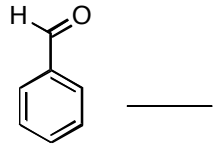
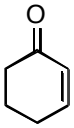
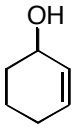
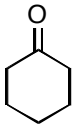
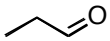
1. Match the following to their IR spectra (30 points)

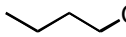


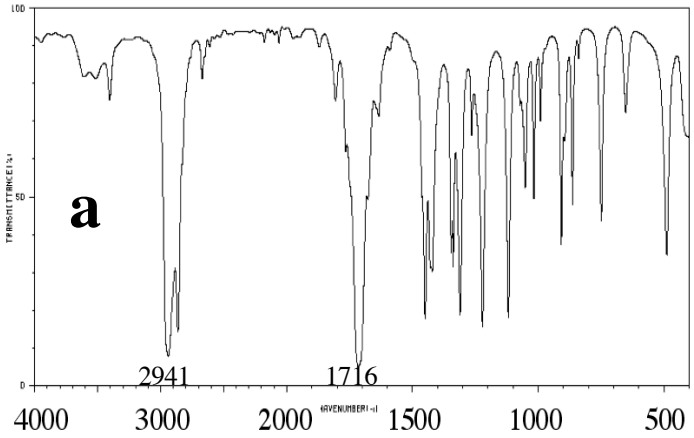


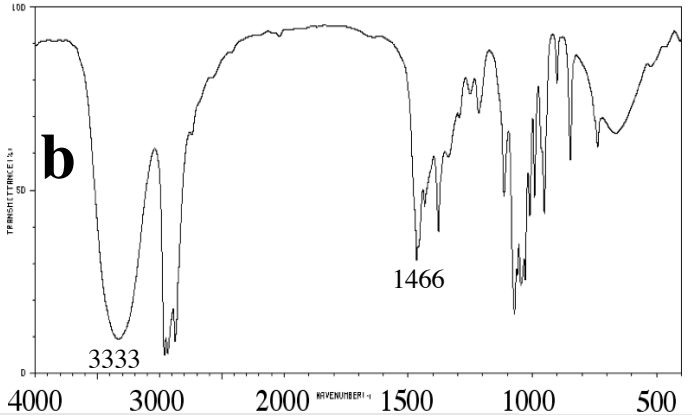


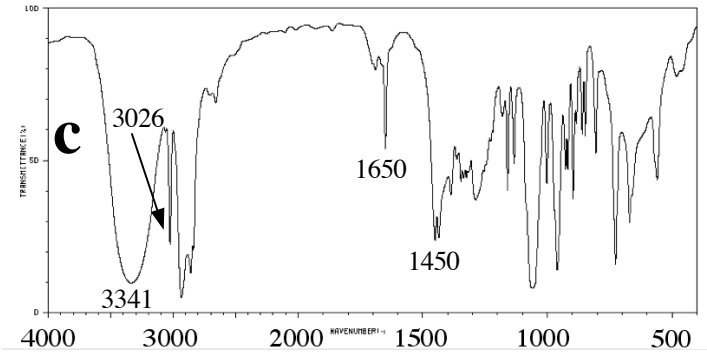


