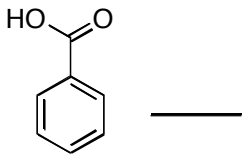
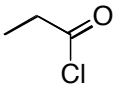
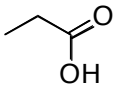
Chem 334, Exam 1
Professor Fox
Spring 2008

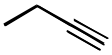
Your Name_____

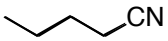
1. Match the following to their IR spectra (24 points) (not all compounds have a match)

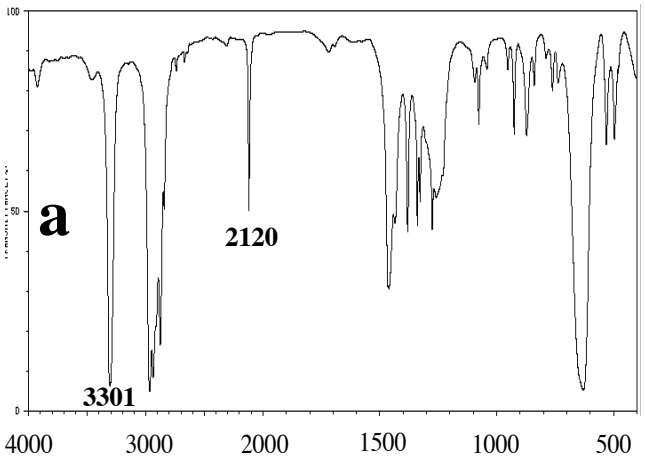


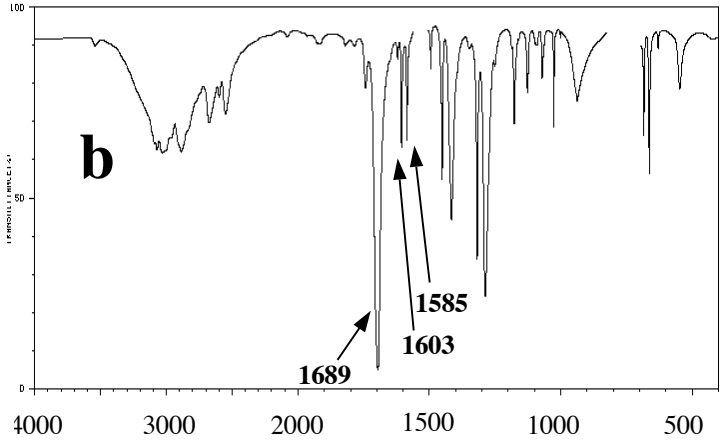


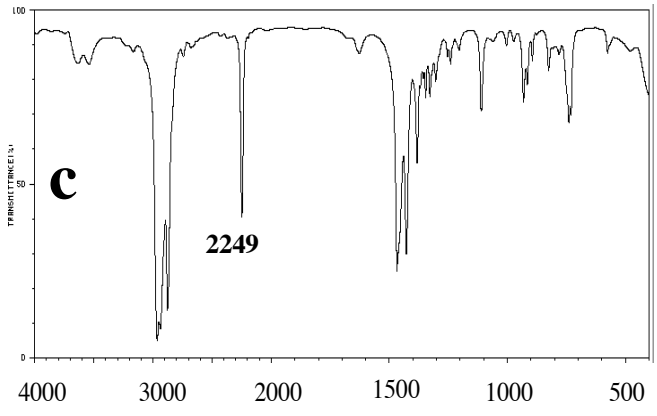


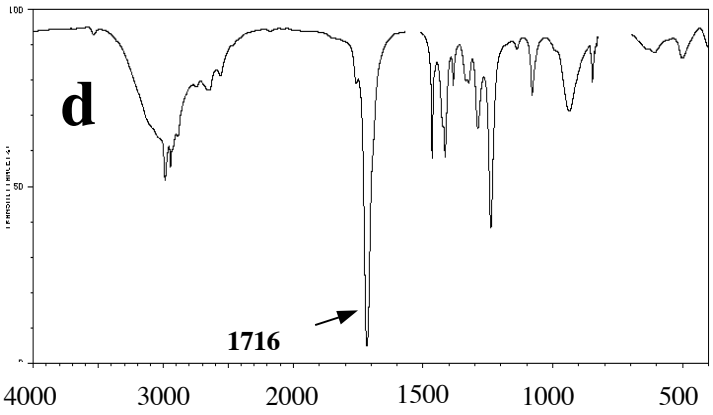






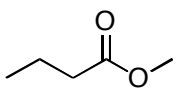




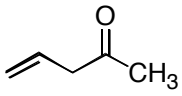


2. Match the following ^{13}C NMR spectra with one of the following substances. Write you answer in the box along side the spectrum Multiplicities [I.e. (s,d,t,q)] are indicated above each peak.

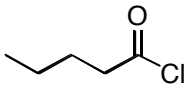
(18 points)



