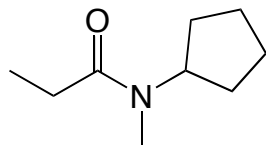
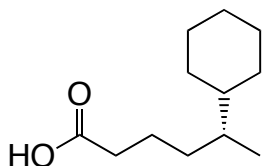


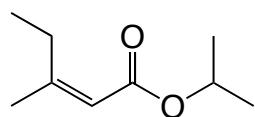
1. Provide an unambiguous name (IUPAC or common) for each of the following molecules. Be sure to indicate stereochemistry where appropriate. (9 points)



N-cyclopentyl-N-methylpropanamide

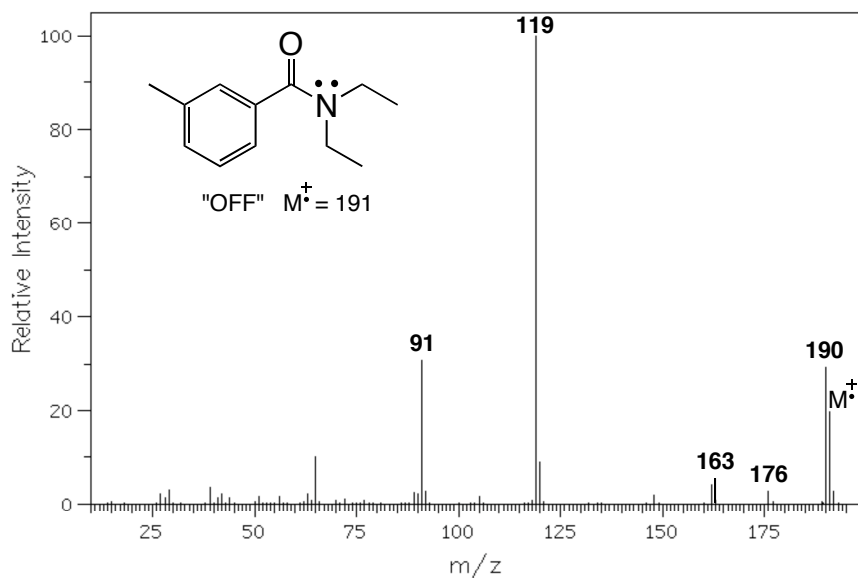


(R)-5-cyclohexylhexanoic acid

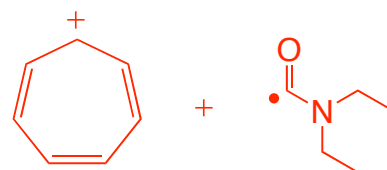


(Z)-isopropyl 3-methylpent-2-enoate

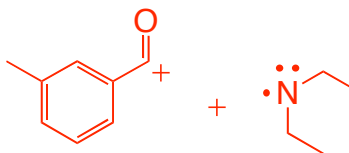
2. You will be synthesizing the insect repellent "OFF" in lab after spring break. Provide structures for the fragments represented by the numbers in the spectrogram below (5 total). For full credit, you must also provide a structure for the uncharged fragment associated with each peak. (12 pts)



