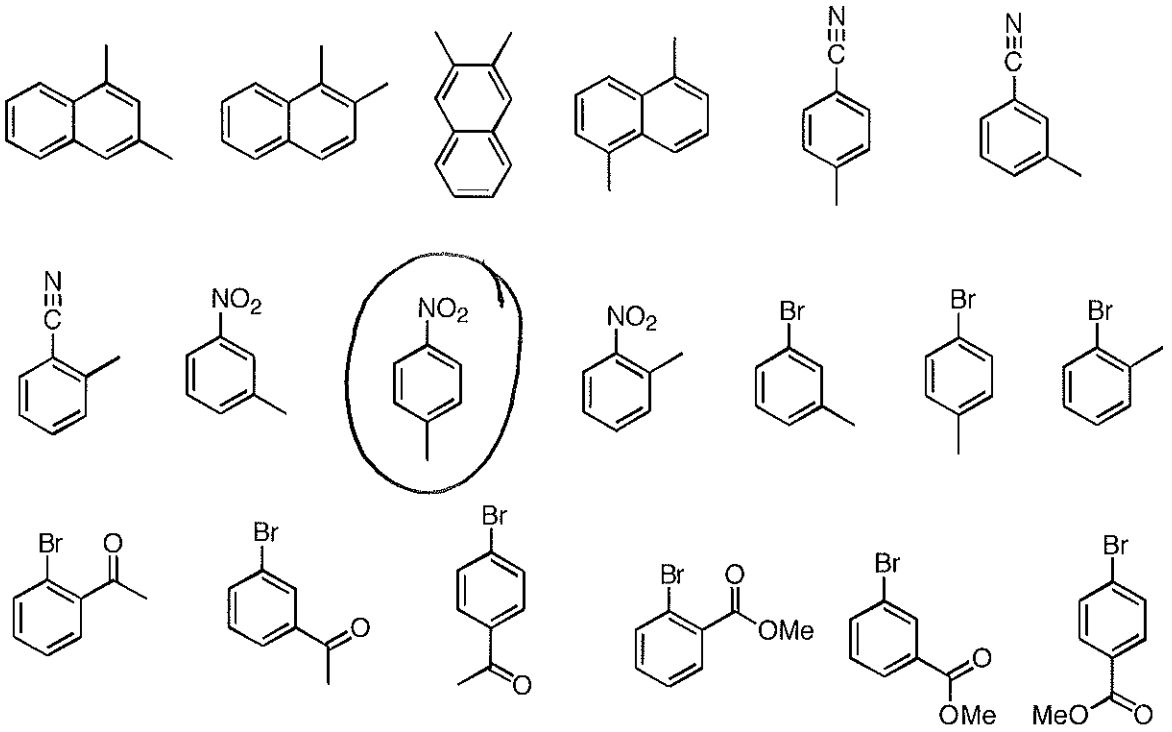
Chem 334, Exam 2
Professor Fox
TA Andrew DeAngelis
Spring 2007