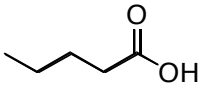
A



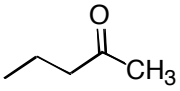
B



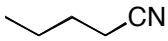
C



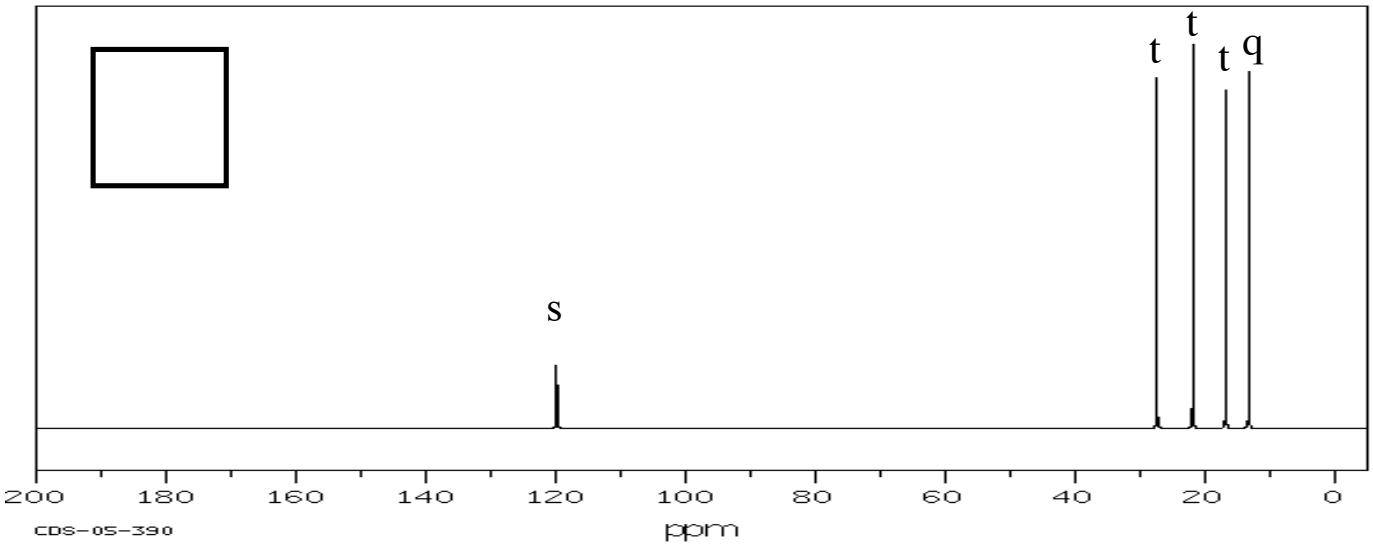
D

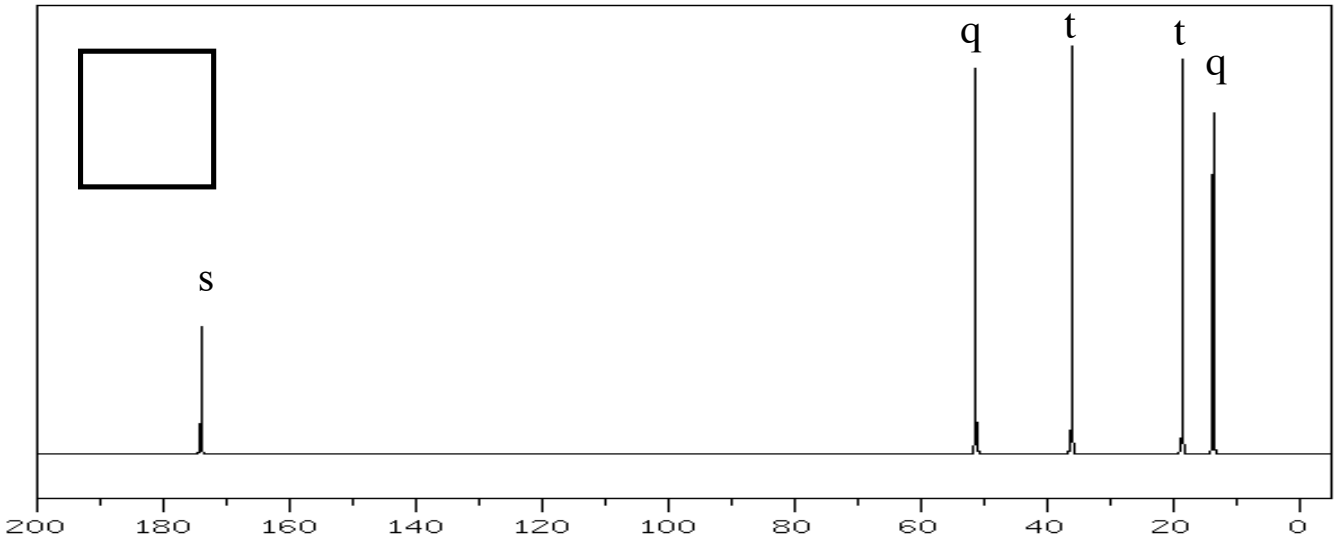


E



F





3. Elucidate the following structure

$C_{10}H_9O_2Cl$

^{1}H NMR
7.71 (dd, *J*=7.7, 2.2 Hz, 1H)
7.44 (dd, *J*=8.1, 2.2 Hz, 1H)
6.95 (dd, *J*=8.1, 7.7 Hz, 1H)
4.81 (dd, J= 10.5, 8.9Hz, 1H)
4.20 (dd, J= 8.9, 7.3Hz, 1H)
3.60 (m, 1H)
1.34 (d, J= 9.2Hz, 3H)

