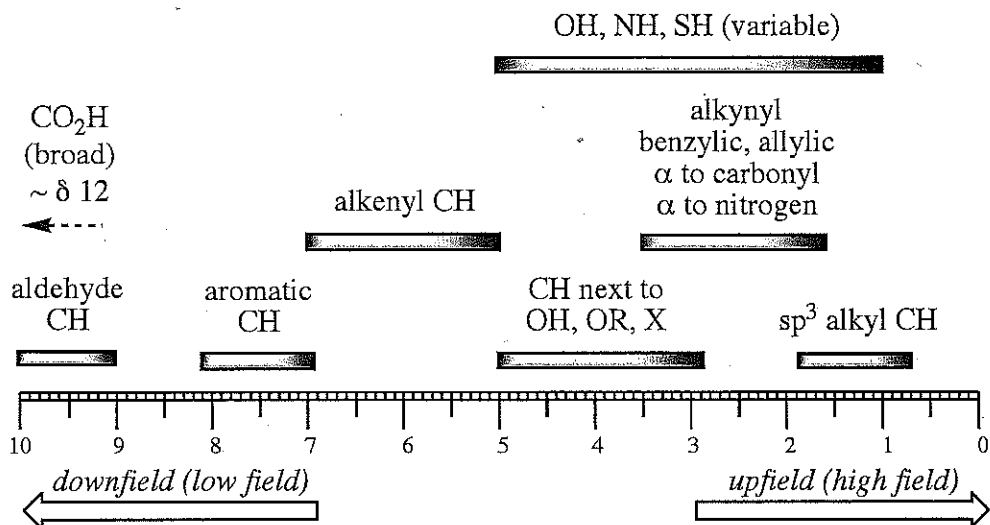
3

- Chemical shift - electronegativity



4

- General chemical shift guidelines:

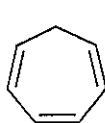
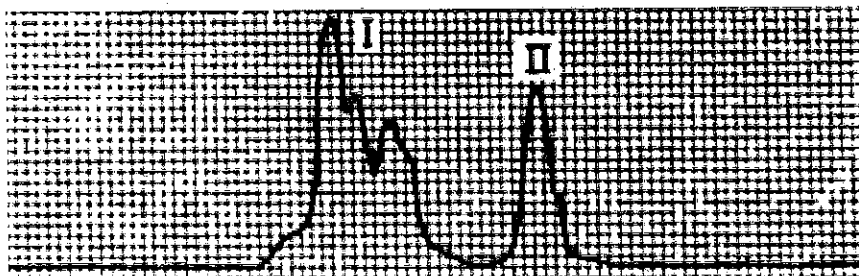


5

50000

The sample was furnished through the courtesy of  
Professor E. J. Corey, Chemistry Department, University of Illinois.

