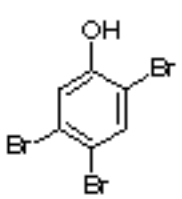
Chem 334, Exam 2
Professor Fox
Spring 2008

Your Name_____

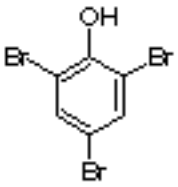
Question 1, 6 points each
Question 2a, 14 points
Question 2b, 14 points
Question 2c, 14 points
Question 2d, 14 points
Question 2e, 20 points

Name_____

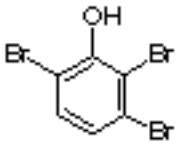
1. Match each structure with the correct spectrum



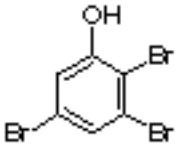
c



b



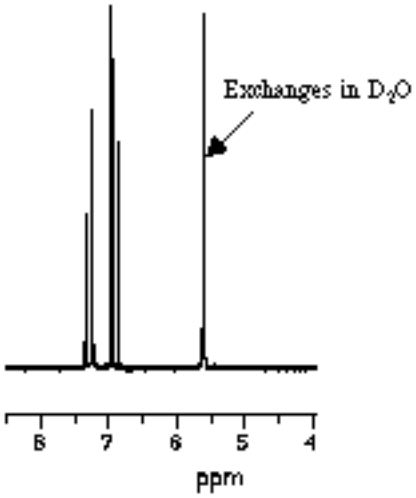
a



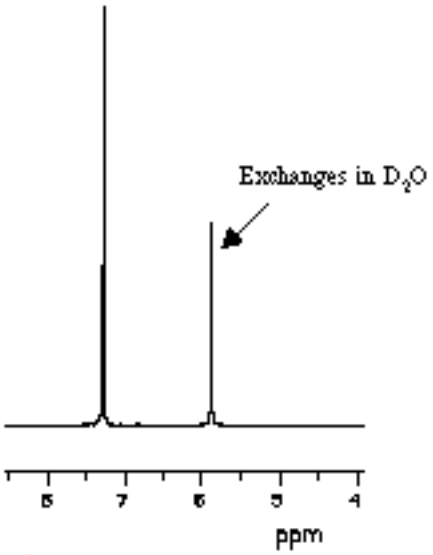
d

write the answers on these lines

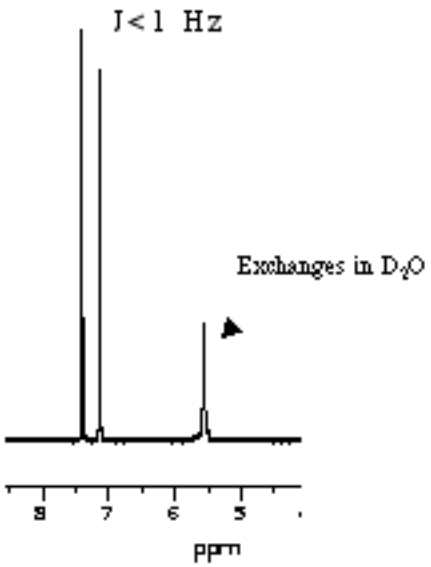
a



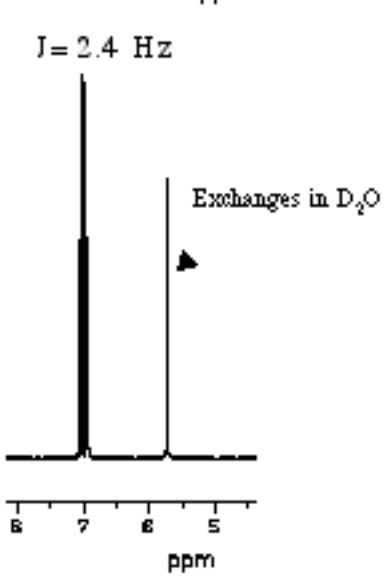
b



c



d



2. Elucidate the following structure

$C_{11}H_{13}NO_3$

^{13}C NMR

208.2 (s)
148.5 (s)
135.4 (d)
135.2 (s)
129.5 (d)
124.4 (d)
122.0 (d)
48.4 (d)
31.0 (t)
15.8 (q)
7.9 (q)