Your Name key

Question 1-4, 15 points each
Question 5a, 10 points
Question 5b, 10 points
Question 5c, 20 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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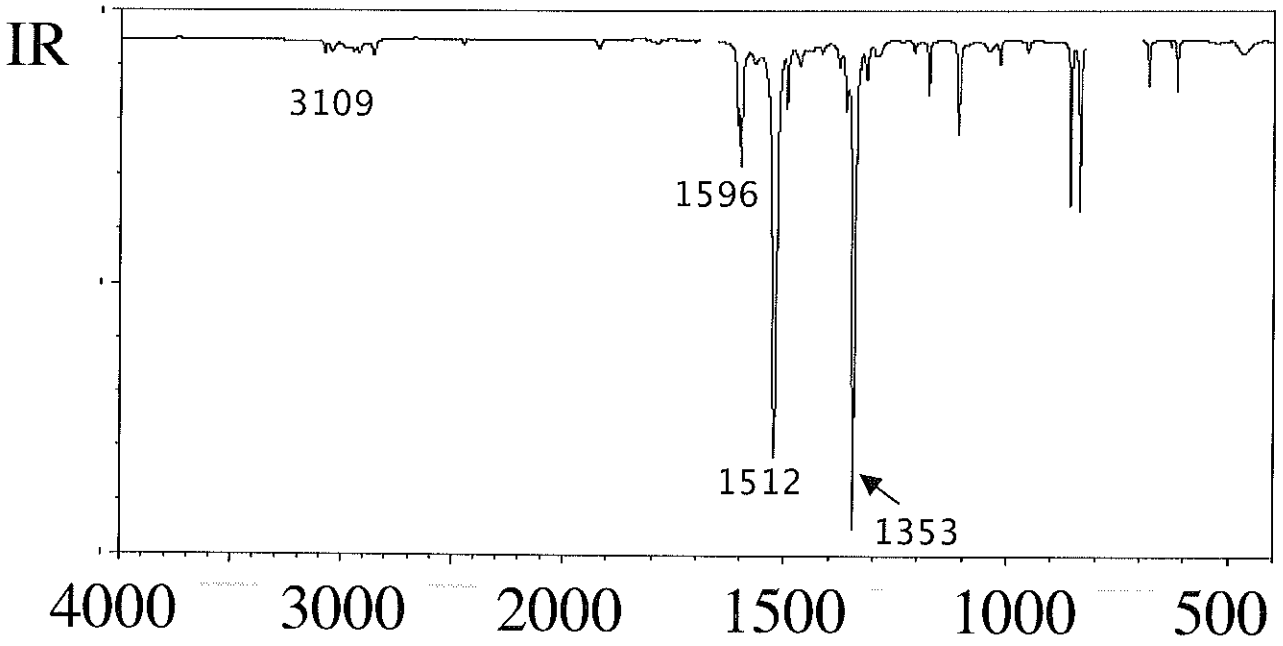
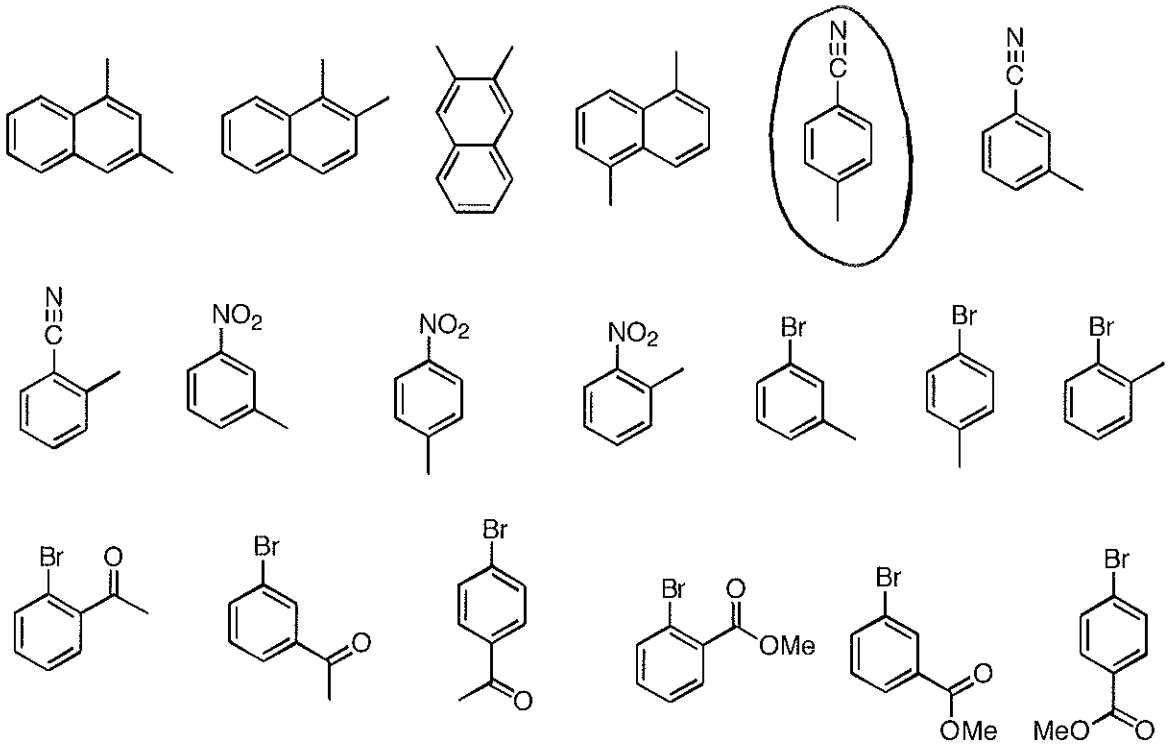
^{1}H NMR 8.07 ppm (d, J=7.9 Hz, 2H)
7.32 ppm (d, J=7.9 Hz, 2H)
2.35 ppm (s, 3H)

