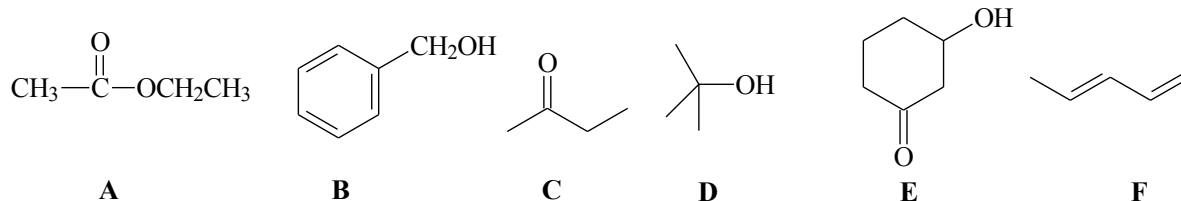


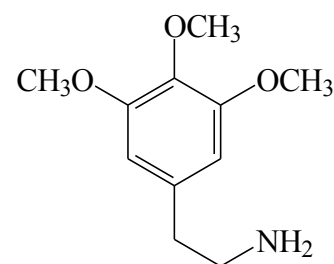
Review 'E35 Spectroscopic Techniques in Organic Chemistry' in the Week 3 Resources.

1. Answer the following questions concerning the six compounds below.



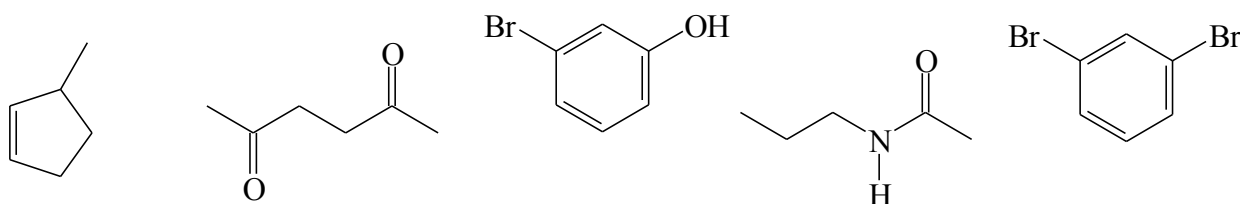
- Which compound(s) will give a molecular ion at $m/z = 74$ in the mass spectrum?
 - Which compound(s) will show a strong absorption in the UV-visible spectrum?
 - Which compound(s) will show absorption around 1700 cm^{-1} in the infrared region?
 - Which compound(s) will show absorption around 3500 cm^{-1} in the infrared region?
 - Which compound(s) will *not* show absorption either around 1700 or 3500 cm^{-1} in the infrared region?
 - How many signals will each compound have in its ^{13}C NMR spectrum?
2. A compound of formula $\text{C}_7\text{H}_6\text{O}$ has a molecular ion at $m/z = 106$ in the mass spectrum, shows a strong absorption in the UV region and an absorption around 1700 cm^{-1} in the IR. Suggest a structure for the compound.
3. Mescaline is a hallucinogenic compound produced by the peyote cactus.

- Name the functional groups present.
- How many signals will be observed in its ^{13}C NMR spectrum?
- At what value of m/z will it show a molecular ion (parent ion) in the mass spectrum?
- Do you expect it to have a strong absorption in the UV-visible spectrum?
- Do you expect it to have a strong absorption around either ~ 3400 or $\sim 1700\text{ cm}^{-1}$ in the infrared spectrum? If so, what functional groups is/are responsible for this absorption?

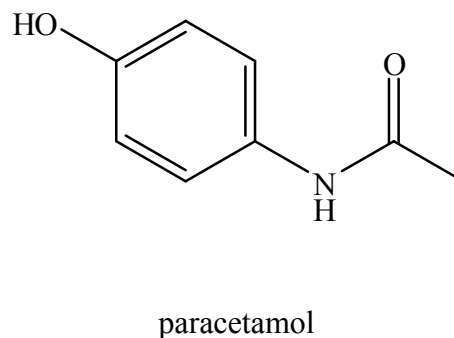
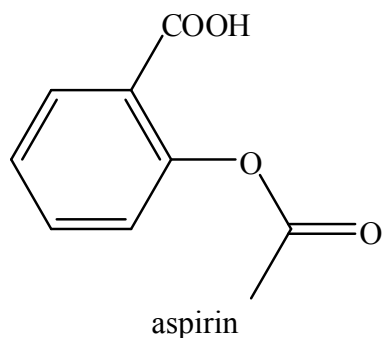


Mescaline

4. How many signals will be observed in the ^{13}C NMR spectrum of each of the following compounds?

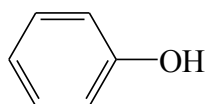


5. By considering both the number and type of carbon environments, *sketch* the ^{13}C NMR spectra you would expect for aspirin and paracetamol. (You do *not* need to worry about the relative position of the lines due to the aromatic ^{13}C nuclei).

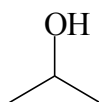


6. Name the functional group(s) in each of the following compounds, including classification into primary, secondary or tertiary where appropriate.

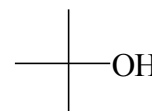
(a)



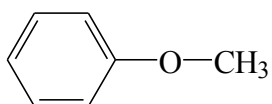
(b)



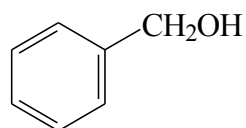
(c)



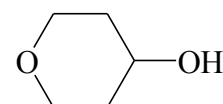
(d)



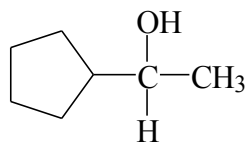
(e)



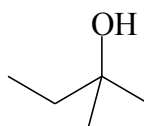
(f)



(g)



(h)



(i)