^{1}H NMR

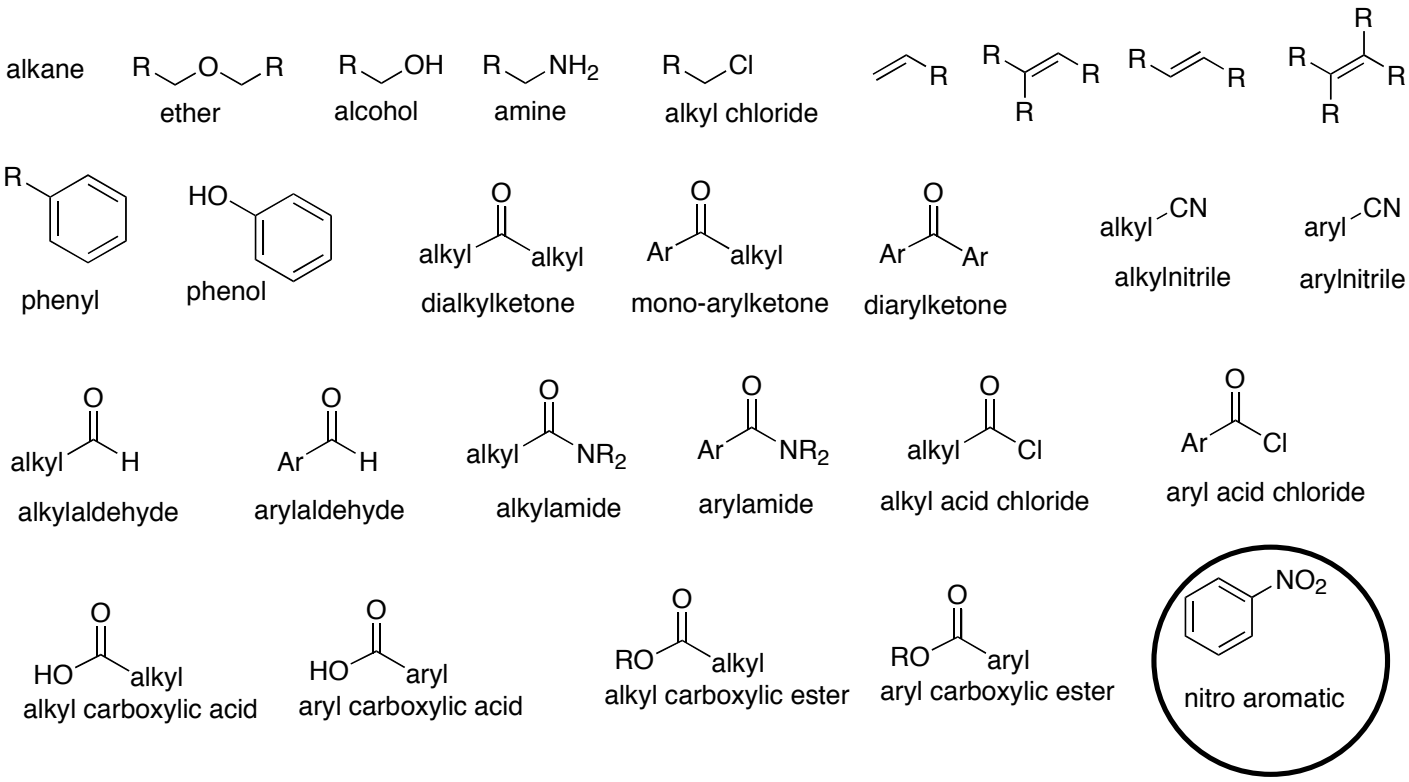
8.05 (t, J=2.1 Hz, 1H)
8.01 (dt, J=7.9, 2.1 Hz, 1H)
7.51 (dt, J=7.9, 2.1 Hz, 1H)
7.47 (t, J=7.9 Hz, 1H)
3.81 (q, J=6.8 Hz, 1H)
2.49 (m, 2H)
1.44 (d, J=6.8 Hz, 3H)
1.06 (t, J=7.0 Hz, 3H)