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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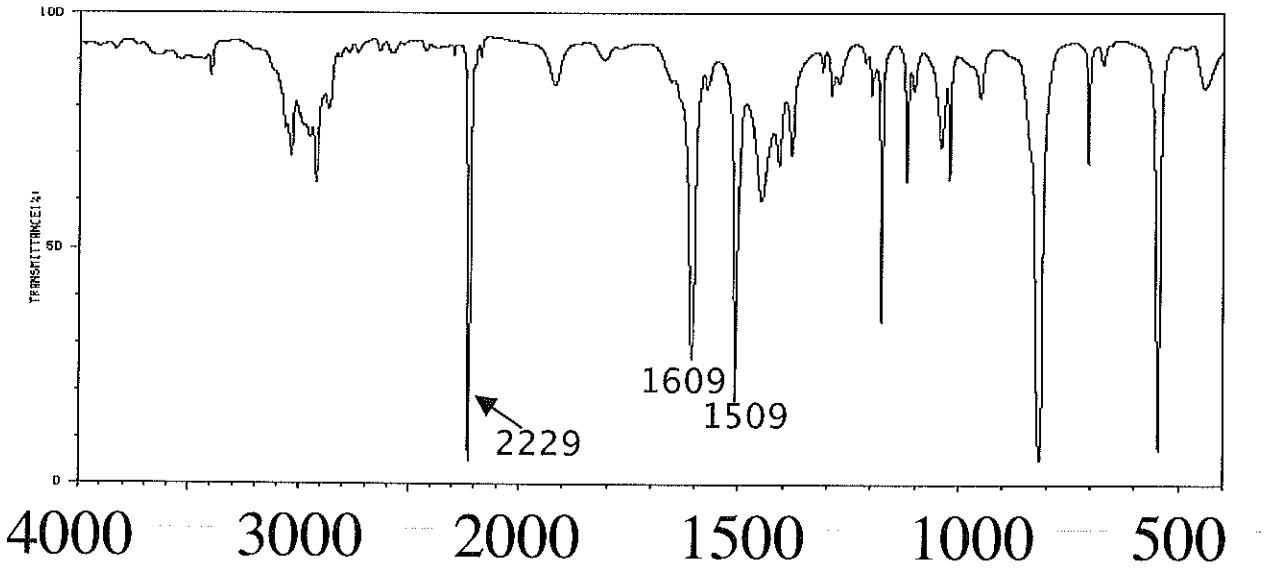
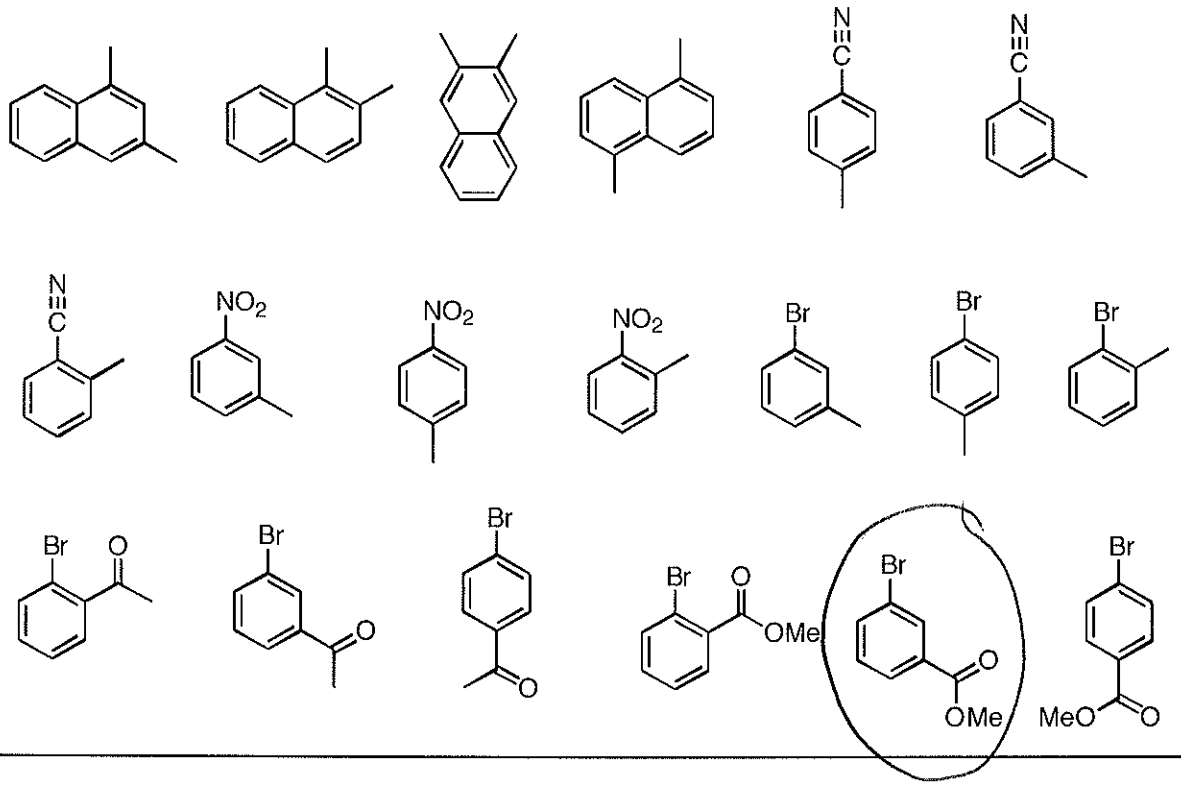
^{1}H NMR