INCREASING MAGNETIC FIELD  $\longrightarrow$

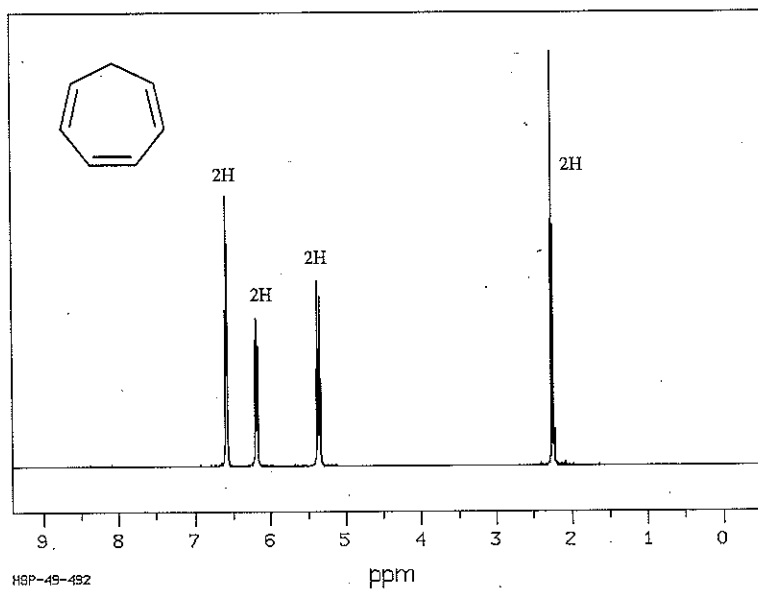


or

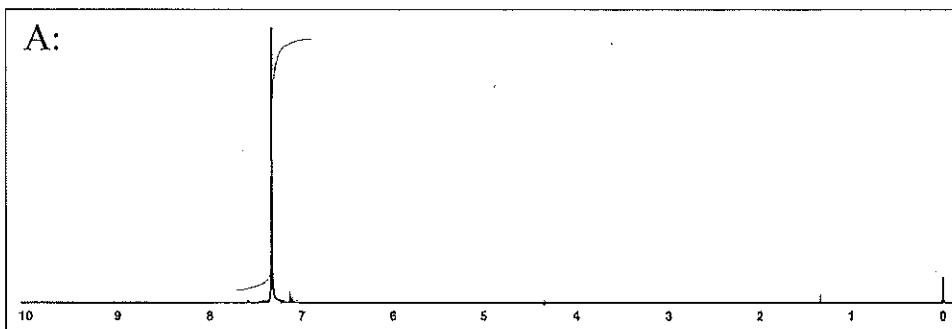
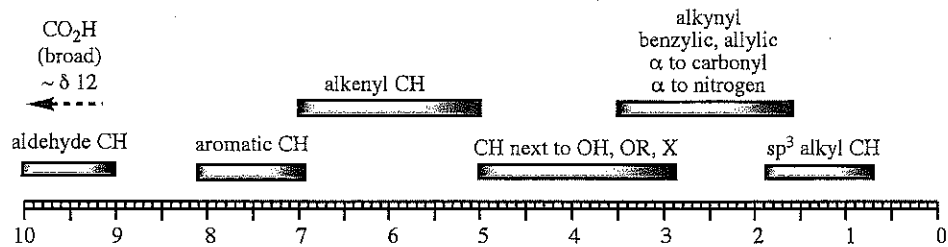


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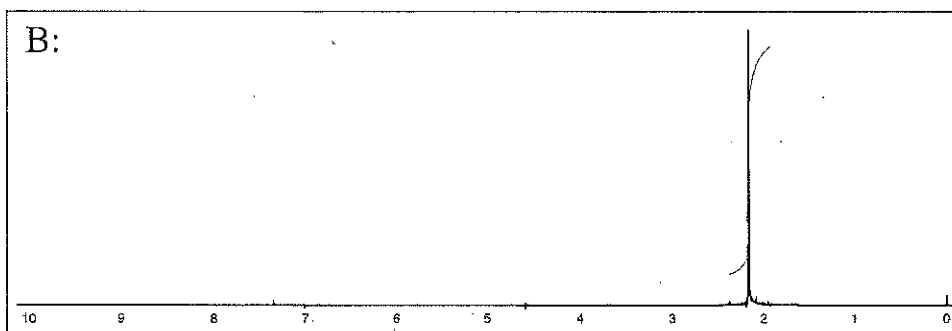
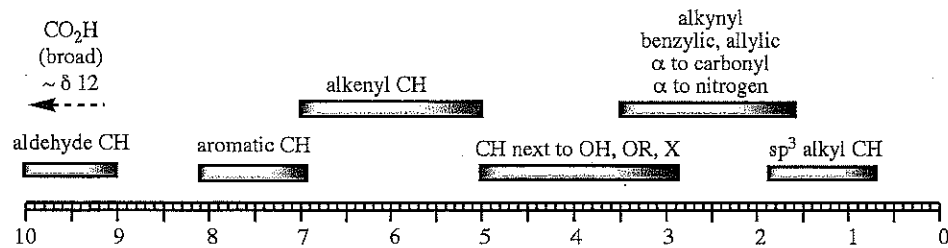
- cycloheptatriene



