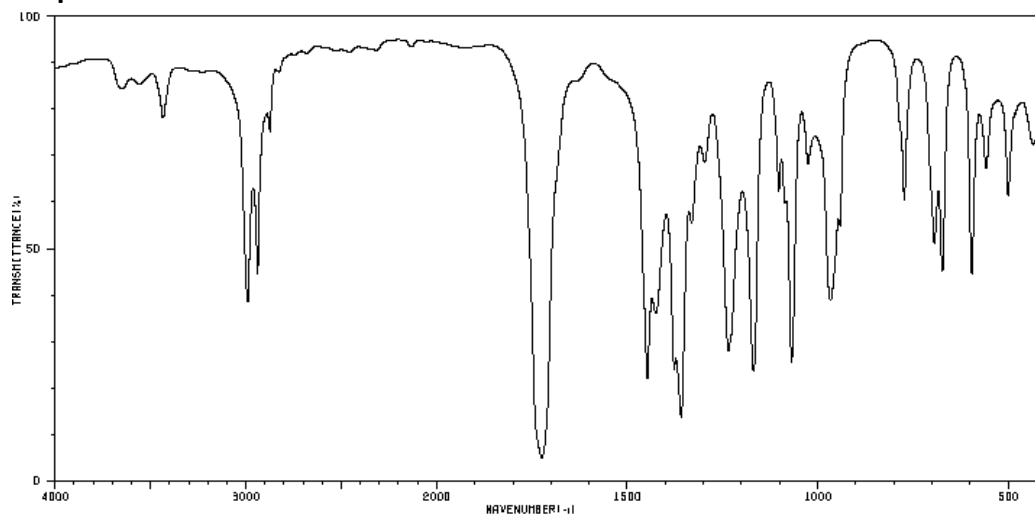


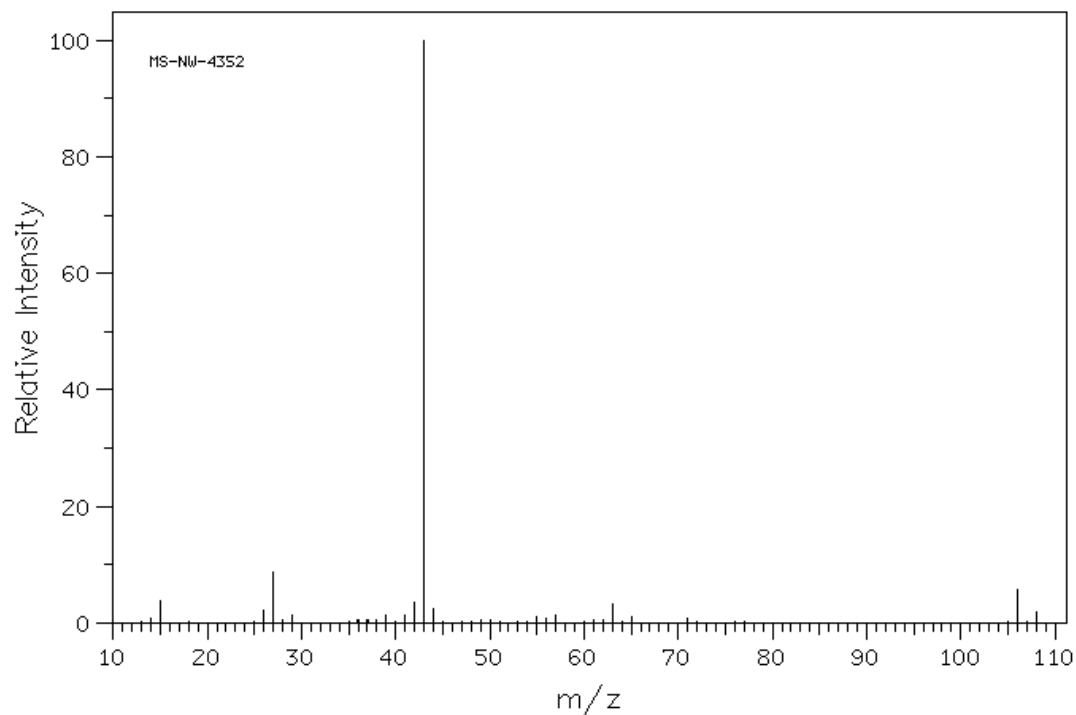
COMBINED SPECTROSCOPY PROBLEMS

1.(15) Identify the compound (draw the structure) that gives rise to the IR, mass and ^1H NMR spectra shown below. Be sure to show your thought processes to assure full credit.