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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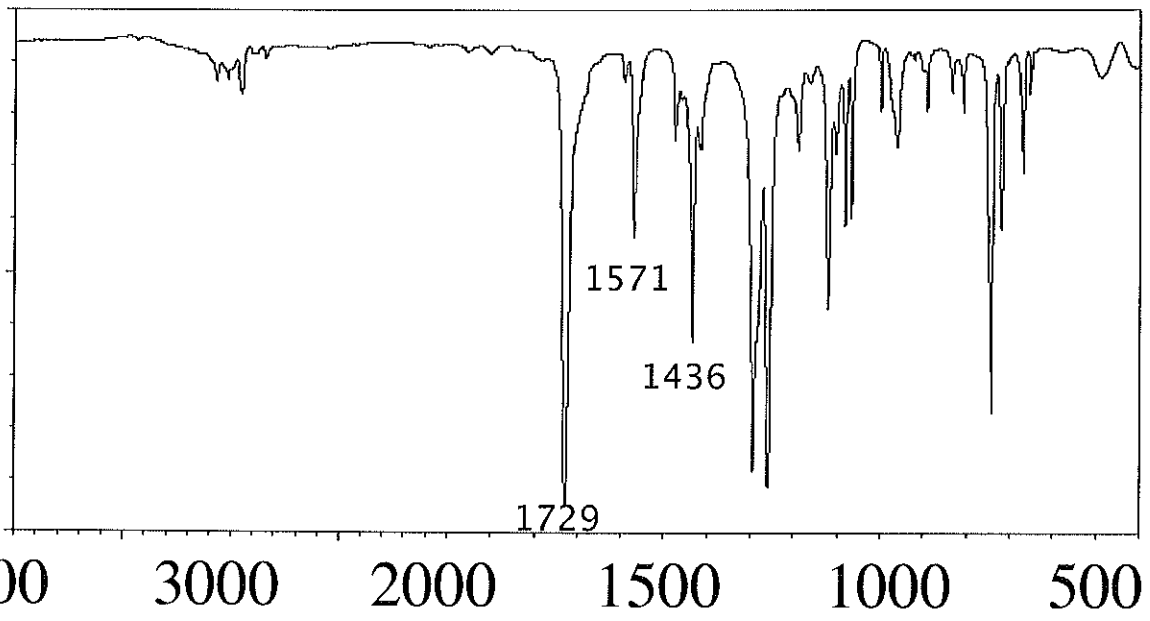
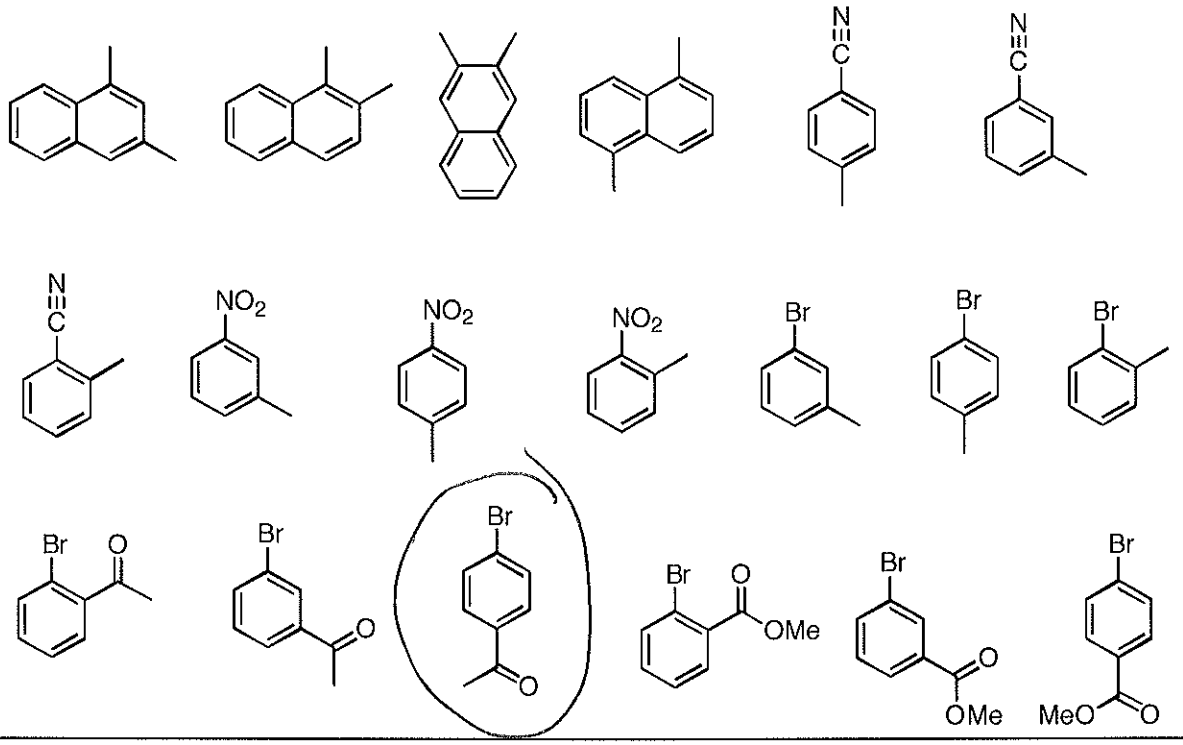
^{1}H NMR