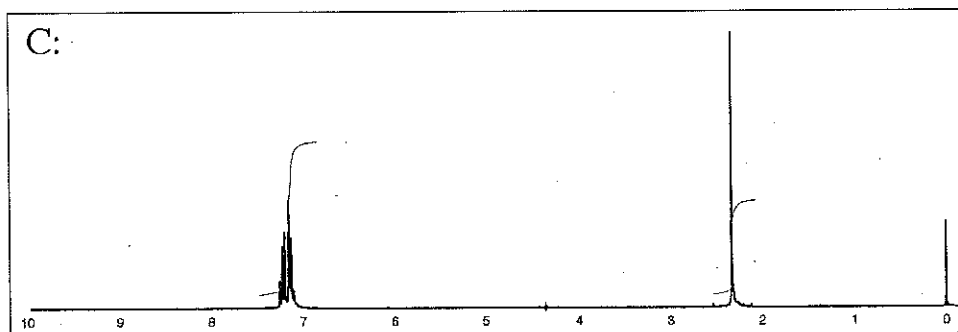
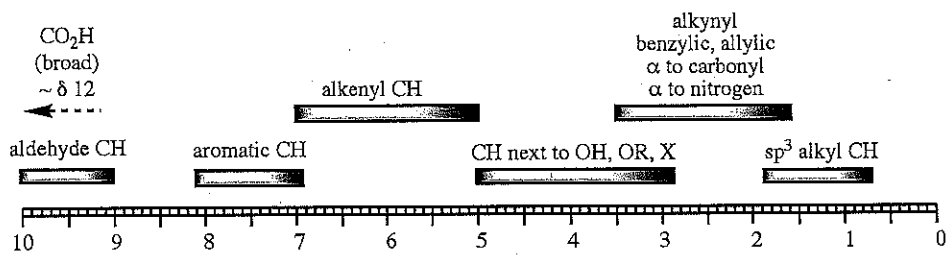
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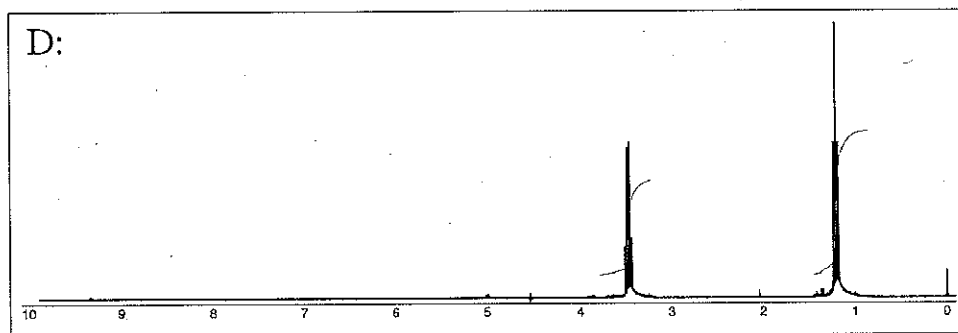
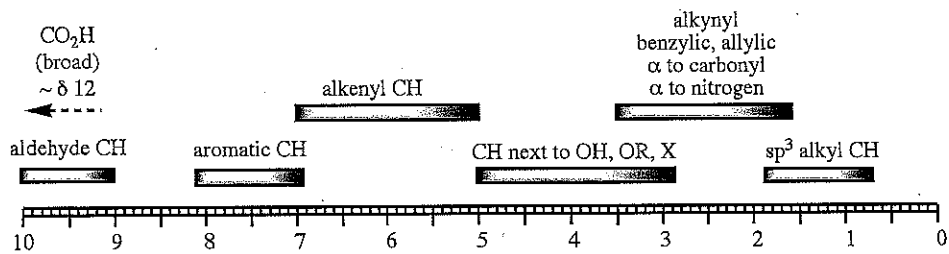
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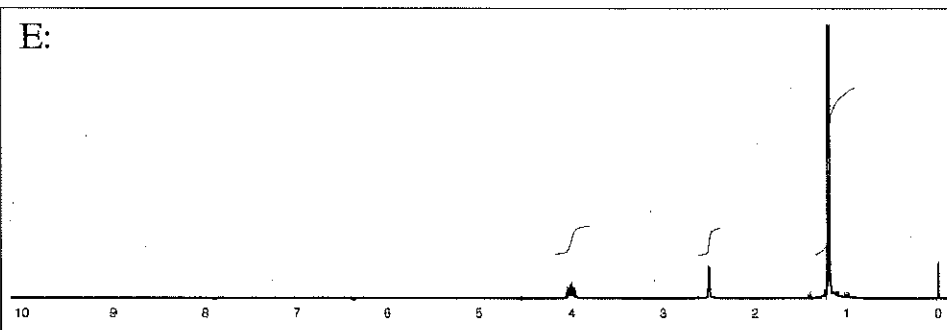
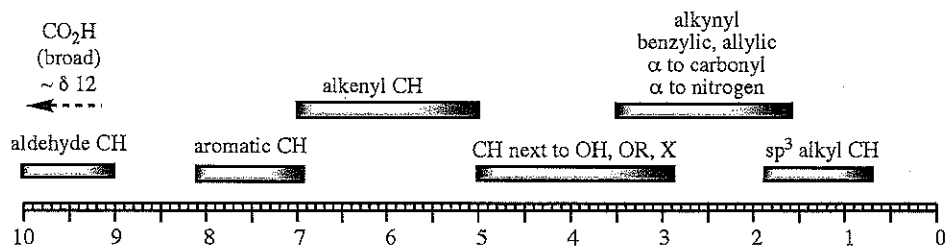
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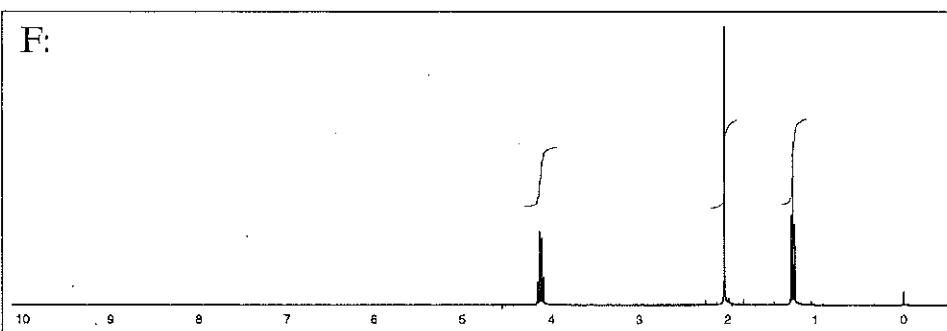
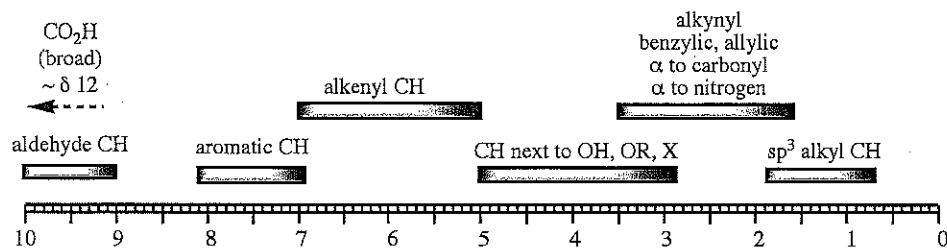
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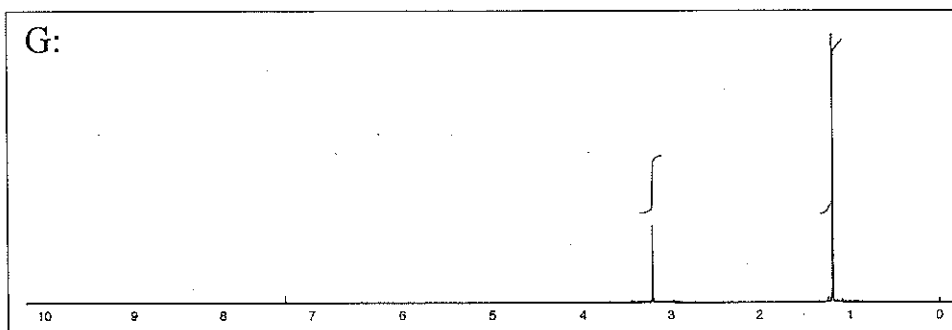
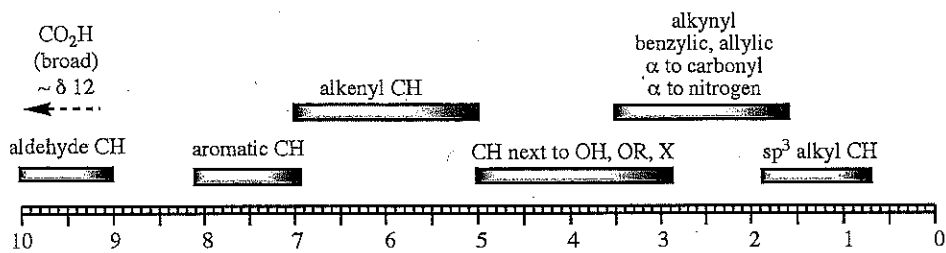
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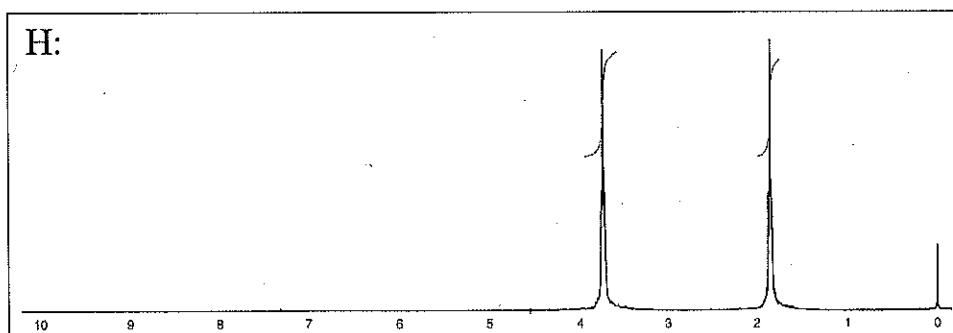