IR Spectrum

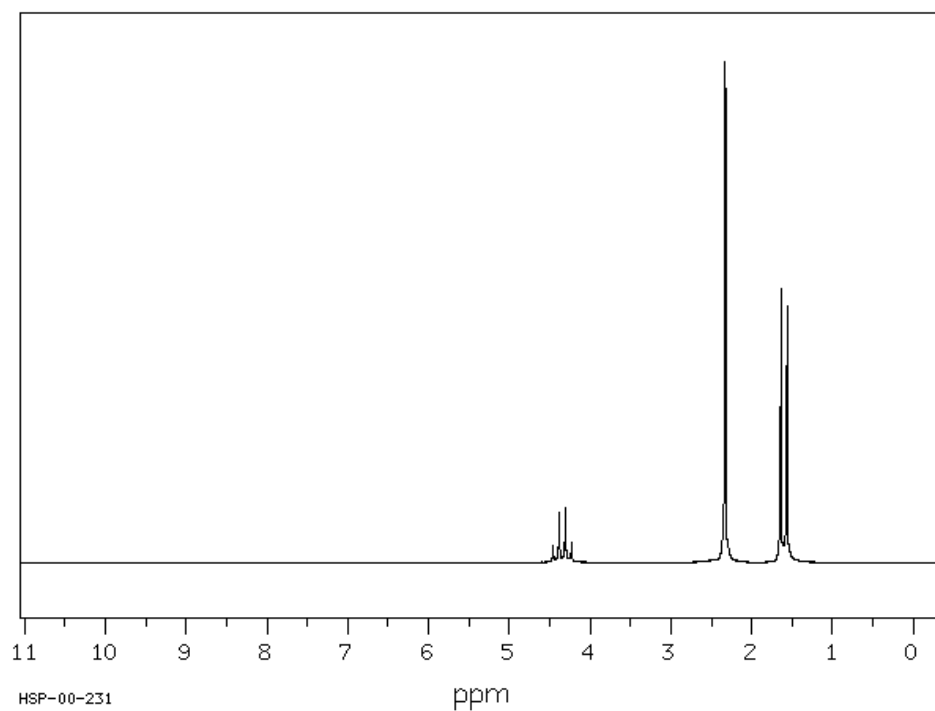


Mass Spectrum



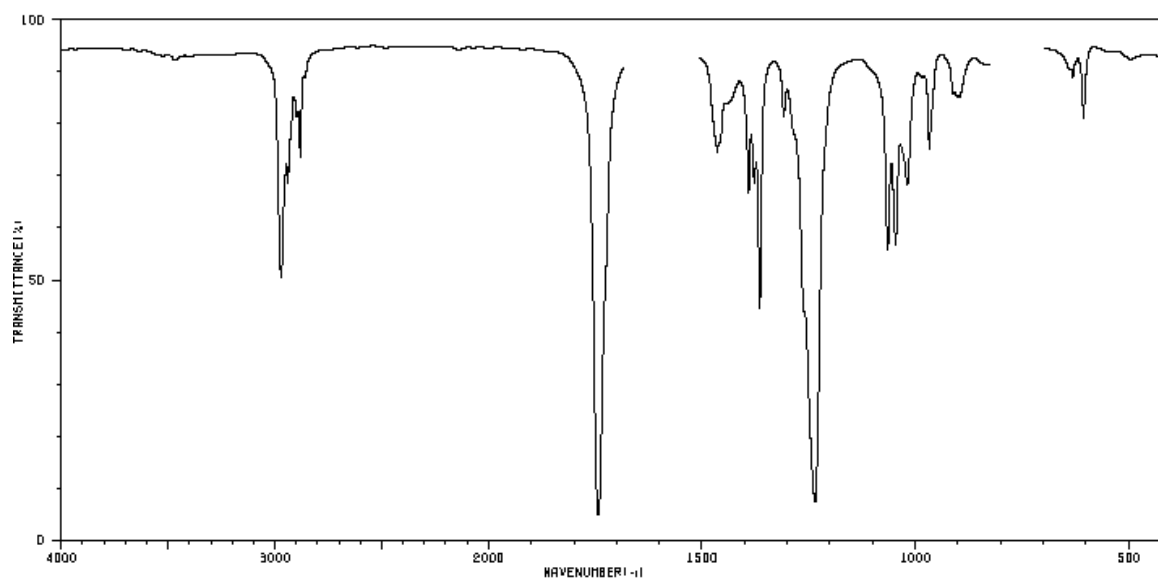
1.(continued)