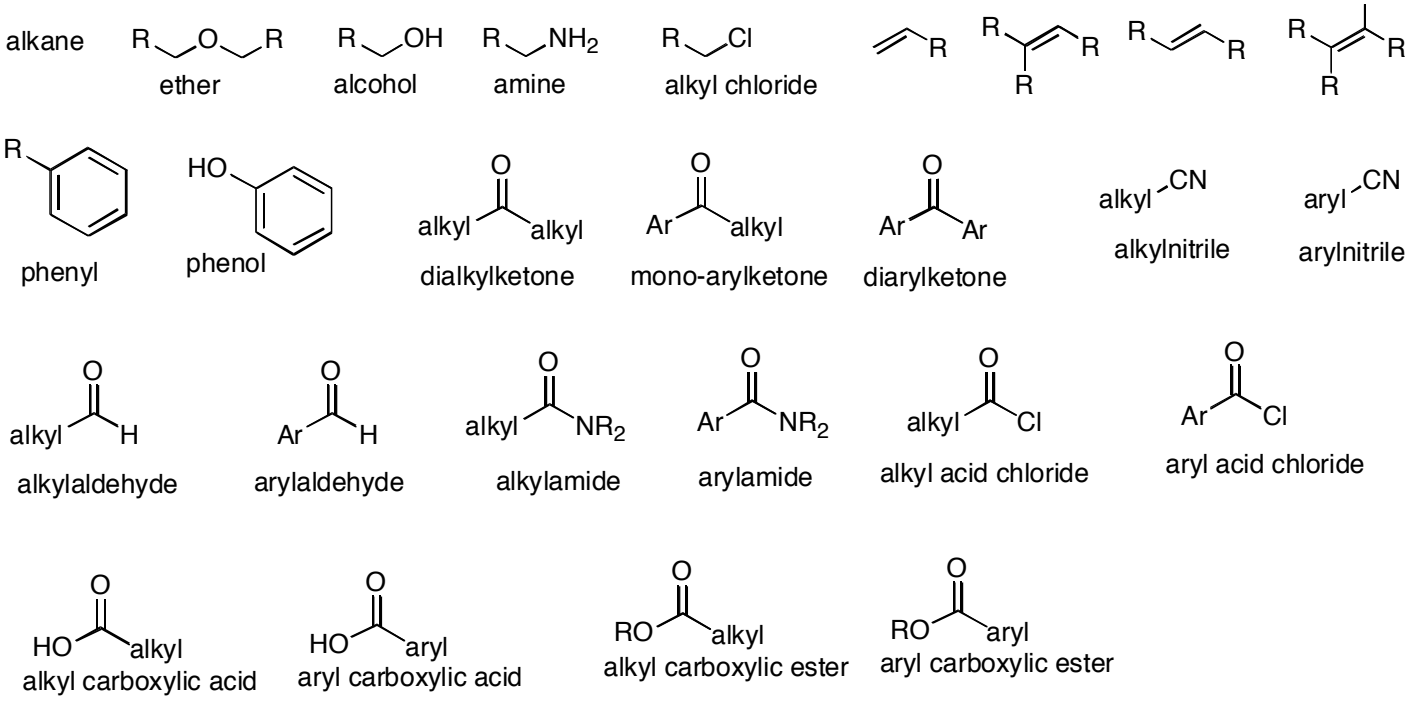
^{13}C NMR
165.7 (s)
160.6 (s)
135.4 (s)
130.2 (d)
128.9 (d)
120.5 (d)
113.5 (s)
79.5 (t)
35.9 (d)
19.2 (q)

IR: 1775 cm^{-1}

a) Circle the functional group that is associated with

note: "Ar" refers to aryl, or an aromatic ring

(i) IR: 1775 cm^{-1} (8 points)



3. Elucidate the following structure (continued)

$C_{10}H_9O_2Cl$

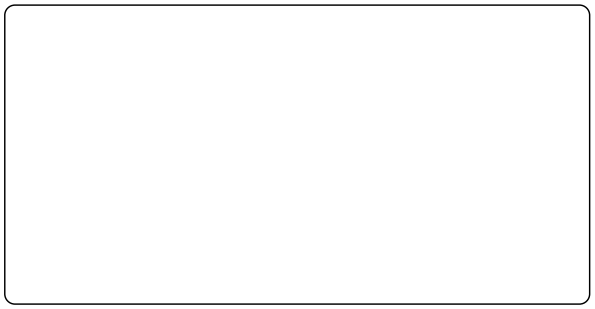
^{1}H NMR
7.71 (dd, *J*=7.7, 2.2 Hz, 1H)
7.44 (dd, *J*=8.1, 2.2 Hz, 1H)
6.95 (dd, *J*=8.1, 7.7 Hz, 1H)
4.81 (dd, J= 10.5, 8.9Hz, 1H)
4.20 (dd, J= 8.9, 7.3Hz, 1H)
3.60 (m, 1H)
1.34 (d, J= 9.2Hz, 3H)

^{13}C NMR
165.7 (s)
160.6 (s)
135.4 (s)
130.2 (d)
128.9 (d)
120.5 (d)
113.5 (s)
79.5 (t)
35.9 (d)
19.2 (q)

IR: 1775 cm^{-1}

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

(20 points)



c. Assign the following coupling constants: (15 points)

7.71 (dd, *J*=7.7, 2.2 Hz, 1H)
7.44 (dd, *J*=8.1, 2.2 Hz, 1H)
6.95 (dd, *J*=8.1, 7.7 Hz, 1H)

d. Assign the following coupling constants: (15 points)

4.81 (dd, J= 10.5, 8.9Hz, 1H)
4.20 (dd, J= 8.9, 7.3Hz, 1H)
3.60 (m, 1H)
1.34 (d, J= 9.2Hz, 3H)

HINT: the peak at 3.60 is coupled to the peaks at 4.81, 4.20 and 1.34