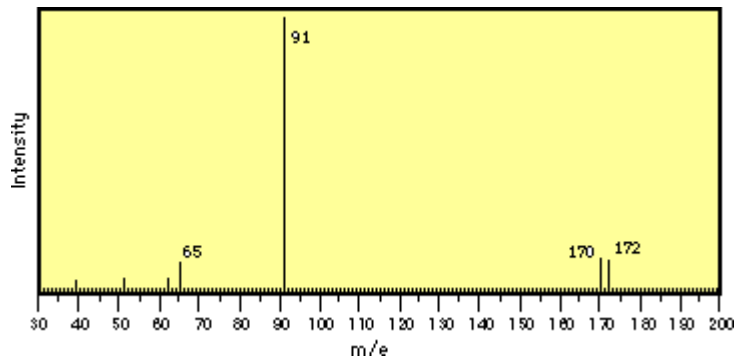
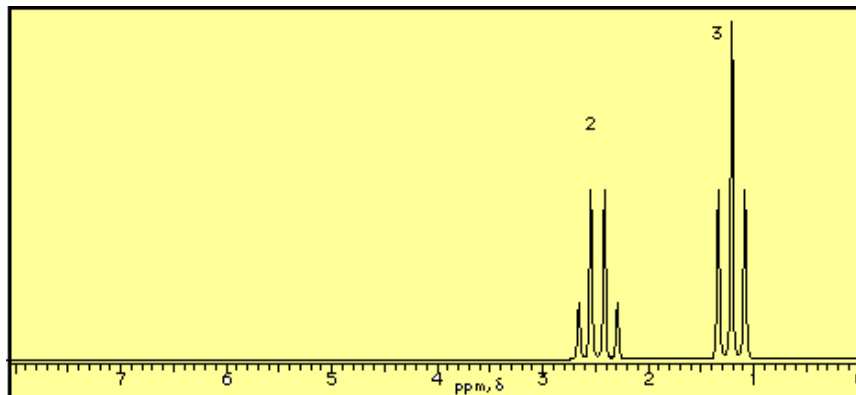


CHAPTER 12/13 - (MS, IR, NMR - Practice Exercises)

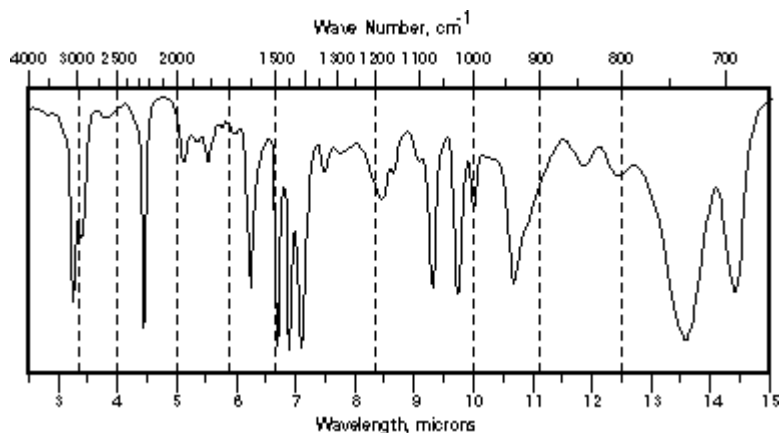
1. The mass spectrum of a benzylhalide (haloalkyl benzene) is given:



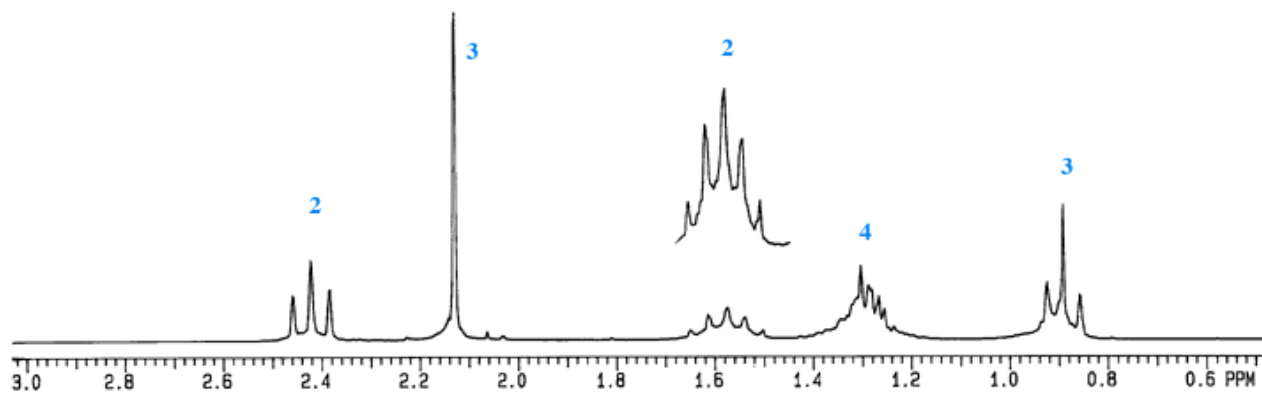
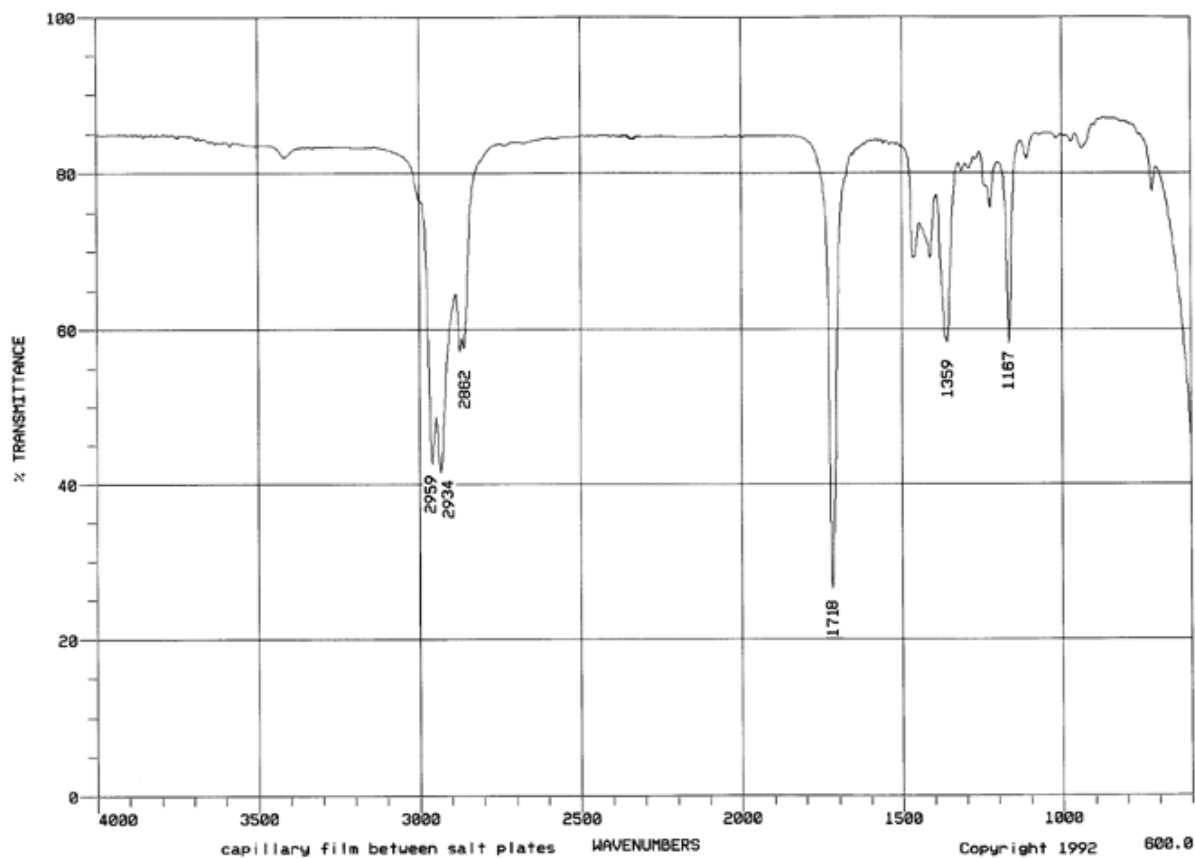
- a) Identify the parent peak
 - b) Identify the base peak
 - c) Determine the possible structure for the compound
 - d) What is the molecular structure for the most stable cation fragment (most intense peak)
2. Give several types of spectroscopic data **IR**, **¹H NMR**, and **MS** of particular compounds. What are they?
- a) **C₅H₁₀O**



b) **C₈H₇N**

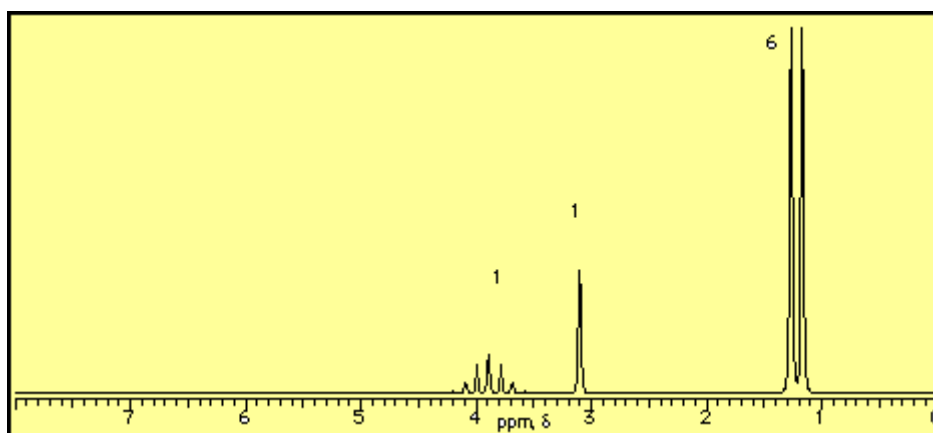
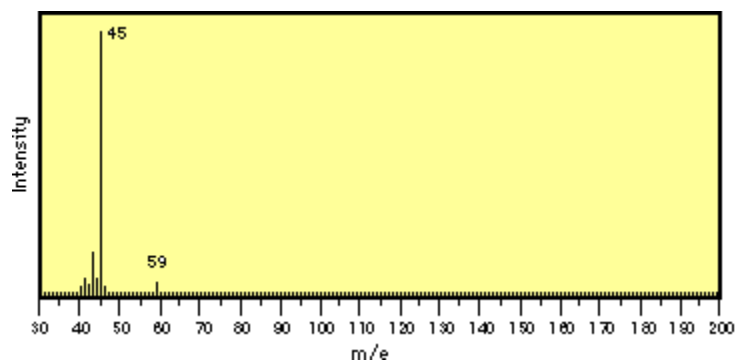
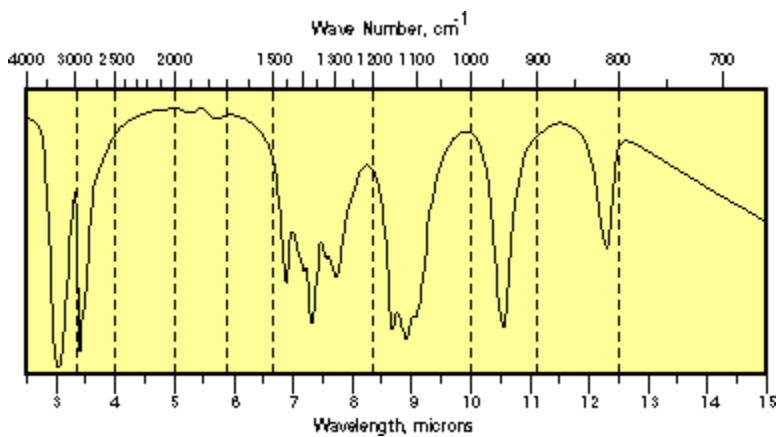


c) $C_7H_{14}O$

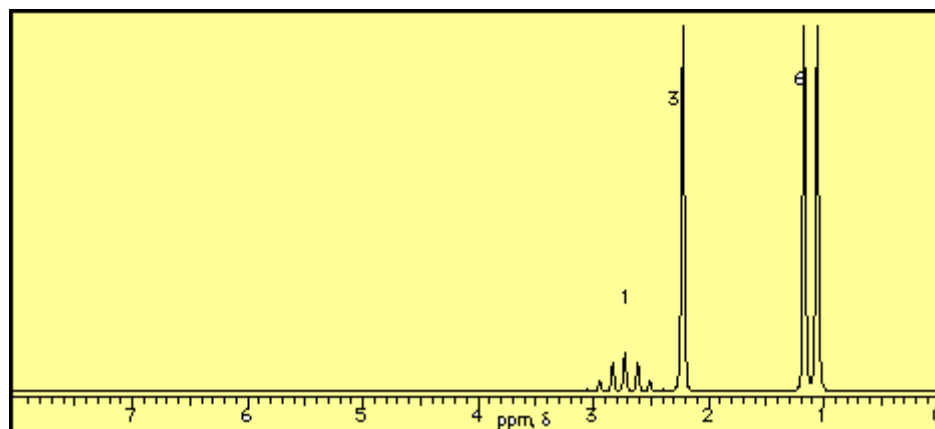
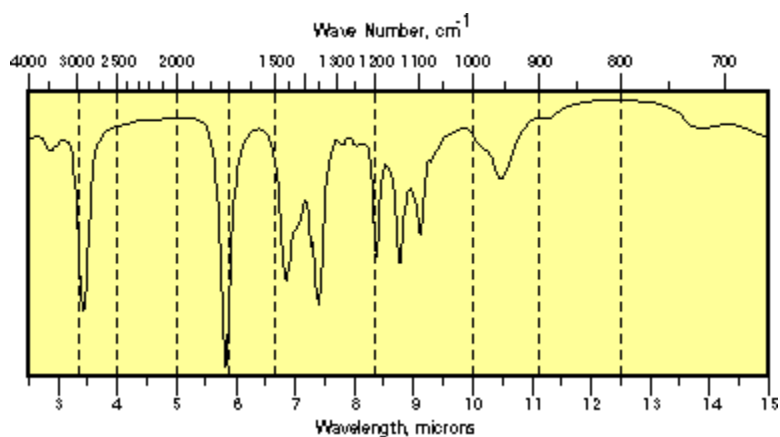
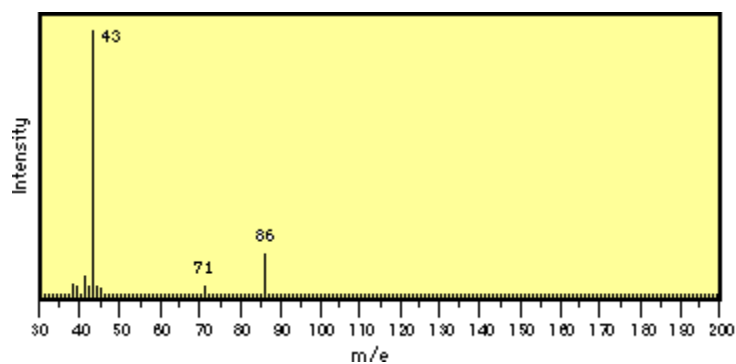


3. Each of the following compounds is characterized by a single 1H NMR spectrum that consists of only a single peak having the chemical shift. Identify each compound.
- a) C_8H_{18} ; δ 0.9 ppm b) C_4H_9Br ; δ 1.8 ppm
4. Each of the following compounds is characterized by a single 1H NMR spectrum that consists of two peaks, both singlets, having the chemical shifts indicated. Identify each compound.
- a) C_6H_8 ; δ 2.7 ppm (4H) and 5.6 ppm (4H)
- b) $C_6H_{10}O_2$; δ 2.2 ppm (6H) and 2.7 ppm (4H)

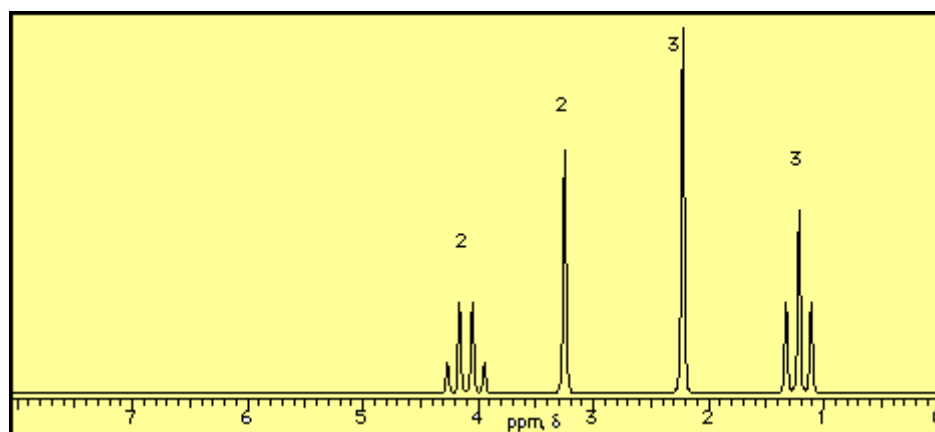
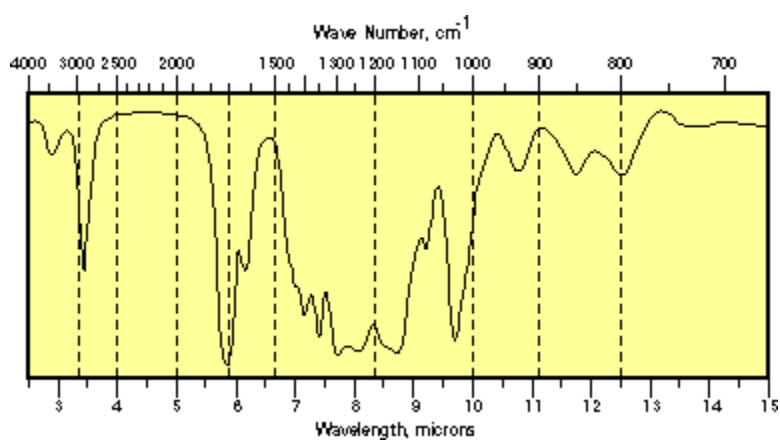
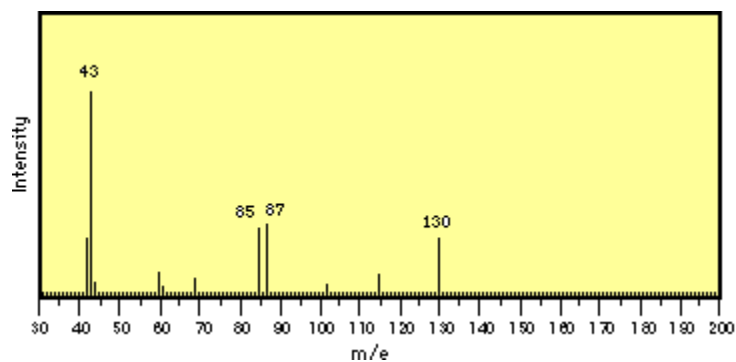
12. The molecular formula for an unknown compound is C_6H_8O (MW = 60). Data for the 1H NMR, infrared and mass spectra for this compound are shown below. Using the spectral and analytical information provided, determine the structure for this compound.



13. The molecular formula for an unknown compound is C_xH_yO . Data for the 1H NMR, infrared and mass spectra for this compound are shown below. Using the spectral and analytical information provided, determine the structure for this compound.



14. The molecular formula for an unknown compound is $C_xH_yO_3$. Data for the 1H NMR, infrared and mass spectra for this compound are shown below. Using the spectral and analytical information provided, determine the structure for this compound.



15. The molecular formula for an unknown compound is $C_xH_yO_2$. Data for the 1H NMR, infrared and mass spectra for this compound are shown below. Using the spectral and analytical information provided, determine the structure for this compound.

