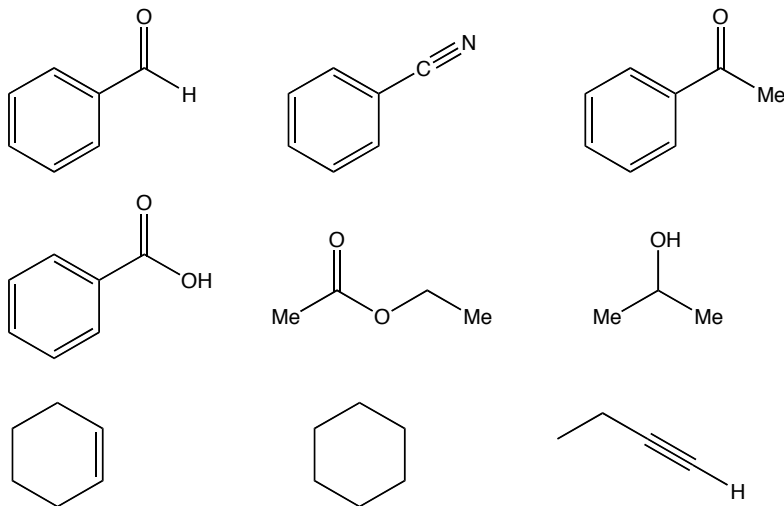
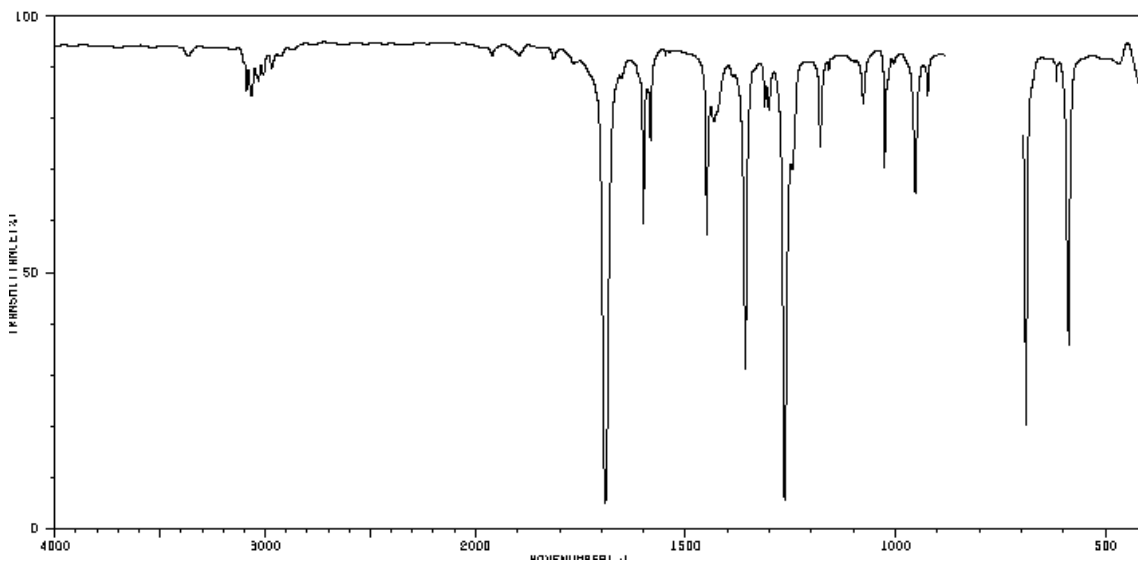