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



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



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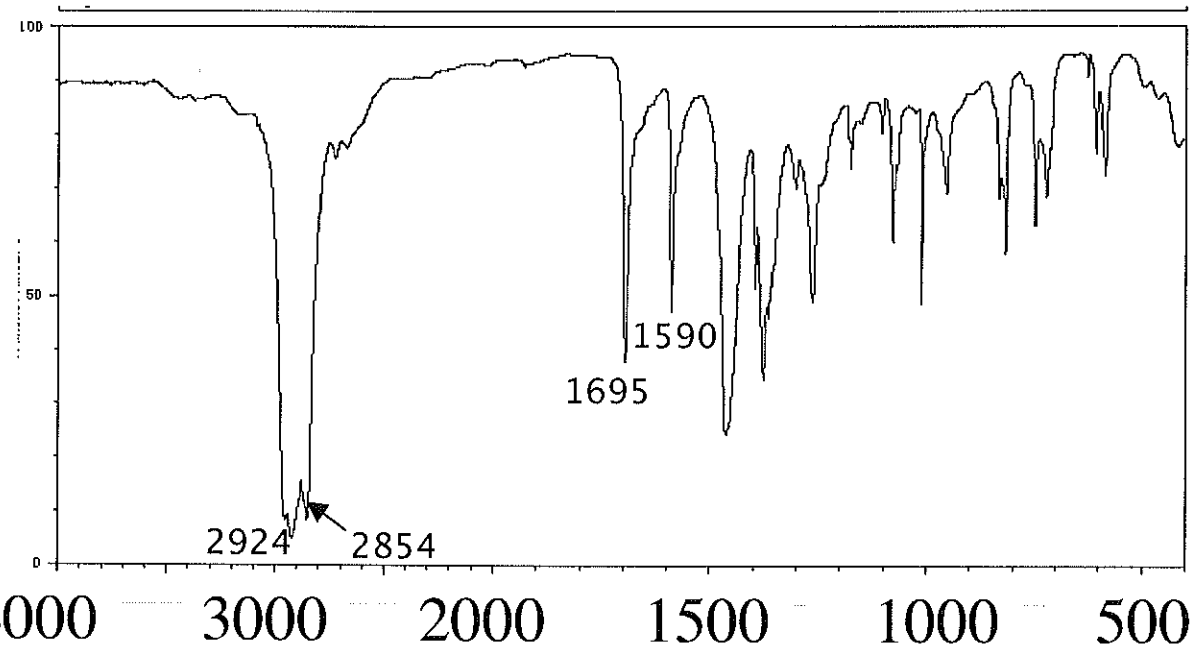
^{1}H NMR 7.81 ppm (d, J=7.9 Hz, 2H)
7.61 ppm (d, J=7.9 Hz, 2H)
2.60 ppm (s, 3H)

IR



5. Elucidate the following structure

AD: $C_{13}H_{18}O_3$

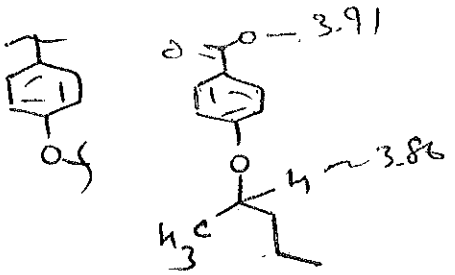
7.86 ppm (d, J=8.0 Hz, 2H)
6.88 ppm (d, J=8.0 Hz, 2H)
3.86 ppm (m, 1H)
3.91 (s, 3H)
1.67 (m, 2H)
1.43 (d, J=7.0 Hz, 3H)
1.33 (m, 2H)
0.96 (t, J=6.9 Hz, 3H)

^{13}C NMR (ester)

167 (s)
163 (s)
130 (2 carbons, d)
122 (s)
114 (2 carbons, d)
73 (d)
50 (q)
39 (t)
20(q)
16.9 (t)
14 (q)

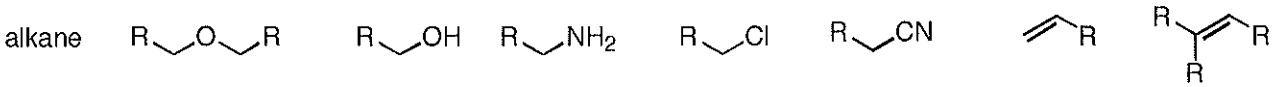
IR: 1729 cm^{-1}

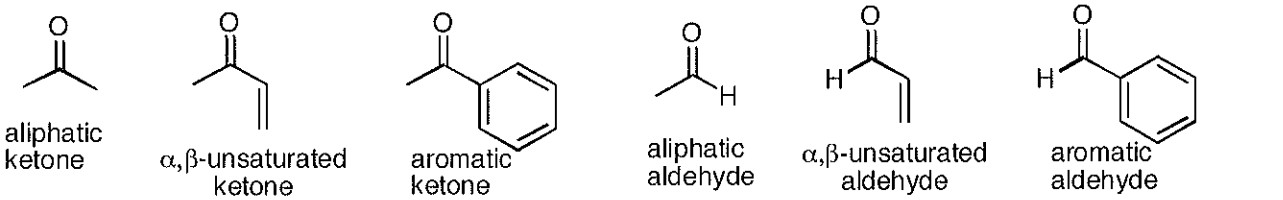
NO OH'S

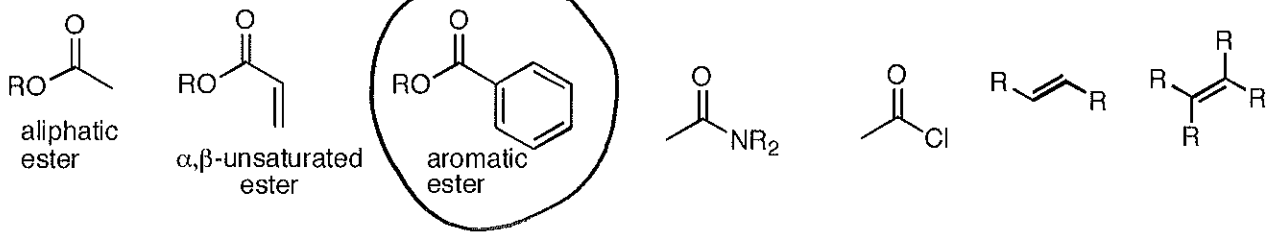


a) Circle the functional group that is associated with

(i) IR: 1729 cm-1

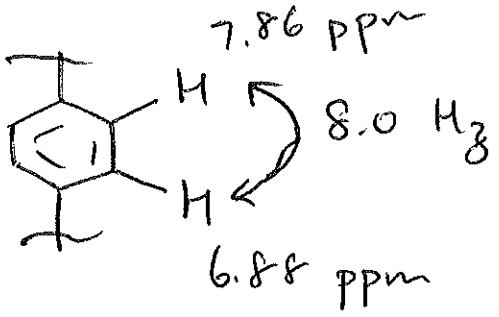






b) Identify the substructure that is associated with the following. Rationalize your answer based both on the chemical shifts and the coupling constants:

7.86 ppm (d, J=8.0 Hz, 2H)
6.88 ppm (d, J=8.0 Hz, 2H)



PARA SUBSTITUTED AROMATIC

5. Elucidate the following structure (continued)

AD: $C_{13}H_{18}O_3$

7.86 ppm (d, J=8.0 Hz, 2H)
6.88 ppm (d, J=8.0 Hz, 2H)
3.86 ppm (m, 1H)
3.91 (s, 3H)
1.67 (m, 2H)
1.43 (d, J=7.0 Hz, 3H)
1.33 (m, 2H)
0.96 (t, J=6.9 Hz, 3H)

^{13}C NMR

167 (s)
163 (s)
130 (2 carbons, d)
122 (s)
114 (2 carbons, d)
73 (d)
50 (q)
39 (t)
20(q)
16.9 (t)
14 (q)

IR: 1729 cm^{-1}

c) draw the structure of the product (no partial credit)