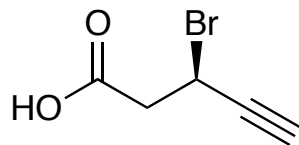
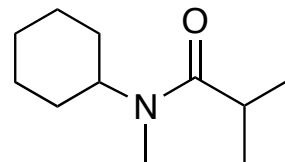


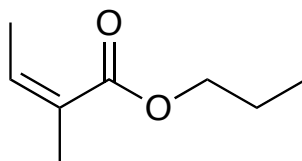
1. Provide an unambiguous name (IUPAC or common) for each of the following molecules. Be sure to indicate stereochemistry where appropriate. (12 points)



(R)-3-bromopent-4-ynoic acid

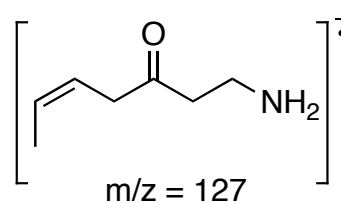
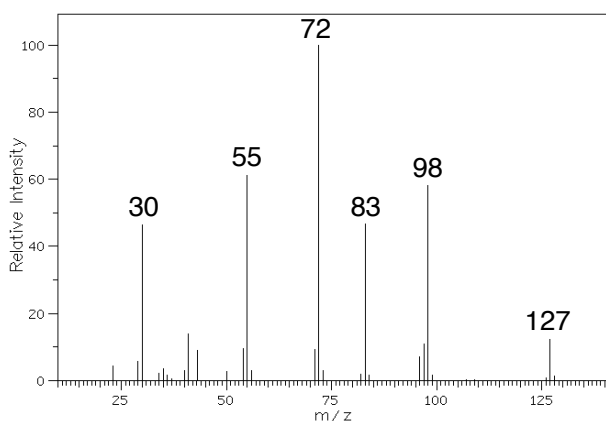


N-cyclohexyl-*N*,2-dimethylpropanamide

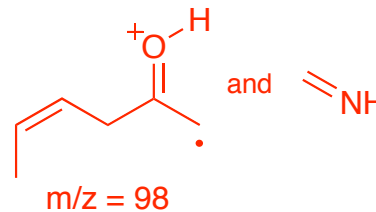


(Z)-propyl 2-methylbut-2-enoate

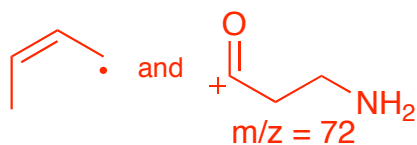
2. Provide structures for the fragments represented by the numbers 30, 55, 72, 83, and 98 in the spectrogram below (5 total). For full credit, you must also provide a structure for the uncharged fragment associated with each peak. (13 pts)



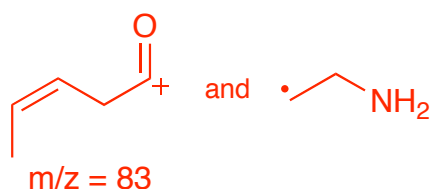
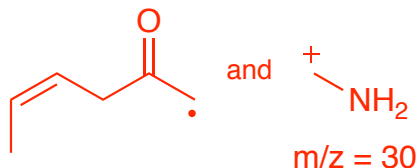
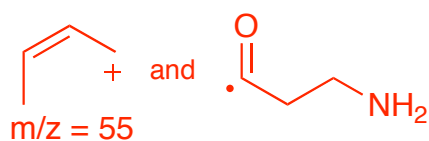
From a McLafferty Rearrangement



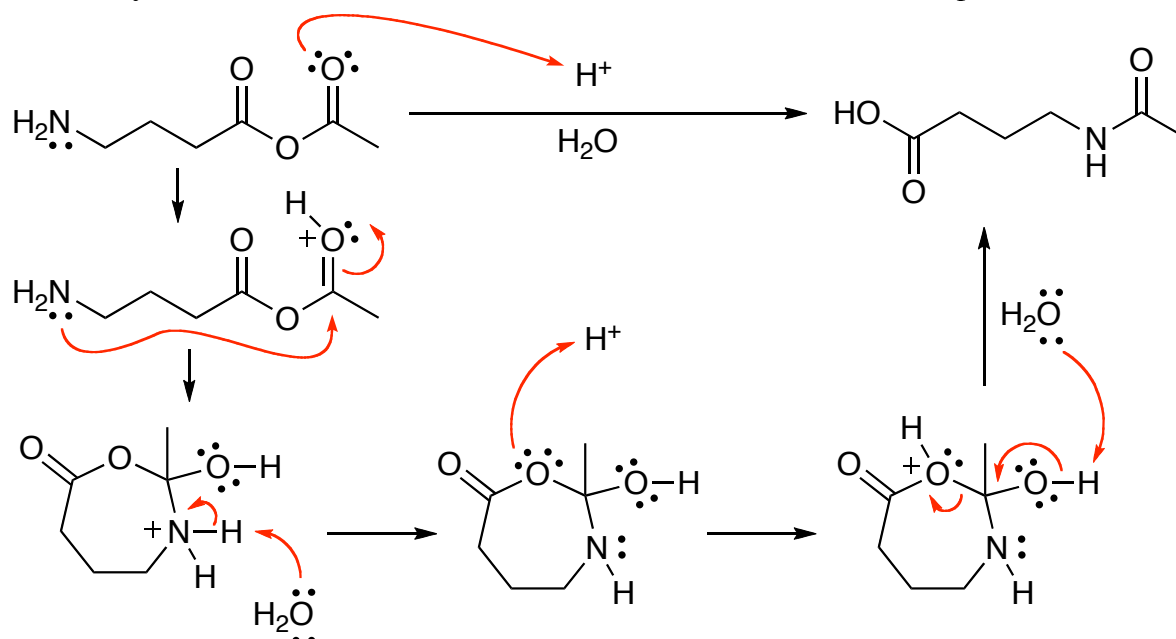
From α -cleavage



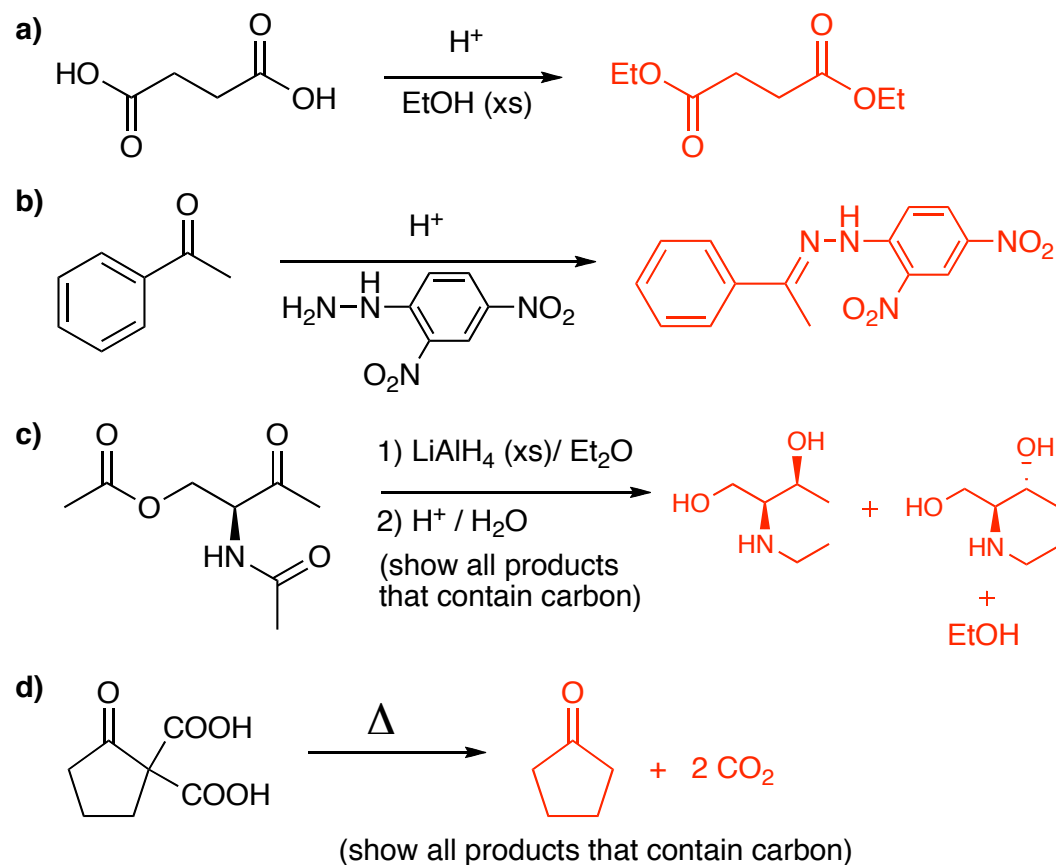
From β -cleavage of an amine



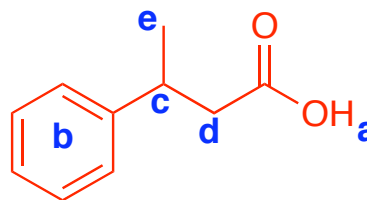
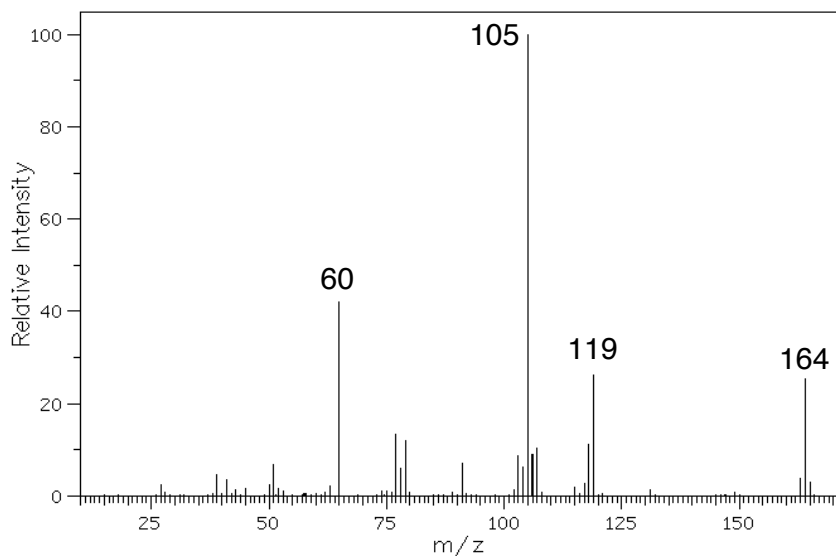
3. Provide a mechanism for the following reaction. Be sure to show all charges and lone pairs of electrons in your structures as well as the structures of all intermediates. (12 points)



4. Predict the *major* product for each of the following reactions. Circle your final answer. (24 points)

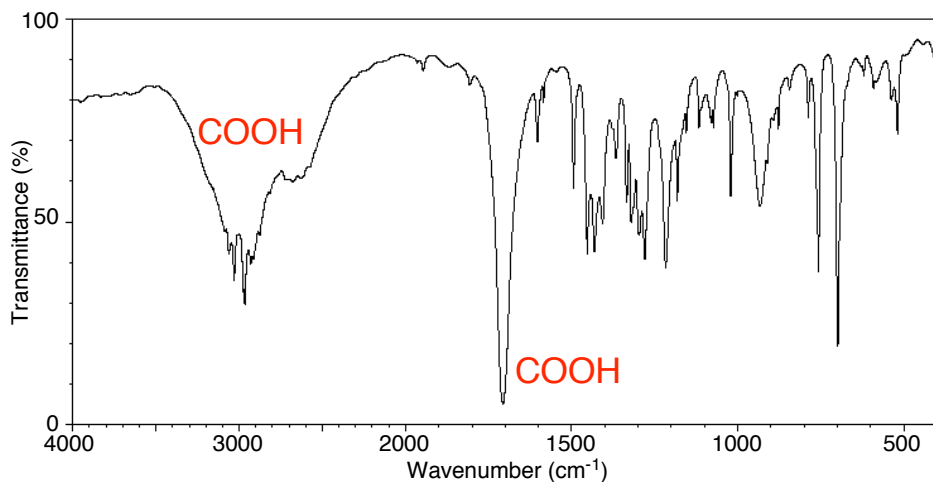
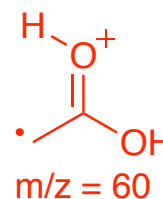
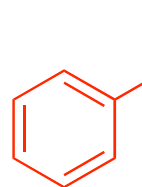


6. An unknown compound gives the following spectra. Provide a structure and make spectral assignments. Note: you must assign all the peaks in the MS and ^1H NMR for full credit. *Circle your final answer.* (12 points)

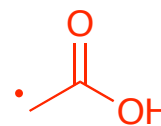
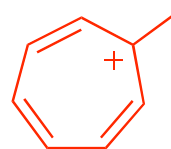


Chemical Formula: $\text{C}_{10}\text{H}_{12}\text{O}_2$

From McLafferty



Tropylium



alpha-cleavage (not sure why the pos charge goes to the left side fragment)

numbers next to peaks indicate integration