¹H NMR Spectrum

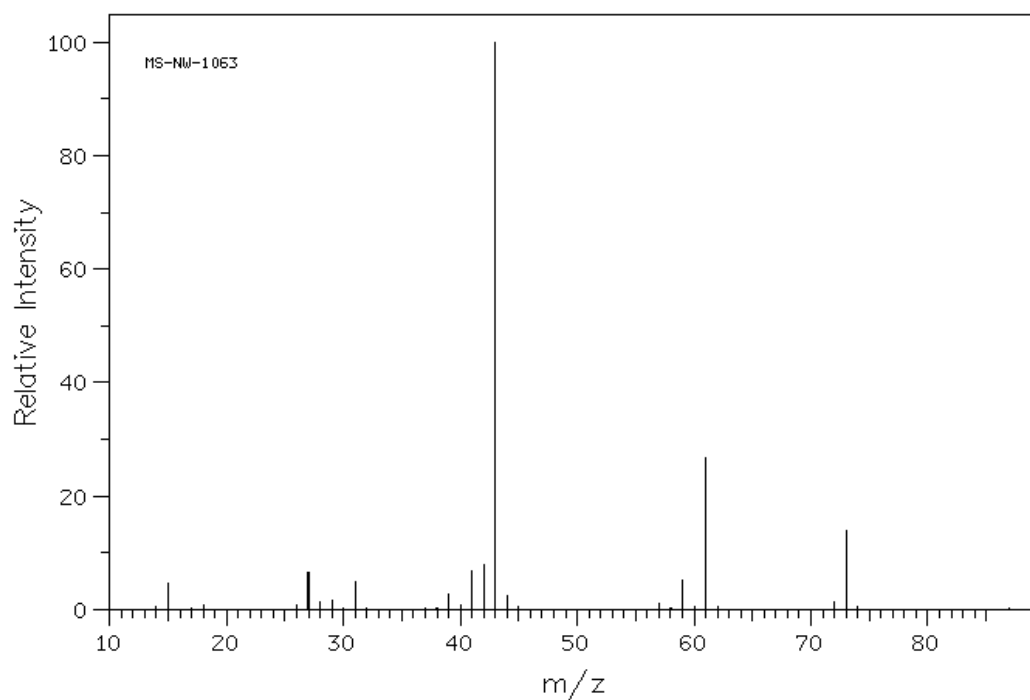


2.(15) Draw the structure of the compound that gives rise to the following IR, mass and ¹H NMR spectra. Integration of the ¹H NMR spectrum – upfield to downfield – is 3:2:3:2. Be sure to highlight features in each spectrum that validate your answer.

