1. Predict the general features of the proton and C-13 NMR spectra of the following compounds. Use the format of question 2 below.  
     
   a) diethyl ketone

b) p-ethylbenzoic acid

c) CH3-O-CH(CH3)-CH2-CH=O

1. Identify the following compounds based on their proton NMR spectra:  
     
   a) C3H6O

2.72 ppm, area 2, quintet  
4.73 ppm, area 4, triplet

b) C8H8O2

11.0 ppm, area 1, singlet  
7.0 ppm, area 5, multiplet  
3.0 ppm, area 2, singlet

c) C10H14

7.05 ppm, area 4, singlet  
2.45 ppm, area 4, quartet  
1.05 ppm, area 6, triplet

d) C3H6Br2

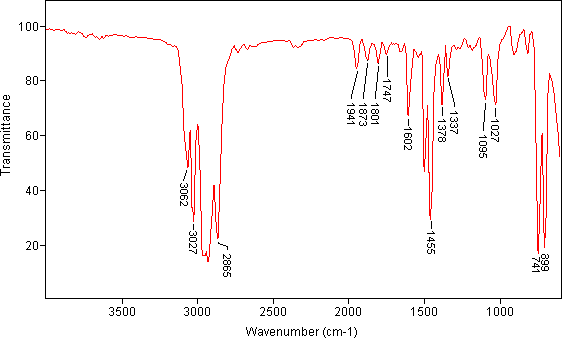
3.80 ppm, area 1, multiplet  
3.50 ppm, area 2, doublet  
1.12 ppm, area 3, doublet