### Problem Set 9: Mass Spec and IR

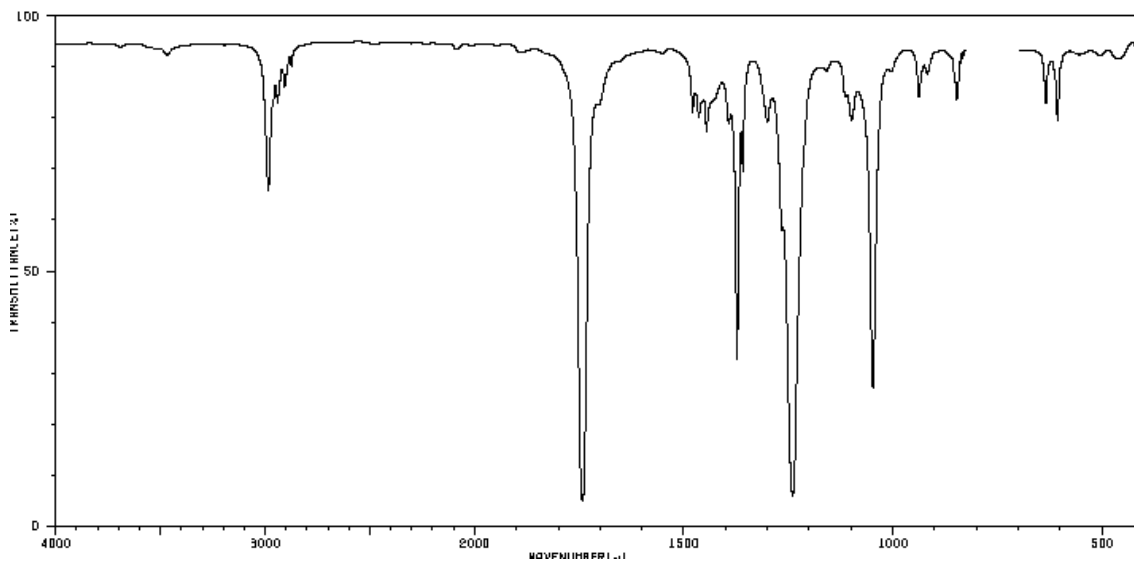
1. Choose from the list of compounds provided, and identify which compound gives each of the following IR spectra.



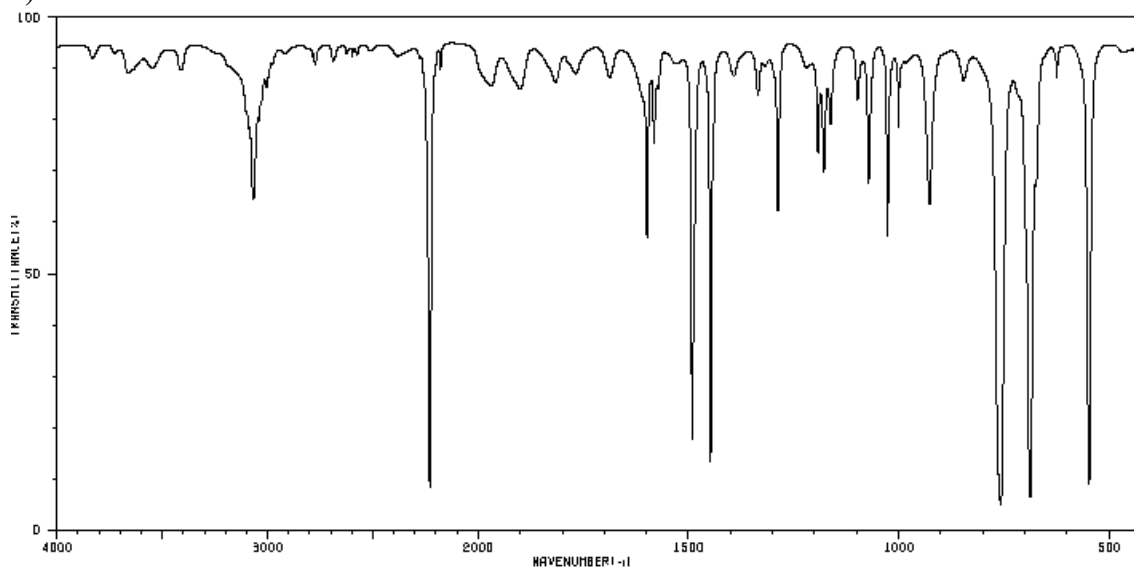
a)



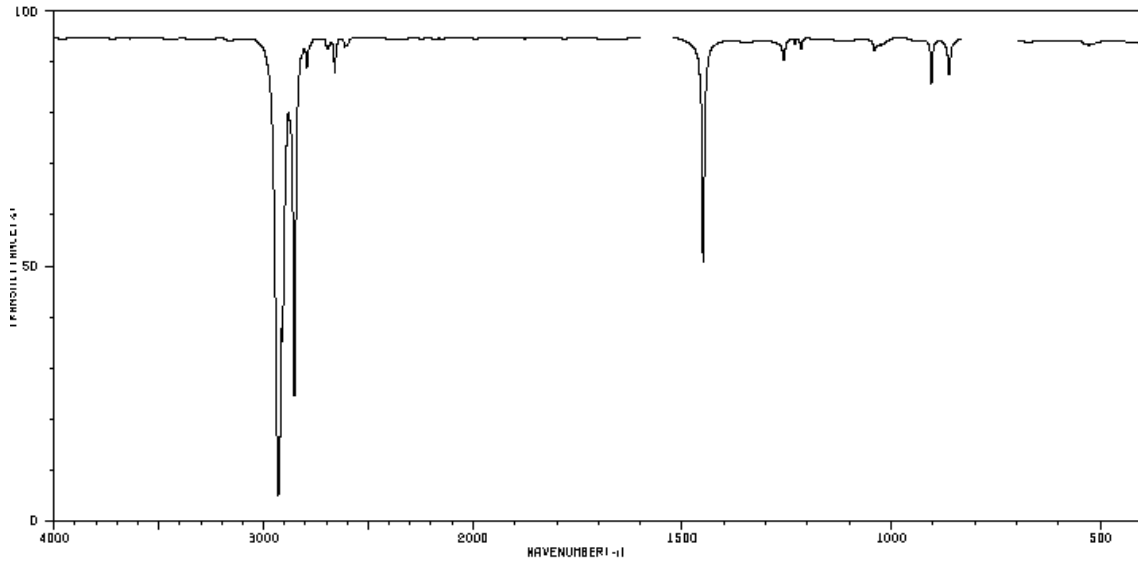
b)



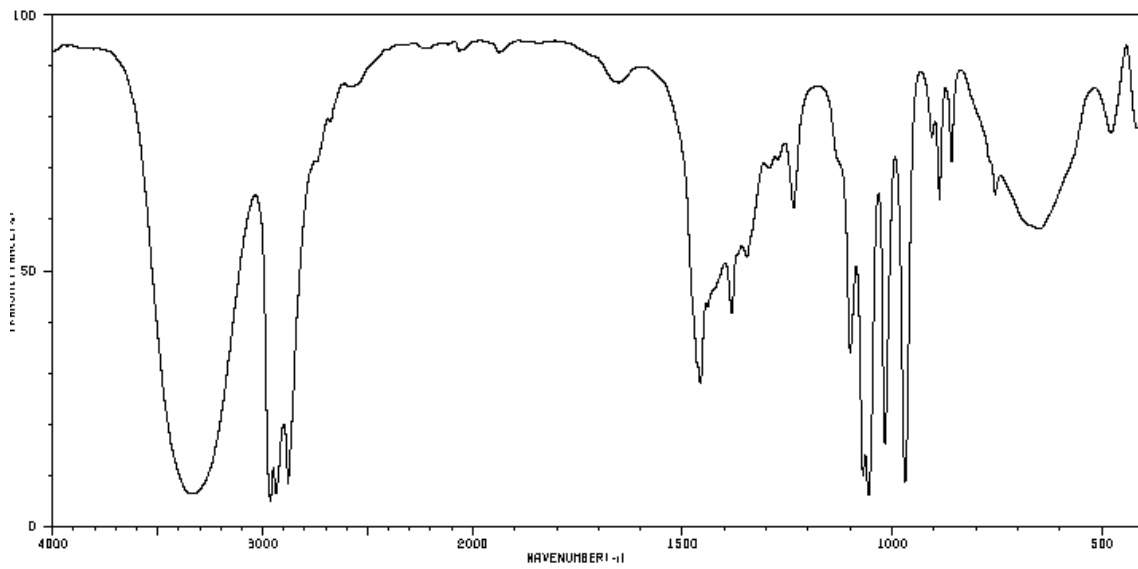
c)



d)

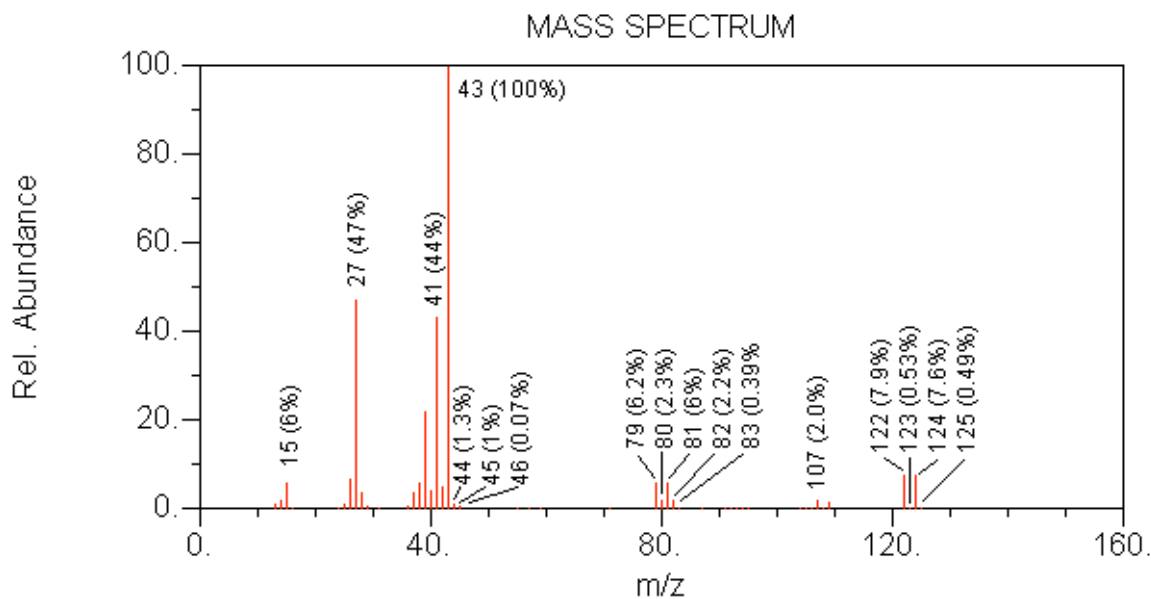


e)

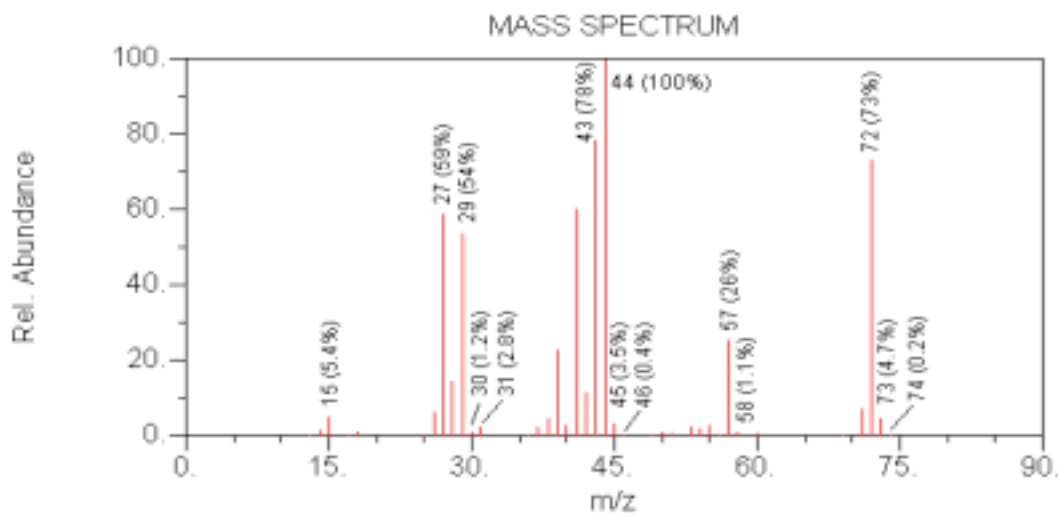


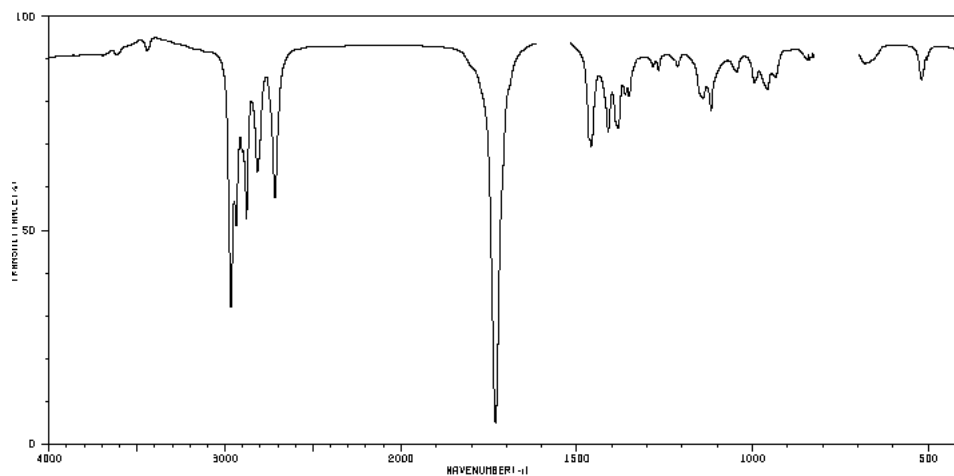
2. For each of the entries below, provide a compound that is consistent with the supplied data. *Note: in some instances, there may be more than one structure that is consistent.*

a) From just the mass spectrum:

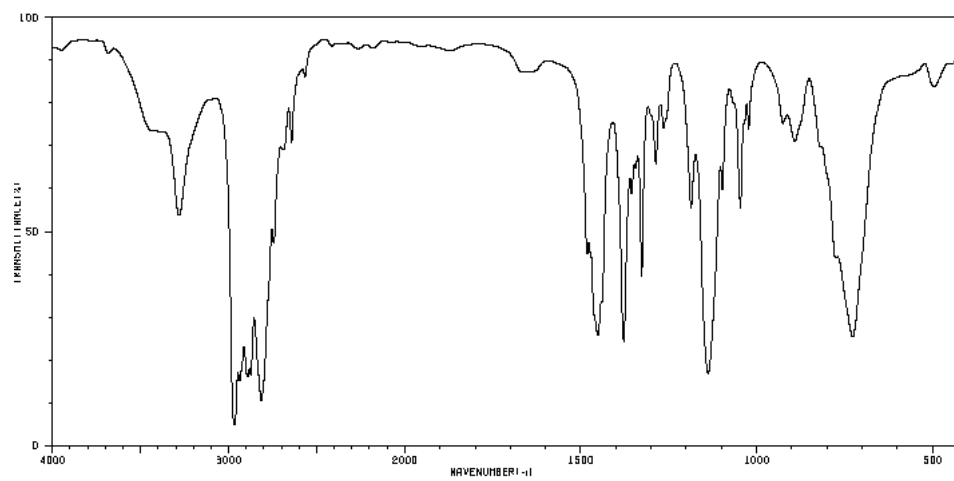
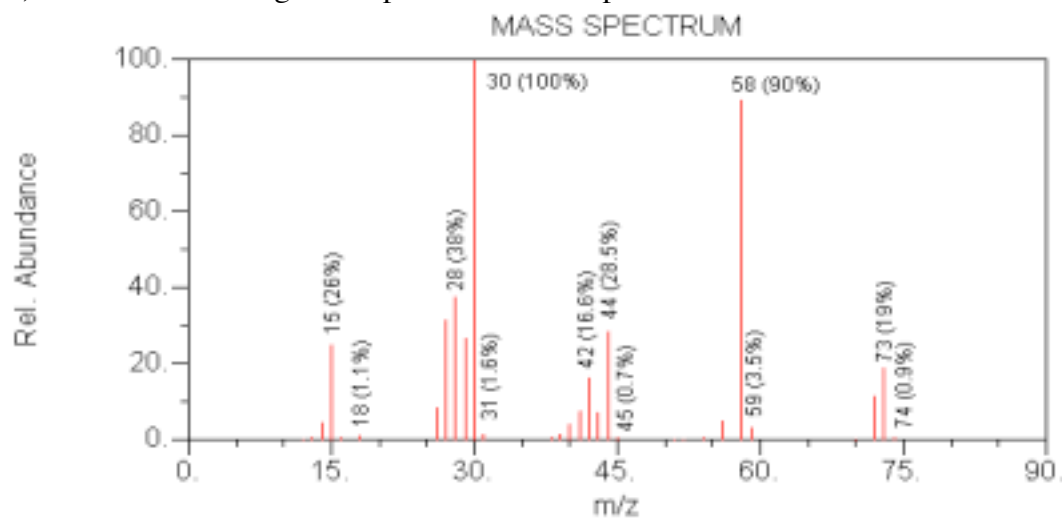