IR:
1715, 1520, 1350 cm^{-1}

a) Circle the functional group that is associated with

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

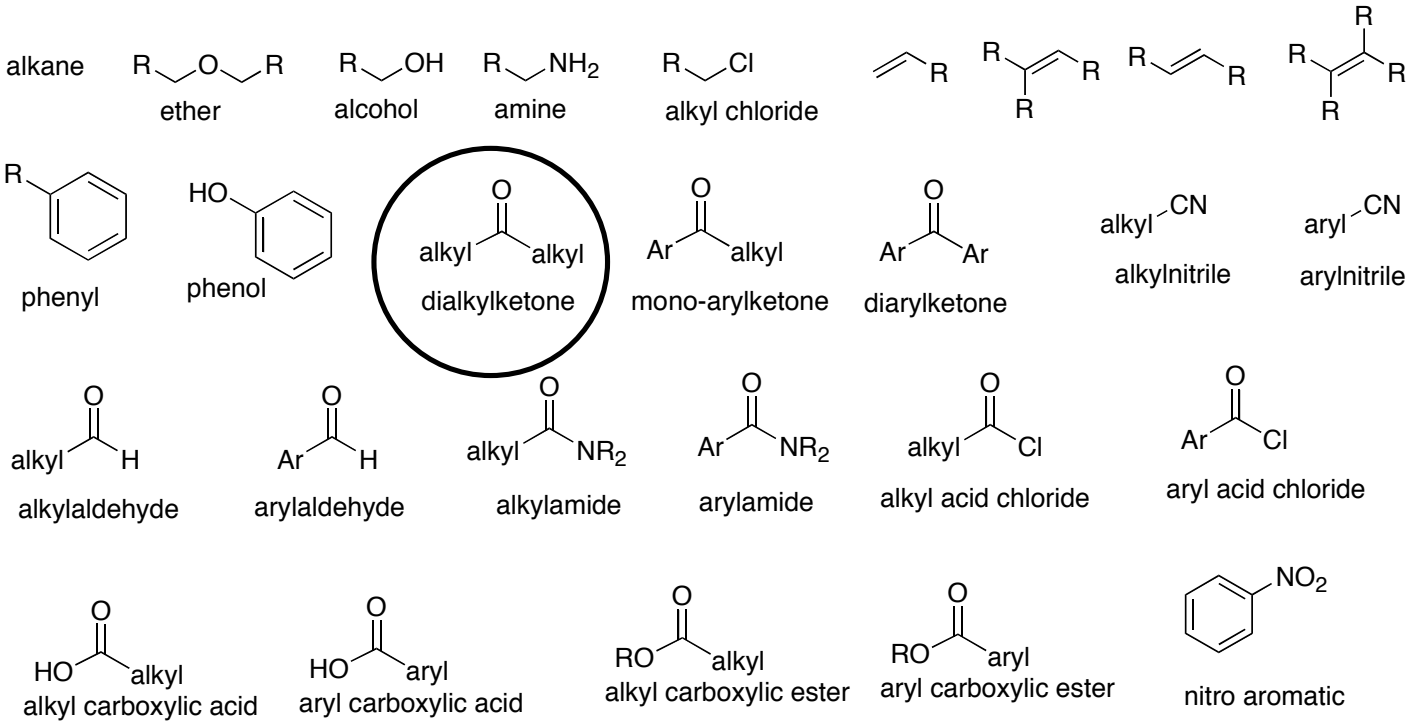
(i) IR: 1520 and 1350 cm^{-1} (both peaks are associated with one functional group)



b) Circle the functional group that is associated with

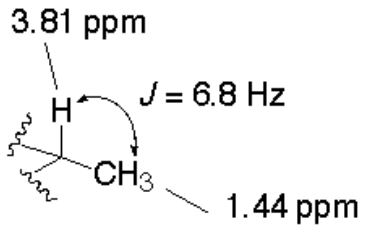
note: "Ar" refers to aryl, or an aromatic ring

(i) IR: 1715 cm^{-1} (both peaks are associated with one functional group)



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

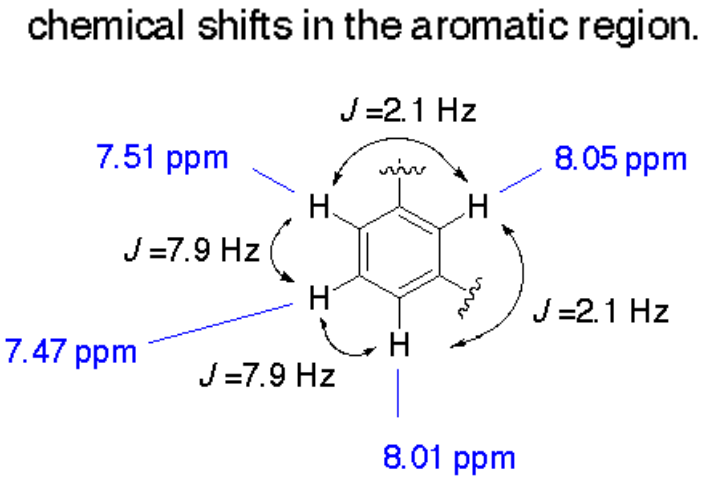
3.81 (q, J=6.8 Hz, 1H)
1.44 (d, J=6.8 Hz, 3H)



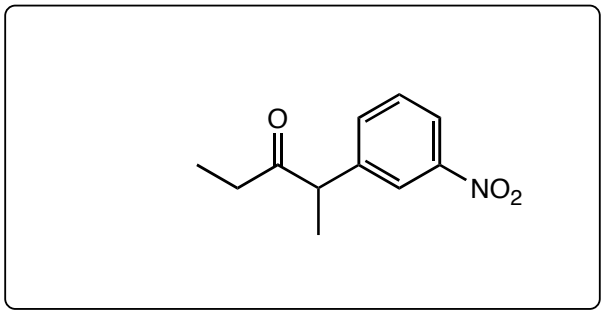
2 Elucidate the following structure (continued)

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

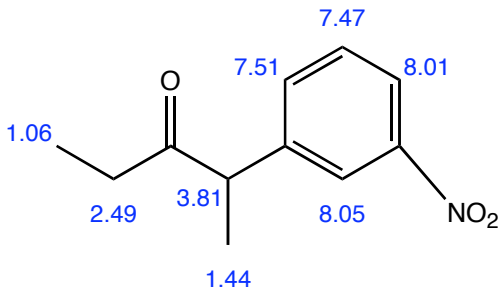
8.05 (t, J=2.1 Hz, 1H)
8.01 (dt, J=7.9, 2.1 Hz, 1H)
7.51 (dt, J=7.9, 2.1 Hz, 1H)
7.47 (t, J=7.9 Hz, 1H)



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



^{1}H NMR assignments



^{13}C NMR assignments