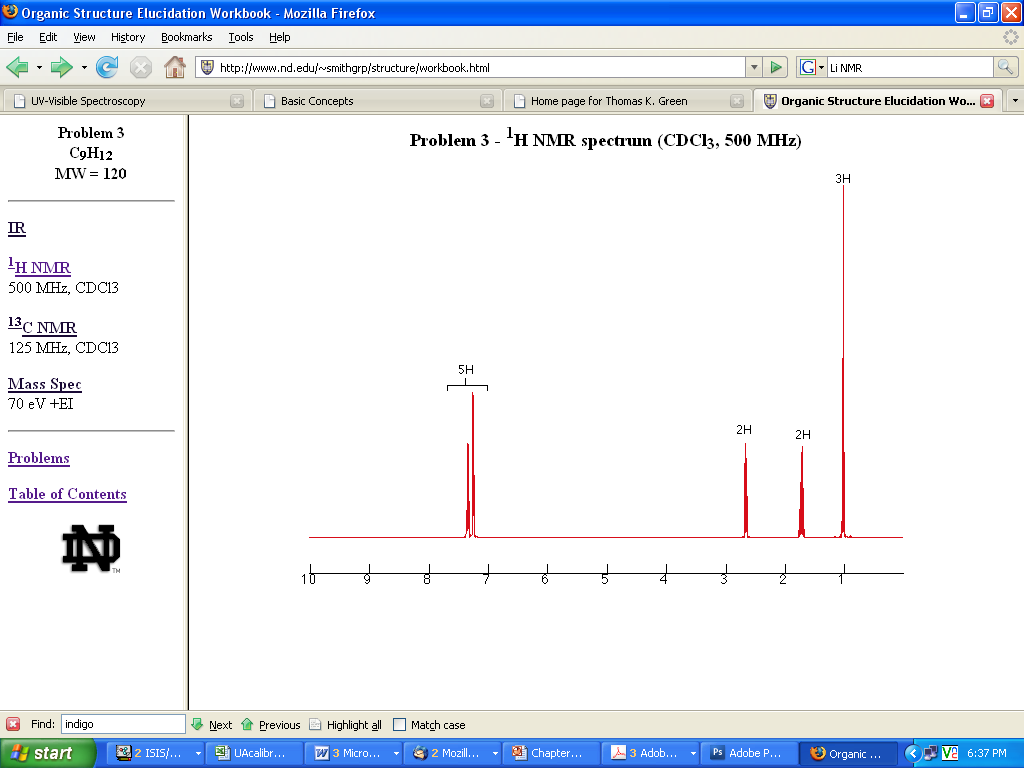
e) C6H10

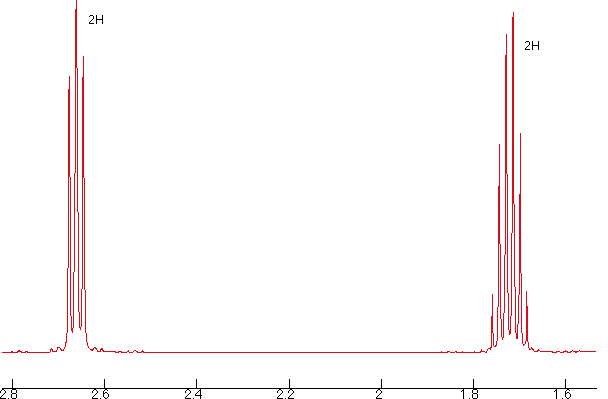
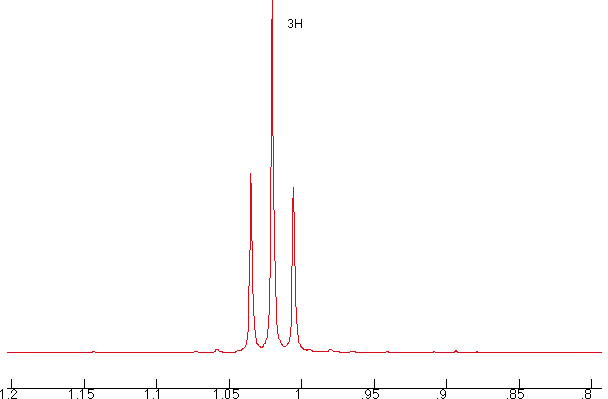
4.82 ppm, area 2, singlet  
2.22 ppm, area 4, triplet  
1.65 ppm, area 4, triplet

1. Unknown. C9H12

* 1. Calculate the degrees of unsaturation
  2. Make assignments in the IR and NMR spectrum. Be sure to draw structures and label with a,b,c, etc.

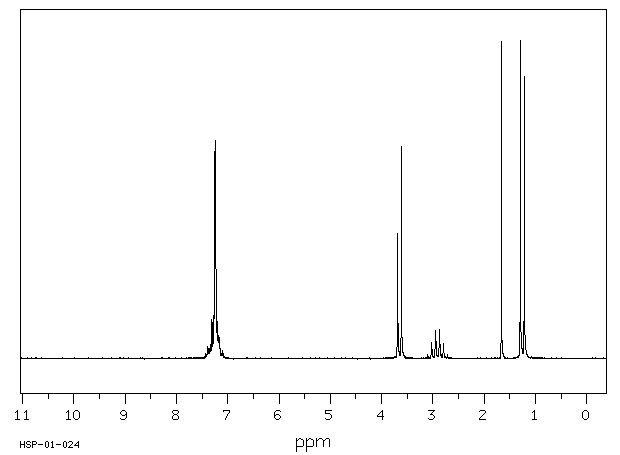




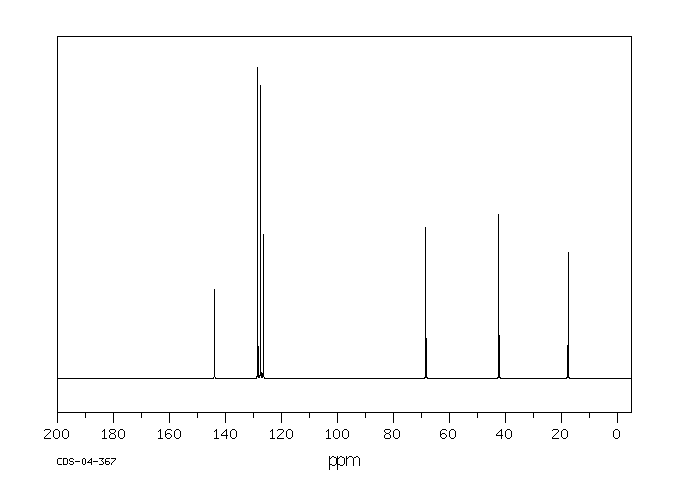
 

1. **Identify the unknown compound based on the data below. Molecular Formula is C9H12O .**   
   **Spectra are shown below and on the following page. Correlate spectral features with the structure.**

**H-NMR:**   
**Areas of the peaks (left to right) are 5 : 3 : 1 : 1 : 2 .**



**C-13 NMR:**



**IR:**