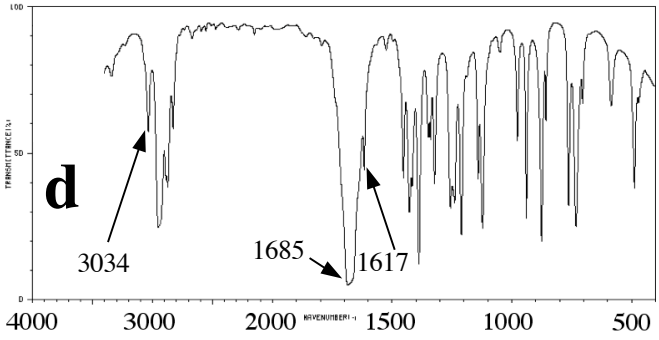


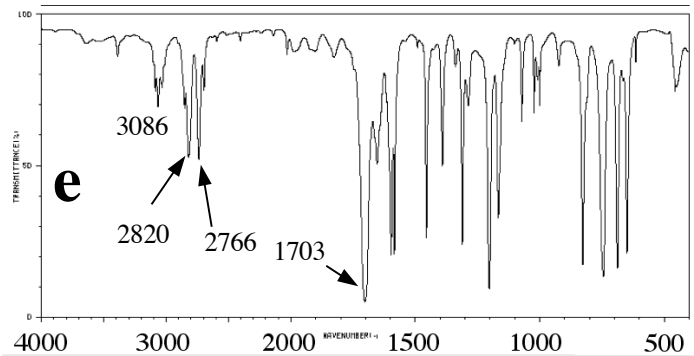


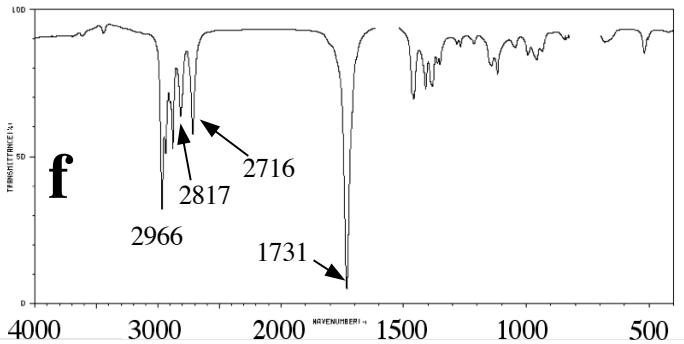




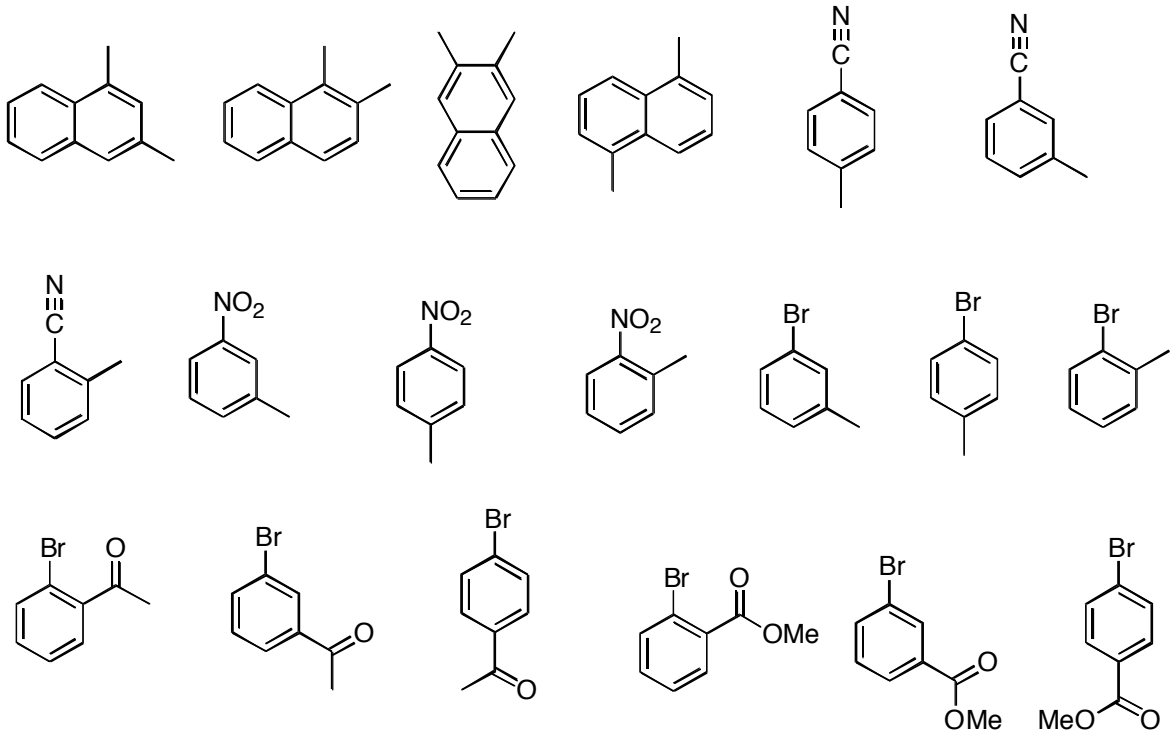








1. Circle the structure of the product that corresponds to the 1H NMR and IR data below. Circle only one structure



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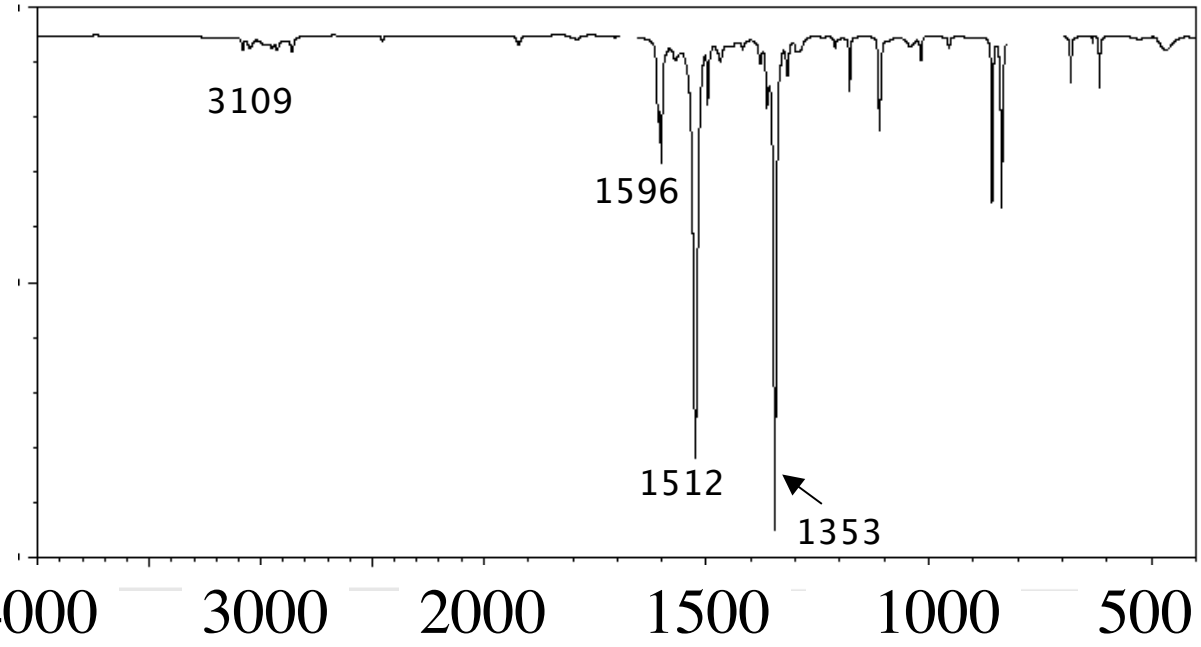
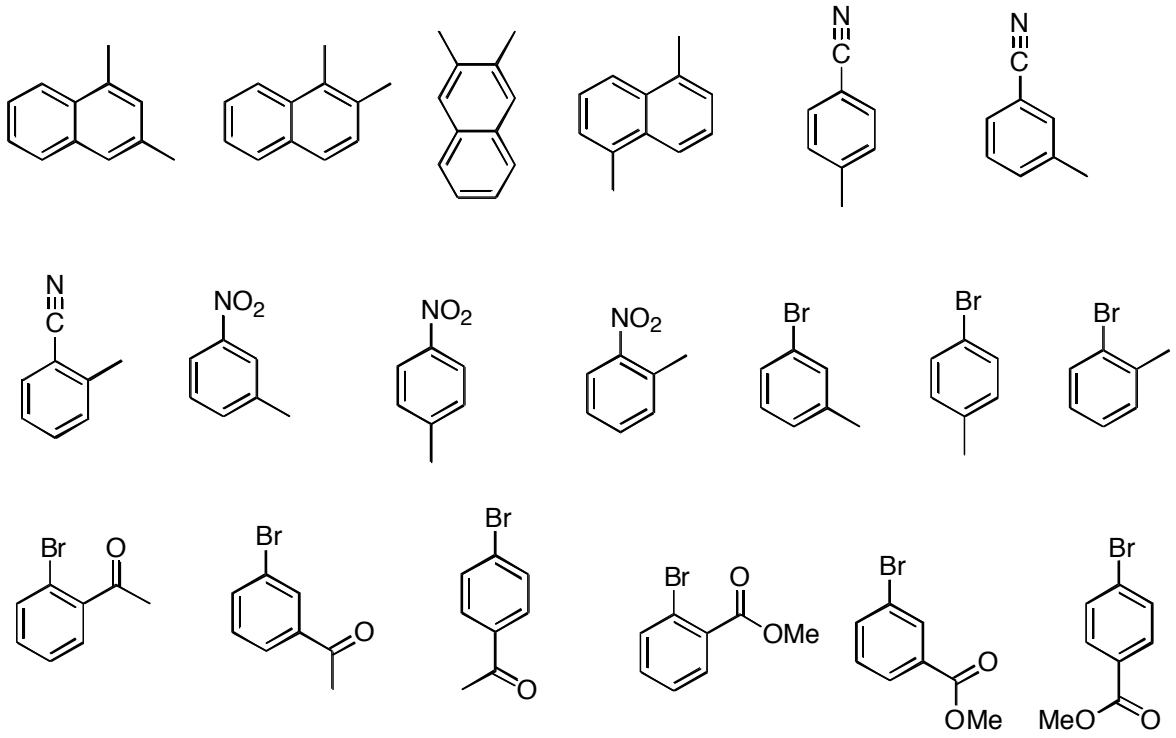
^{1}H NMR

8.07 ppm (d, J=7.9 Hz, 2H)
7.32 ppm (d, J=7.9 Hz, 2H)
2.35 ppm (s, 3H)

IR



2. Circle the structure of the product that corresponds to the 1H NMR and IR data below. Circle only one structure



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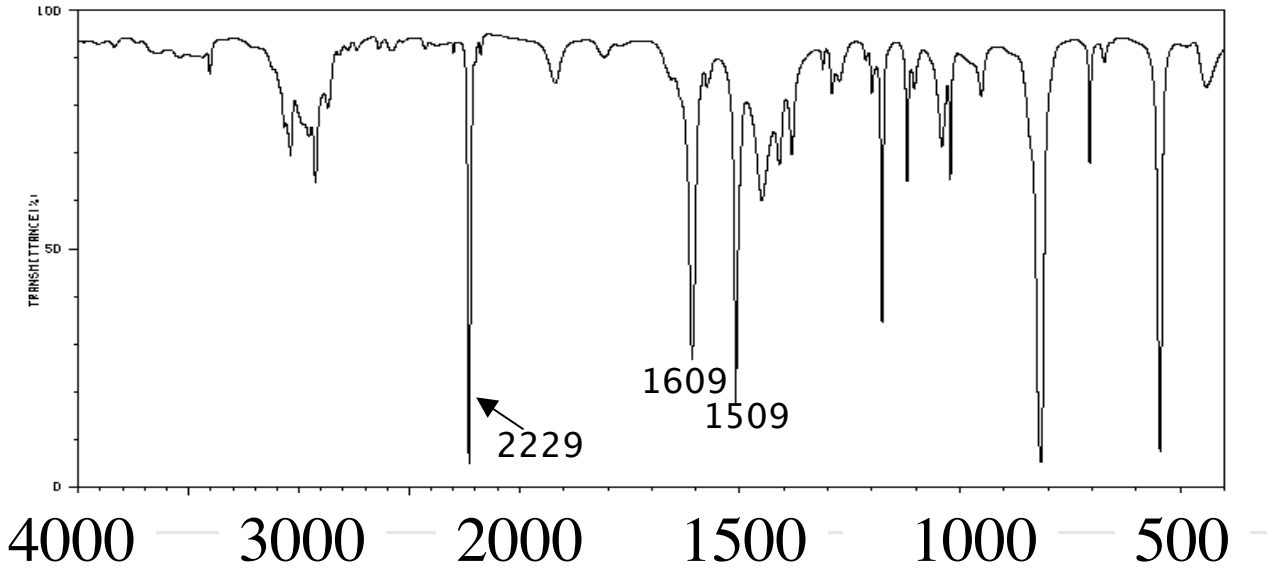
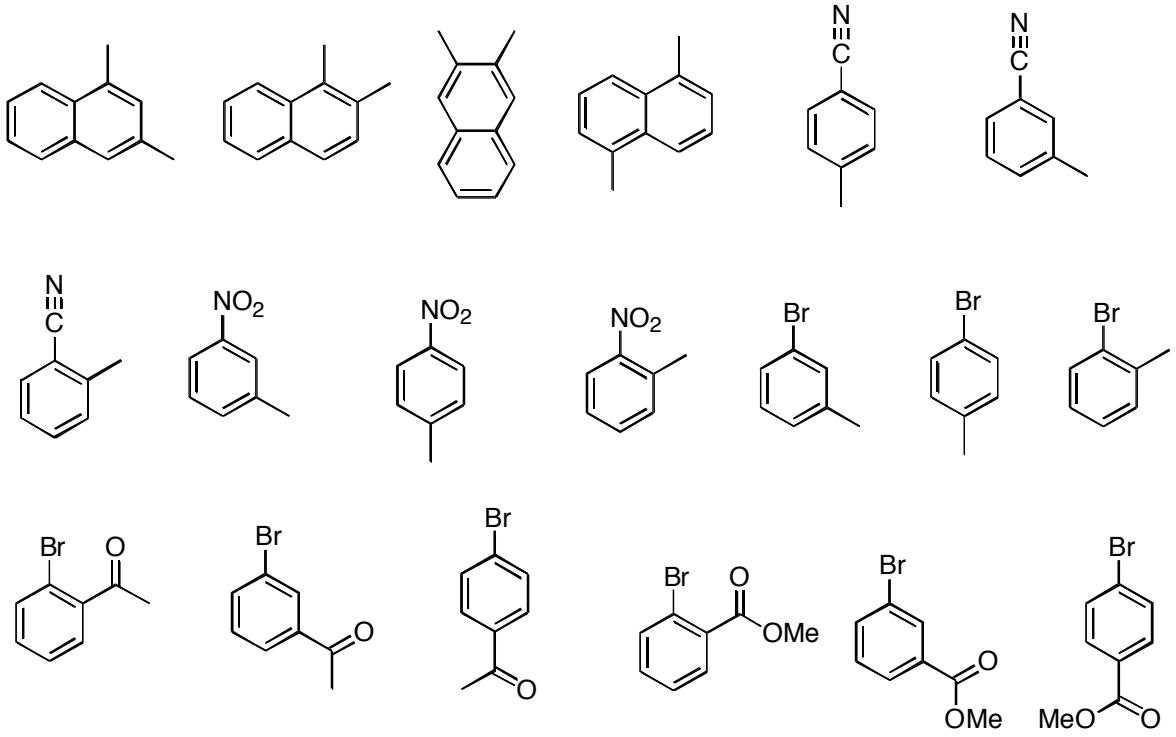
^{1}H NMR