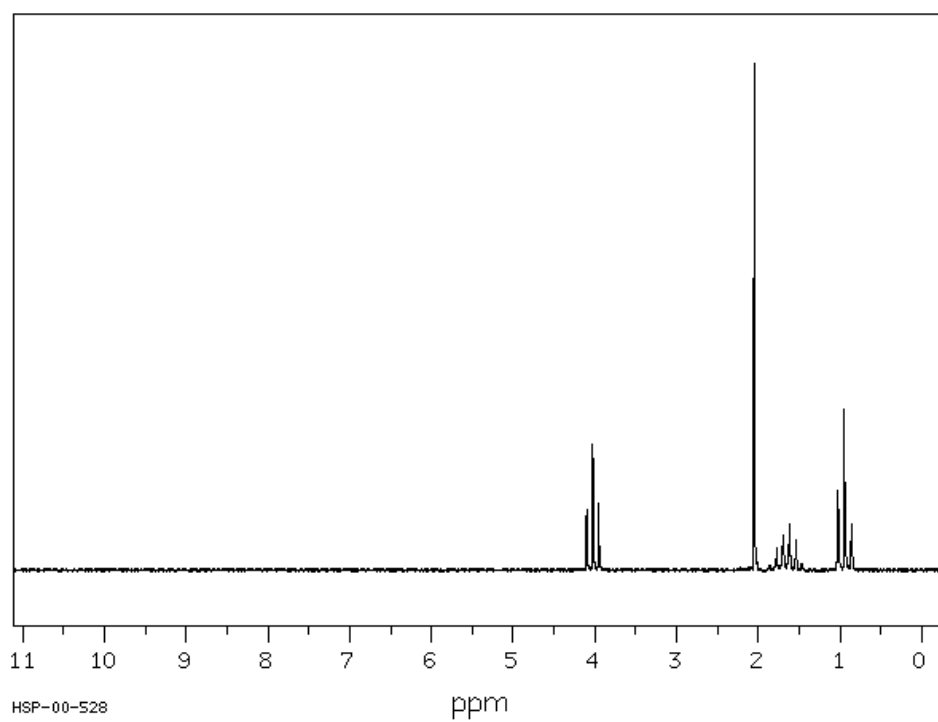
IR Spectrum



2.(continued) **Mass spectrum**
 $m^+ = 102$

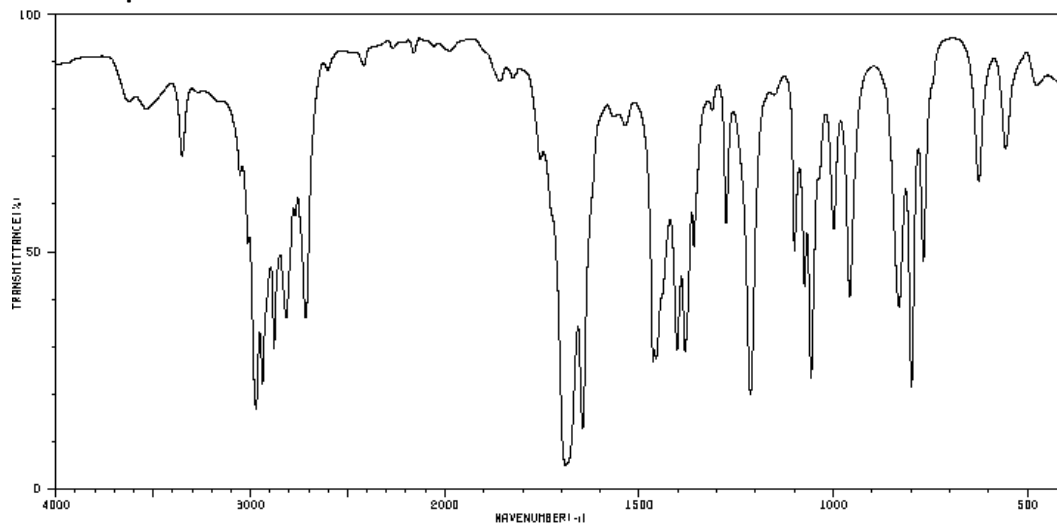


^1H NMR spectrum

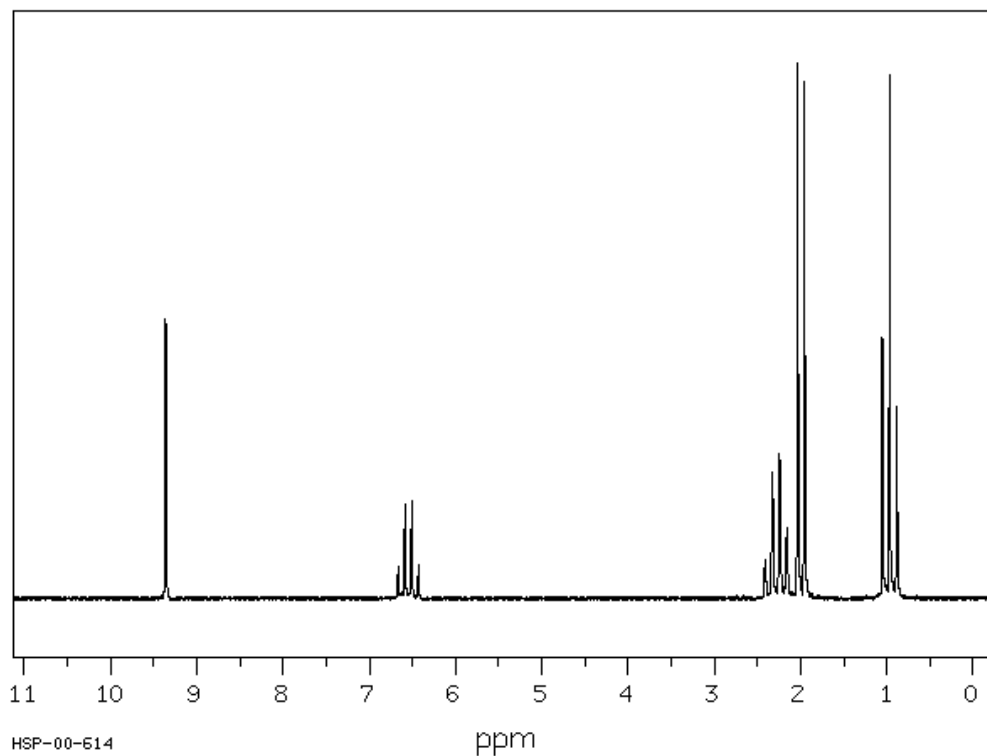


3.(15) Draw the structure of the compound that gives rise to the following IR, ^1H NMR, and C-13 NMR spectra. The **mass spectrum** gives a molecular ion (m^+) at $m/z = 98$. In order to accrue partial credit, show all your thought processes and *put a box around your final structure*. Integration of the ^1H NMR spectrum – upfield to downfield – is 3:3:2:1:1

Infrared spectrum:

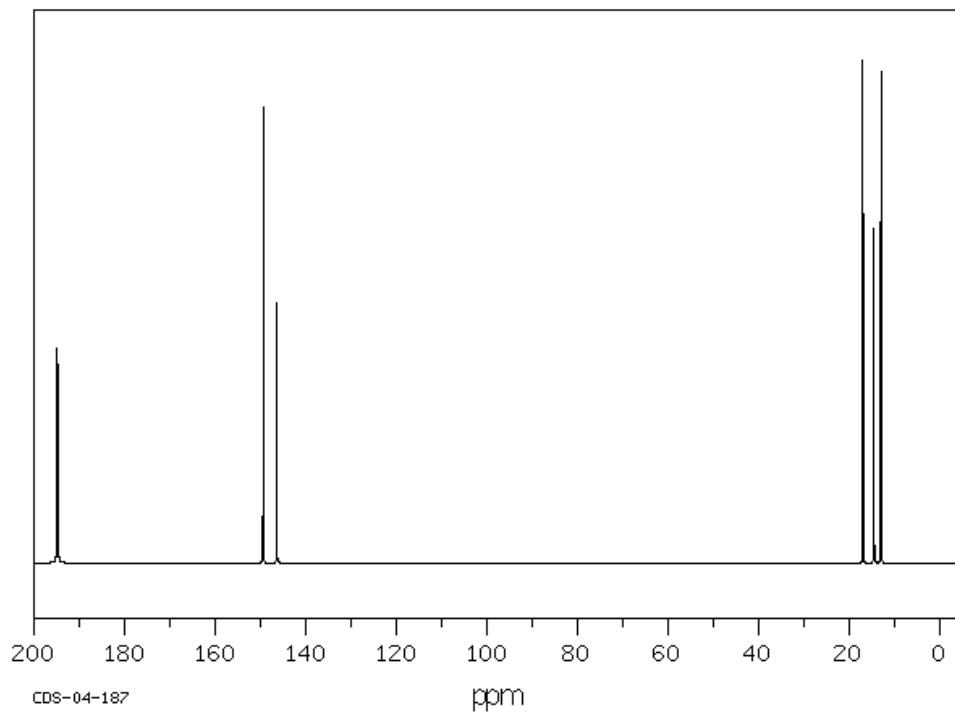


^1H NMR spectrum:



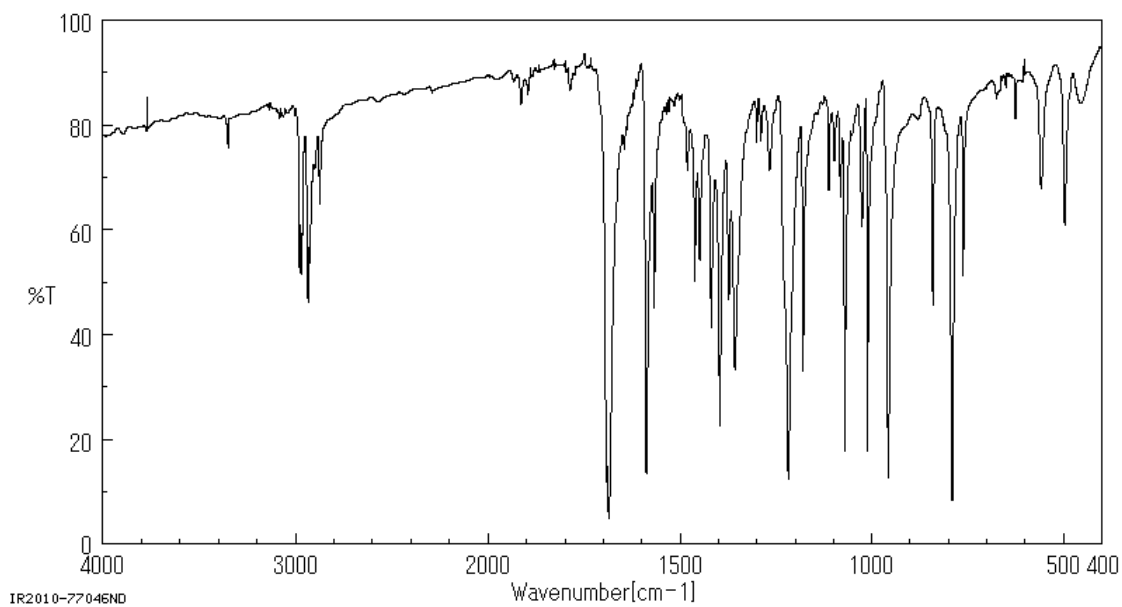
3.(continued)

C-13 NMR spectrum:



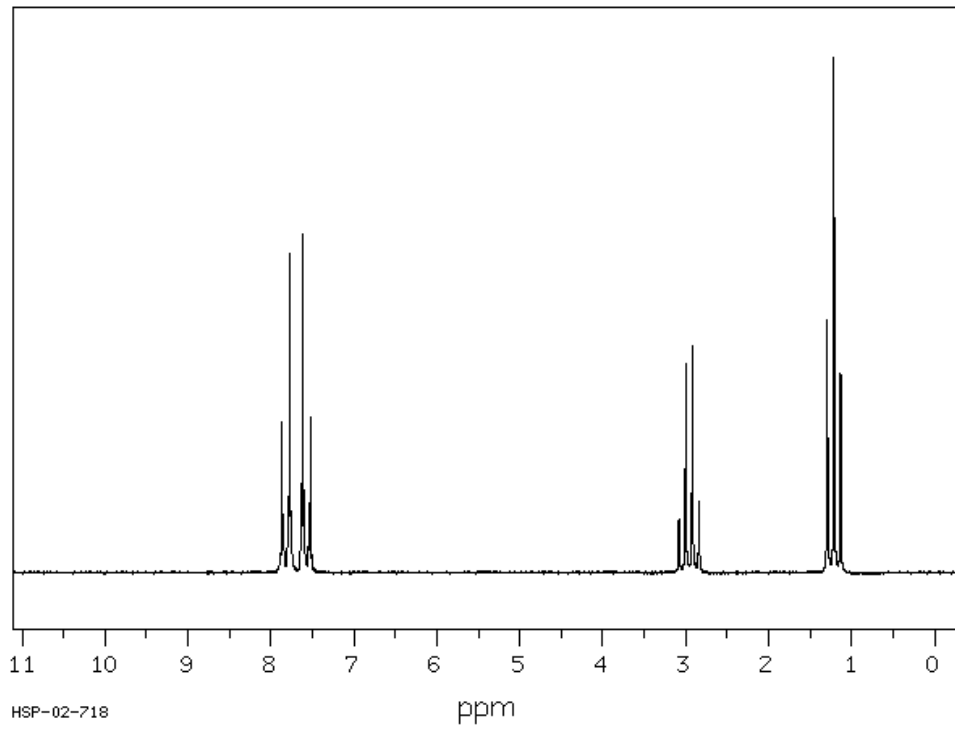
4.(15) An unknown compound gives rise to the following IR, ¹H NMR, C-13 NMR and mass spectra. Integration of ¹H NMR spectrum, upfield to downfield, is 3:2:2:2. Identify the compound and show your thought processes and *put a box around your final structure*.

IR spectrum:

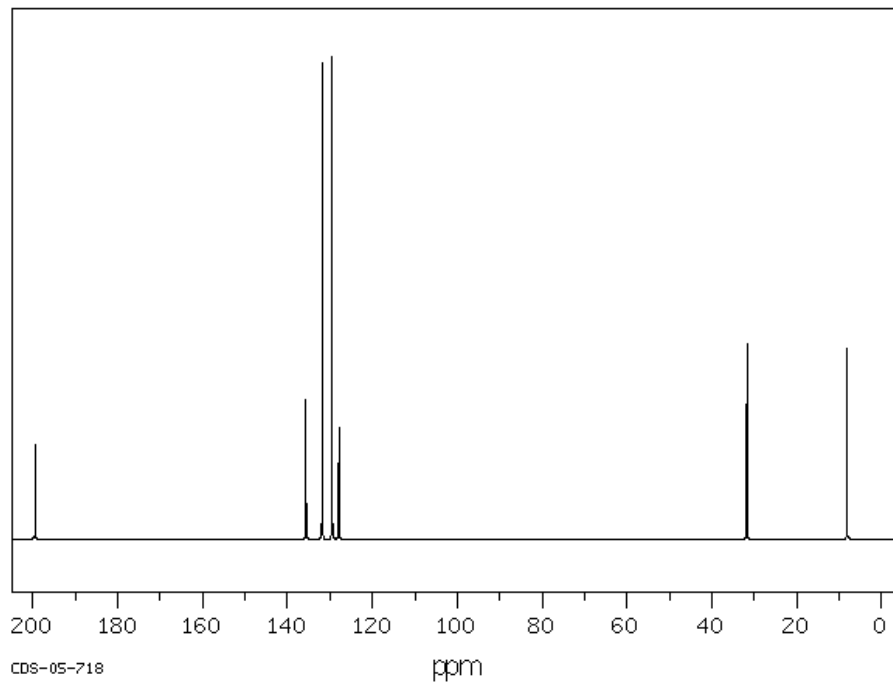


4.(continued)

¹H NMR spectrum:



C-13 NMR spectrum:



8.(continued)

Mass Spectrum:

