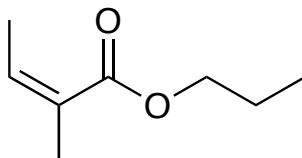
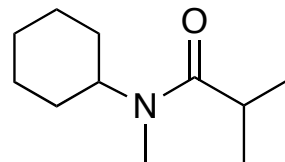
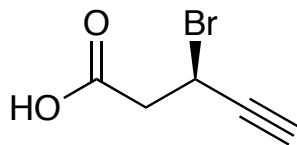
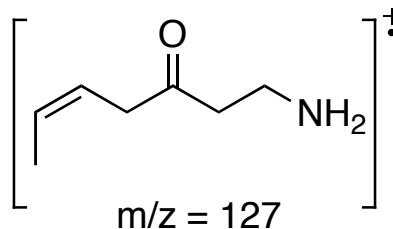
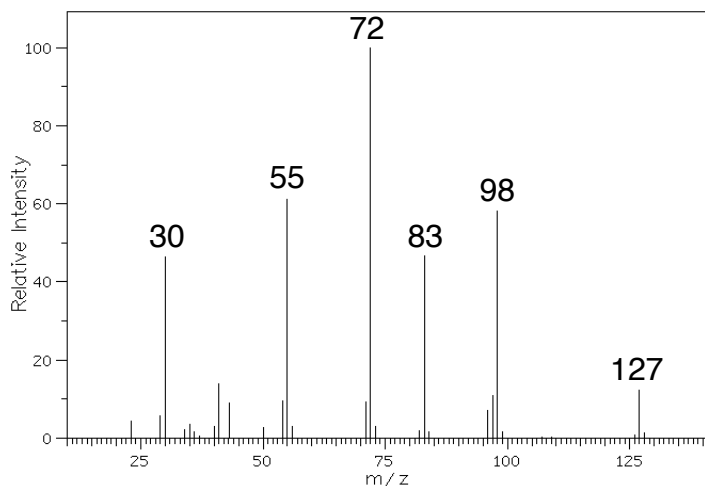


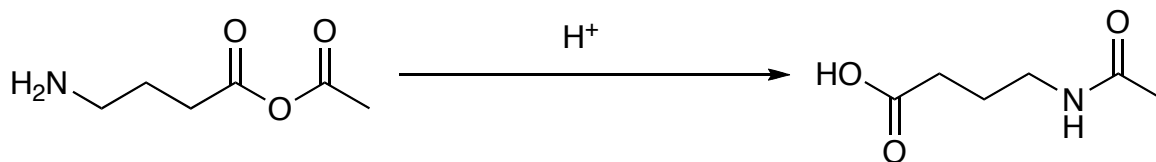
1. Provide an unambiguous name (IUPAC or common) for each of the following molecules. Be sure to indicate stereochemistry where appropriate. (12 points)



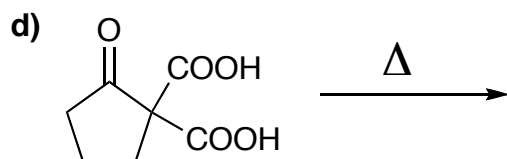
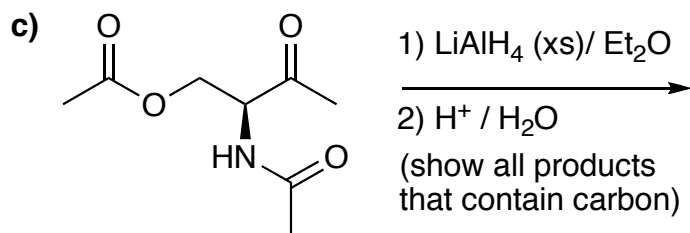
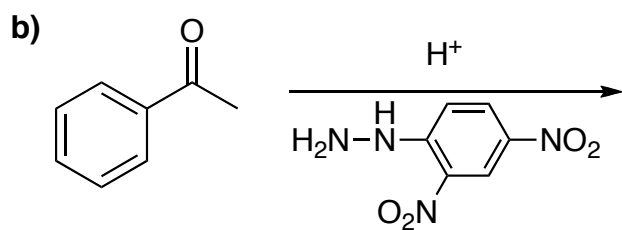
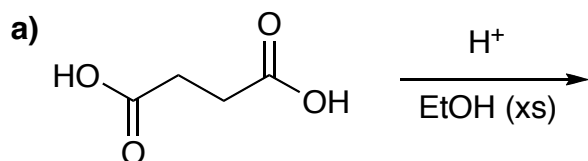
2. Provide structures for the fragments represented by the numbers 30, 55, 72, 83, and 98 in the spectrogram below (5 total). For full credit, you must *also provide a structure for the uncharged fragment* associated with each peak. (13 pts)



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)



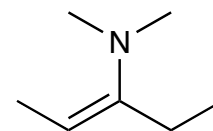
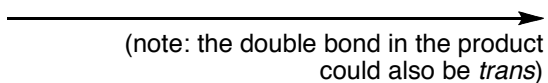
4. Predict the *major* product for each of the following reactions. *Circle your final answer.* (24 points)



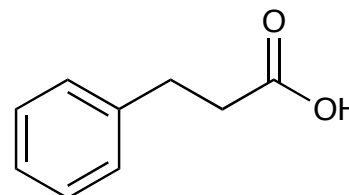
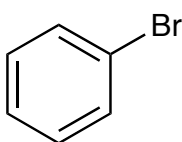
(show all products that contain carbon)

5. Provide syntheses for the following transformations. For full credit, be sure to draw all intermediary products along the way. (27 points)

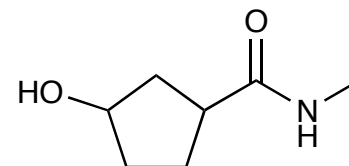
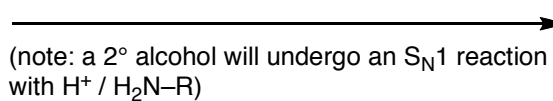
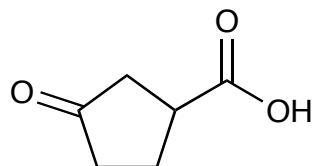
a) starting material and reagents that end up in your product must be 2 carbons or less



b)



c)



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)