7.22 ppm (d, J=7.9 Hz, 2H)
7.45 ppm (d, J=7.9 Hz, 2H)
2.41 ppm (s, 3H)

IR



3. Circle the structure of the product that corresponds to the 1H NMR and IR data below. Circle only one structure



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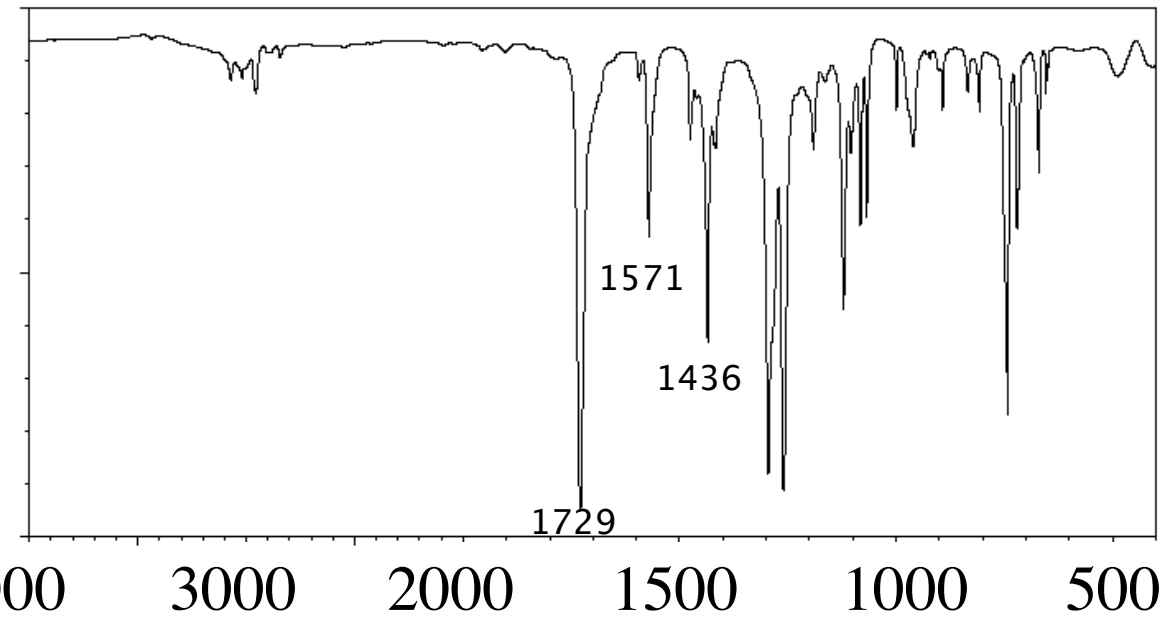
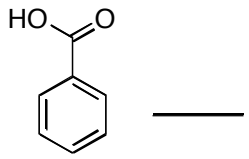
^{1}H NMR

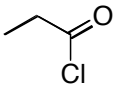
8.17 ppm (t, J=2.1 Hz, 1H)
7.96 (dt, J=8.0, 2.1 Hz, 1H)
7.67 (dt, J=7.7,2.1 Hz, 1H)
7.31 (dd, J=8.0, 7.7 Hz, 1H)
3.91 ppm (s, 3H)

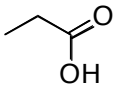
IR

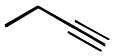


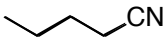
1. Match the following to their IR spectra (24 points) (not all compounds have a match)