b) From the following mass spectrum and IR spectrum:

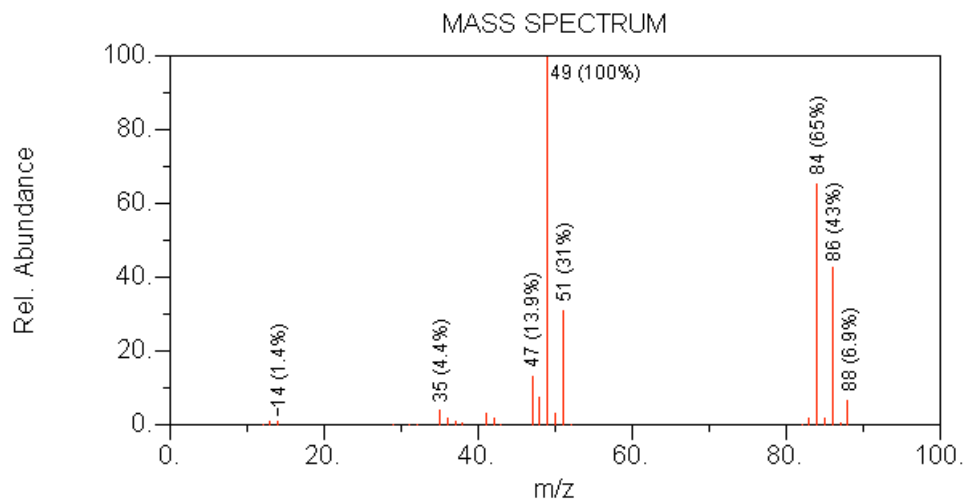




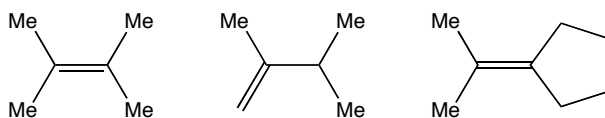
c) From the following mass spectrum and IR spectrum:



3. Given the following mass spectrum, can you identify the compound? *Hint: think isotope patterns!*



4. If you had samples of the following three compounds, how would you be able to tell them apart by using only IR spectroscopy? *Hint: think about symmetry, and types of C-C and C-H bond absorbances.*



5. The mass spectra of diisopropyl ketone and dicyclopropyl ketone are shown below.

- Identify the fragmentations that lead to each of the labeled signals.
- Why is the base peak profile different? (*i.e.* why is 43 [and not 71] the base peak for diisopropyl ketone, but the signal at 69 [and not 41] the base peak for dicyclopropyl ketone?)