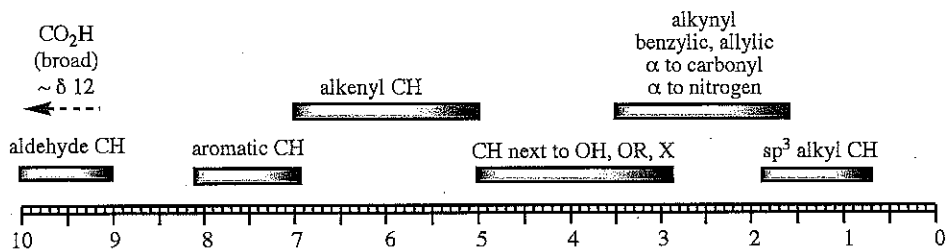
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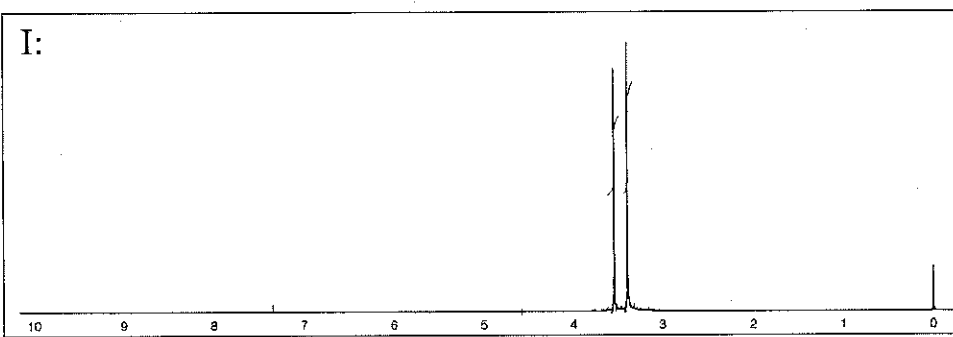
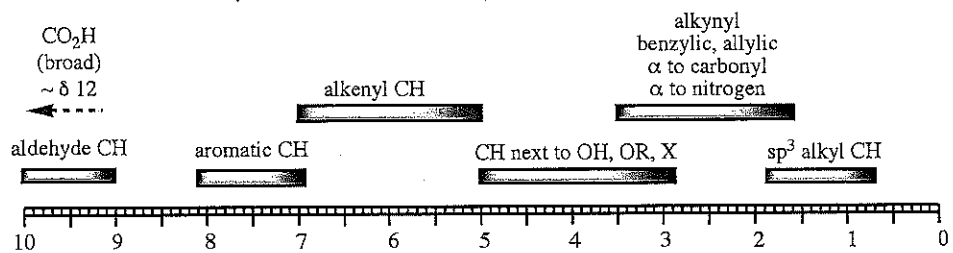
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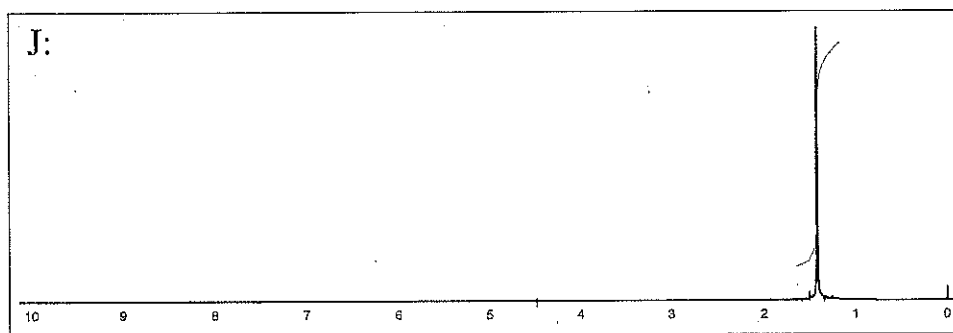
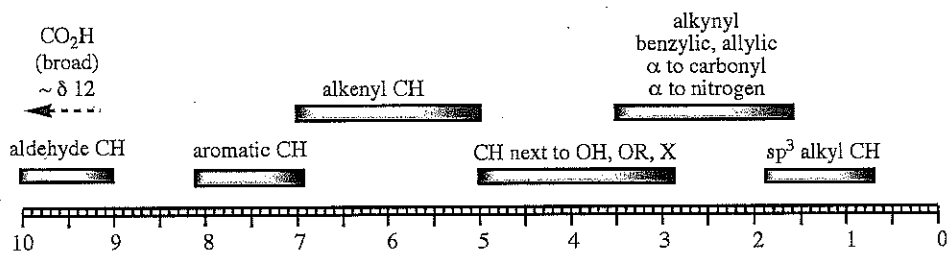
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15