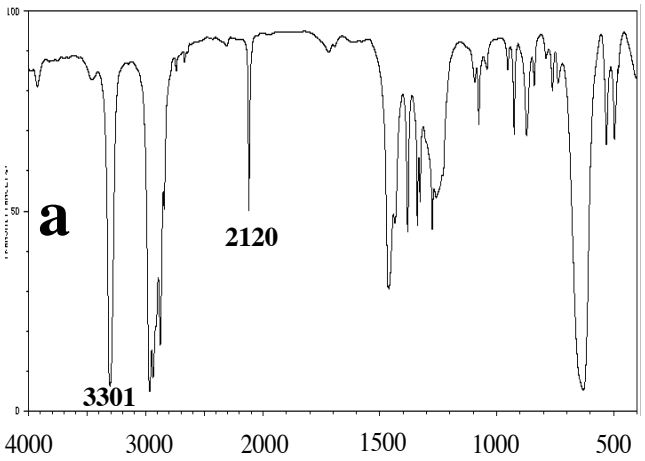


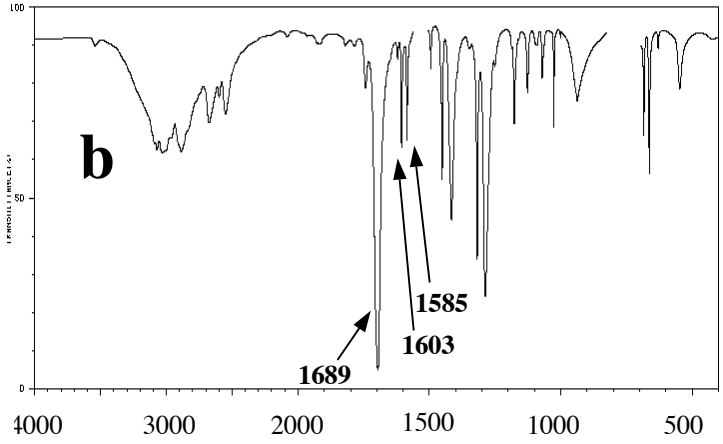


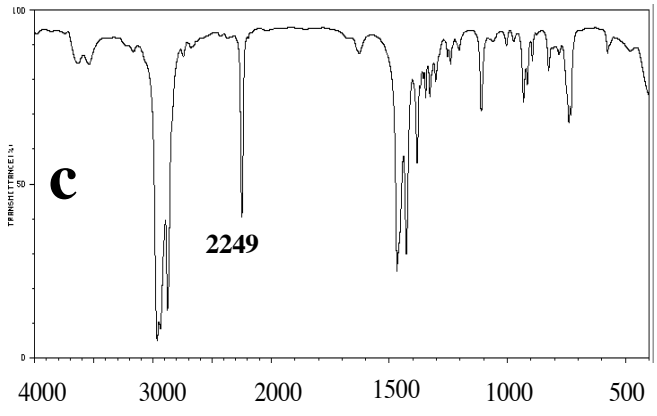


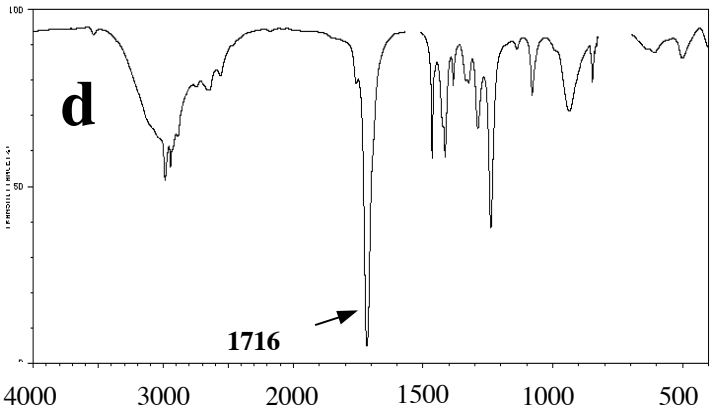






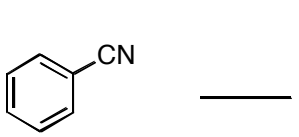






(24 points) (not all compounds have a match)

1. Match the following to their IR spectra



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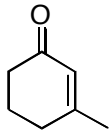

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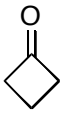

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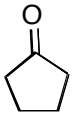

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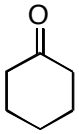

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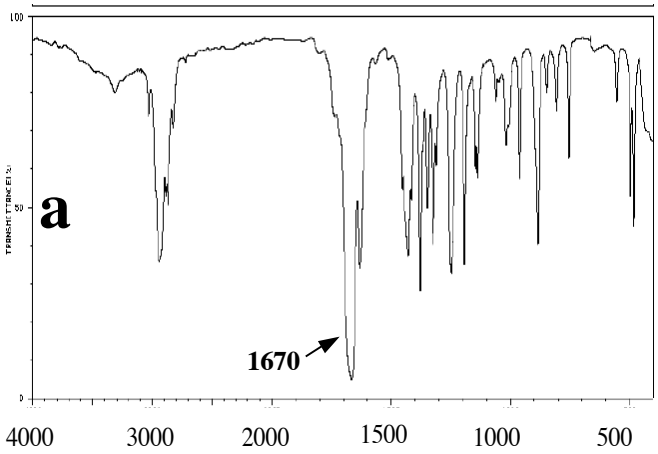
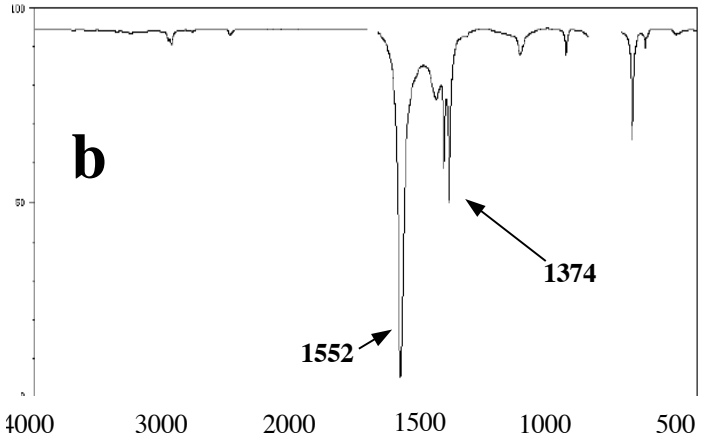
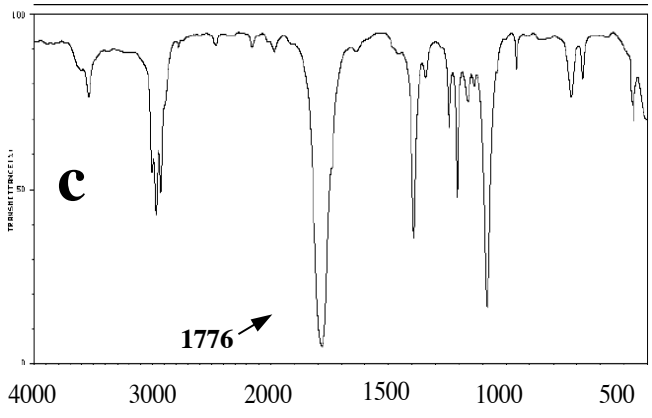
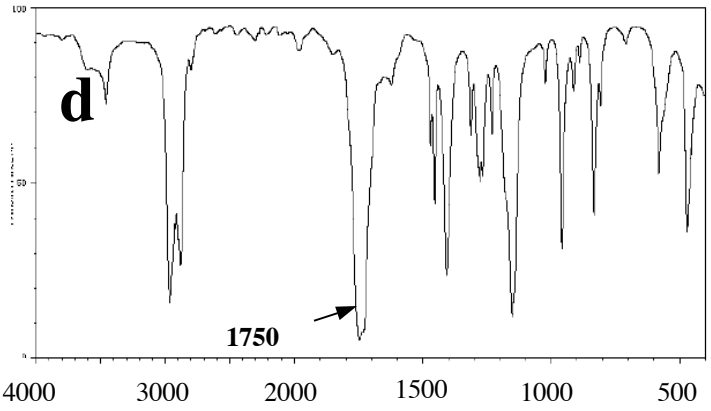


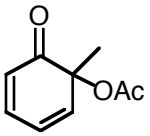


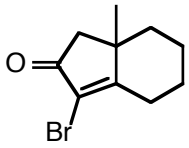


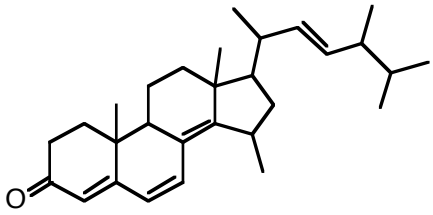


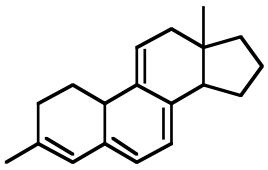
Name_____

2. Calculate the UV maximum for the following compounds. (20 points)



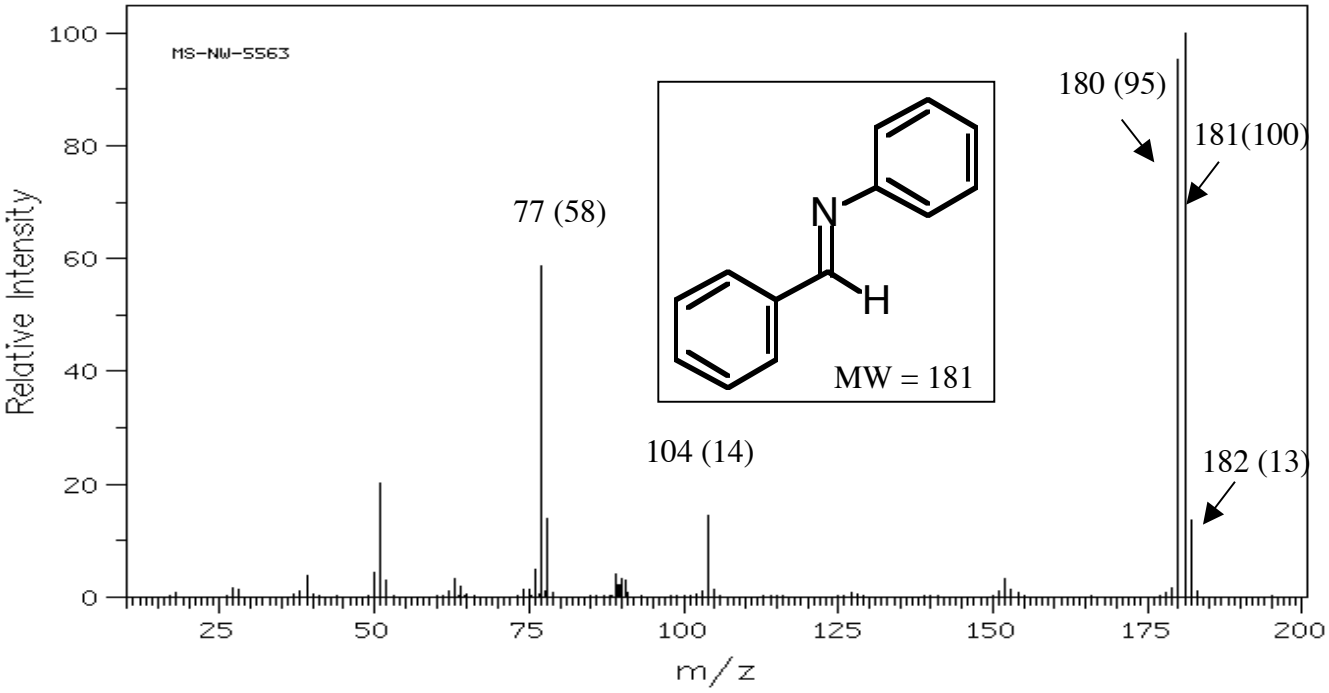






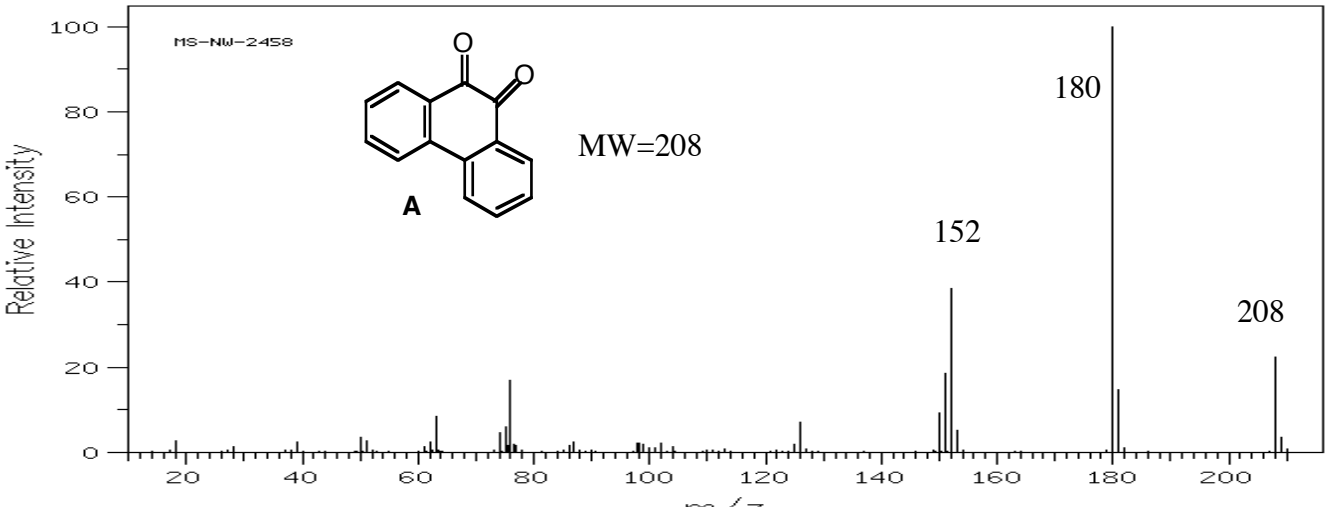
Name_____

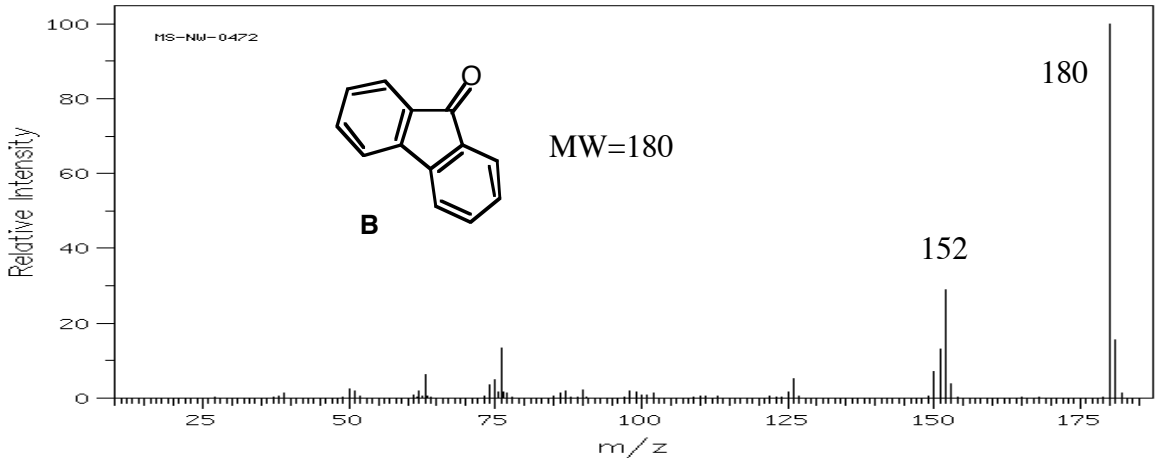
3. Explain how the labeled fragments are formed. Relative intensities are given in parentheses. (20 points)



Name_____

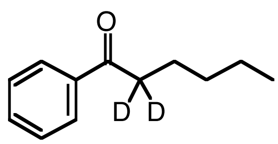
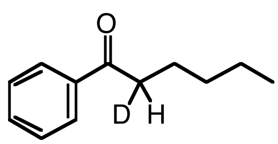
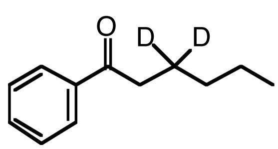
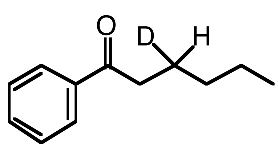
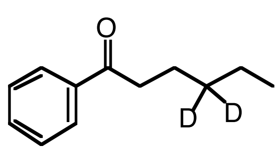
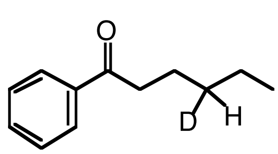
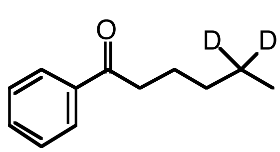
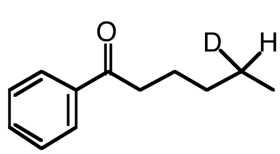
4. The mass spectra of compounds **A** and **B** are nearly identical, except for the additional peak at 208 in the spectrum of **A**. Explain why, and in doing so assign the labeled peaks in the mass spectrum. (20 points)





Name____

5. McLafferty rearrangements of the molecules depicted below will give rise to fragments that can be detected by mass spectrometry. Circle the fragments that are observed. You may need to circle more than one answer for each! (24 points)

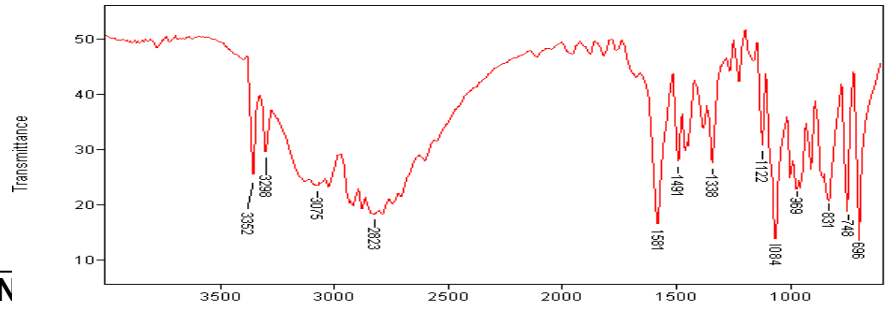
	120	121	122
	120	121	122
	120	121	122
	120	121	122
	120	121	122
	120	121	122
	120	121	122
	120	121	122

2. $C_9H_{13}NO$

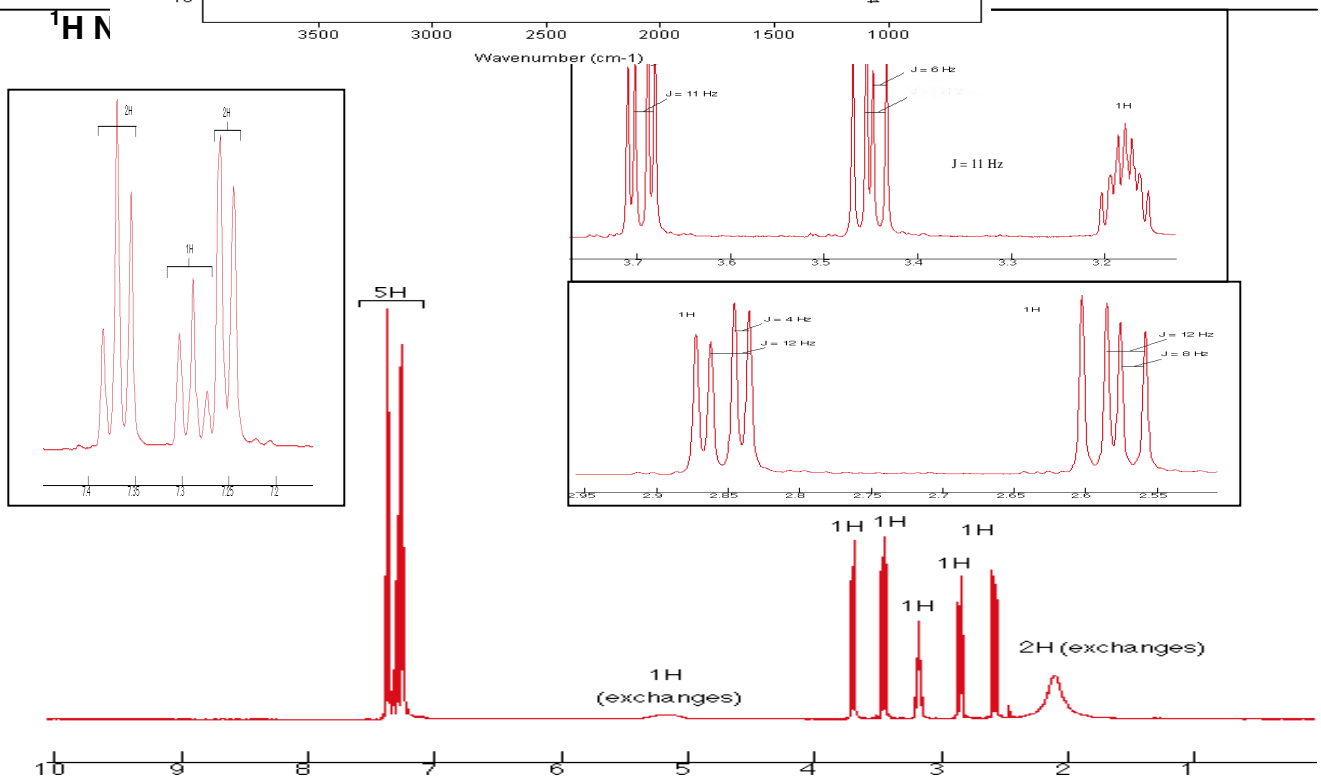
^{13}C NMR	**^{1}H NMR**
138.6, s	7.40–7.22, m, 5H
129.1, d (2)	5.2 broad s, 1H (exchanges with D_2O)
128.3, d (2)	3.69, dd, 1H, J = 11 and 3 Hz
126.3, d	3.45, dd, 1 H, J = 11 and 6 Hz
66.2, t	3.17, m, 1H
54.1, d	2.86, dd, 1H, J=12 and 4 Hz
40.8, t	2.58, dd, 1 HJ = 12 and 8 Hz
	2.1, broad s, 2H

MS: 151 (M^+, 92), 134 (3), **120** (100), 103 (22), **91** (40), 77 (12), 65 (9), **60** (90), 42 (9), 30 (4), 28 (2)

IR:



^{1}H N



2. (continued)
To receive full credit for question 2, clearly show your rationale for elucidating the structure. In addition, all ^{1}H and ^{13}C NMR chemical shifts, as well as ^{1}H coupling constants must be assigned and displayed in the designated blocks. This will involve drawing your final structure at least 3 times. Furthermore, assign at least **2** peaks associated with the main functional groups in the IR spectrum. Also, assign the bolded numbers in the mass spectrum. Simply drawing the structure of the product will get you no credit.

^{13}C chemical shift assignments

^{1}H Chemical shift assignments

^{1}H coupling constant assignments