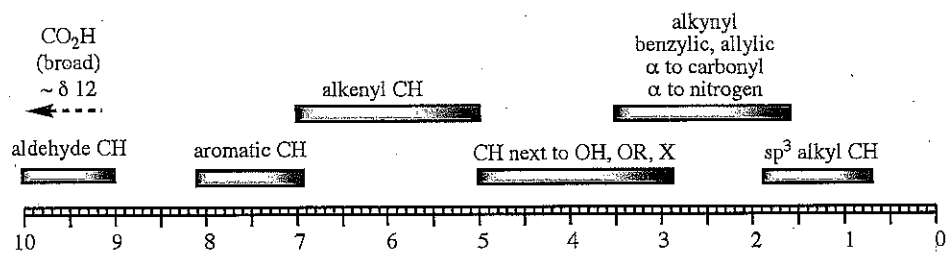


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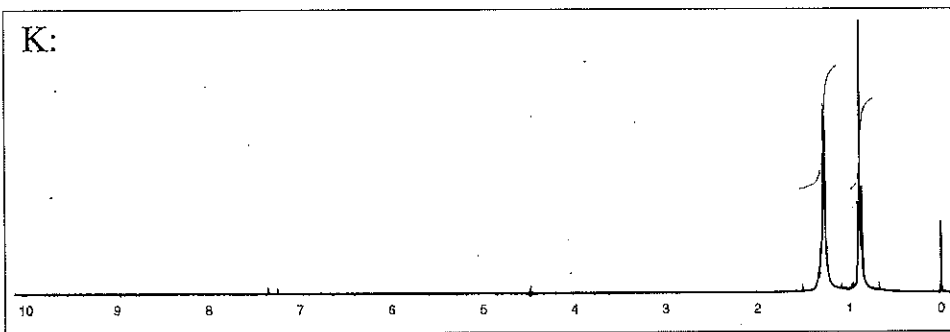


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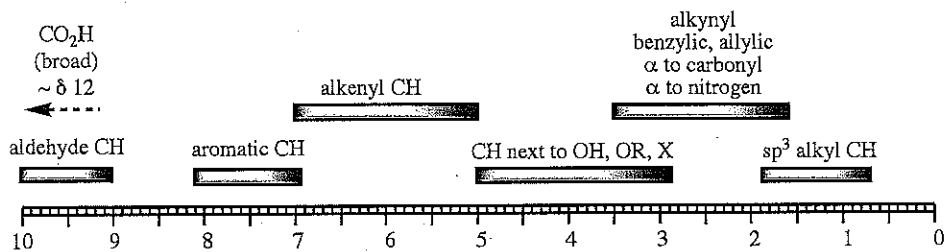




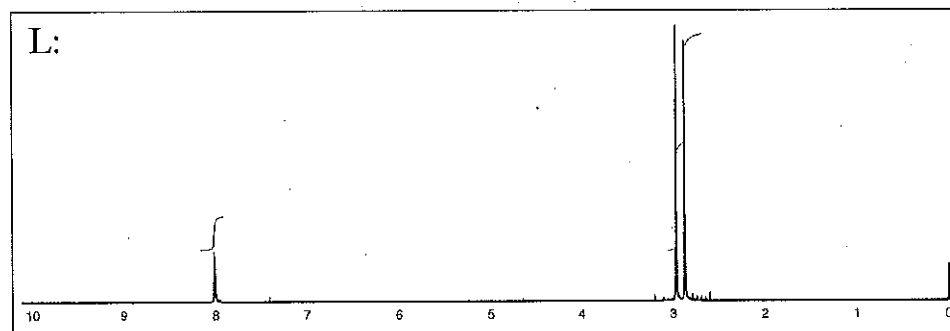
K:



18



L:



19