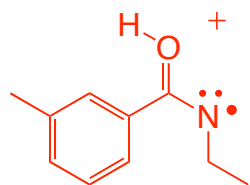
91



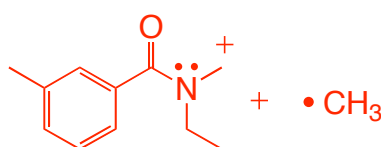
119



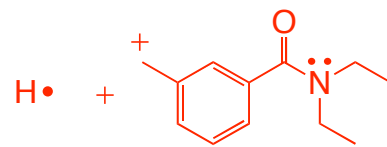
163



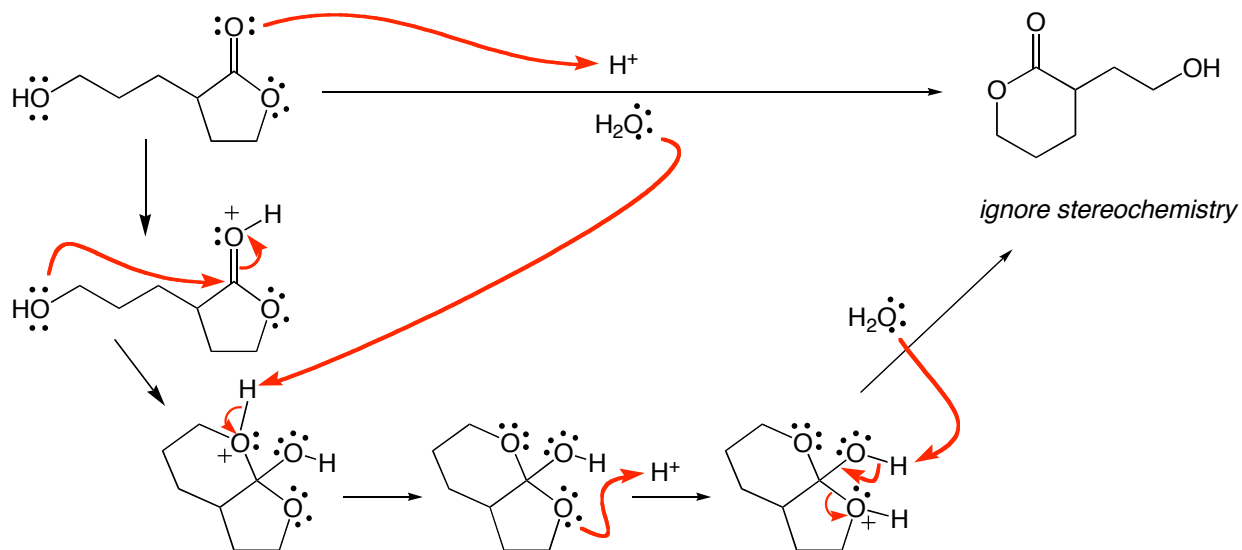
176



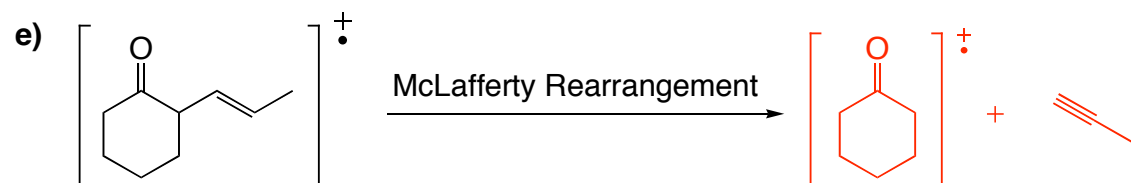
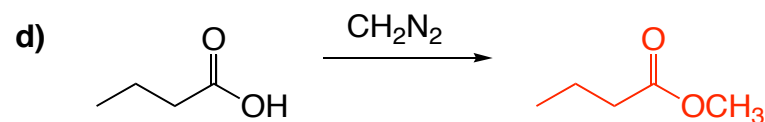
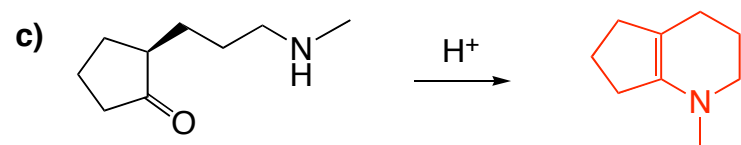
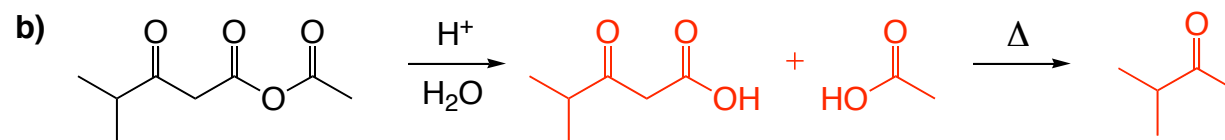
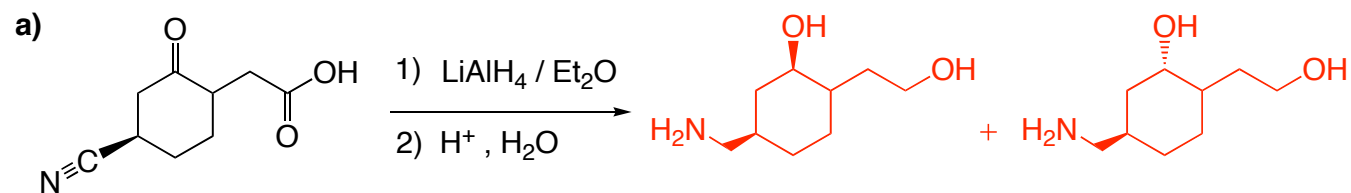
190



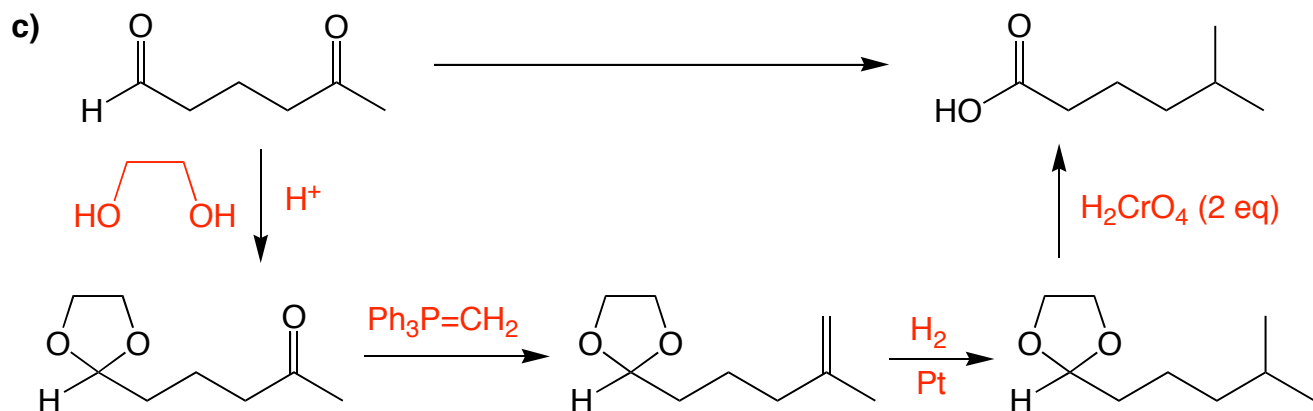
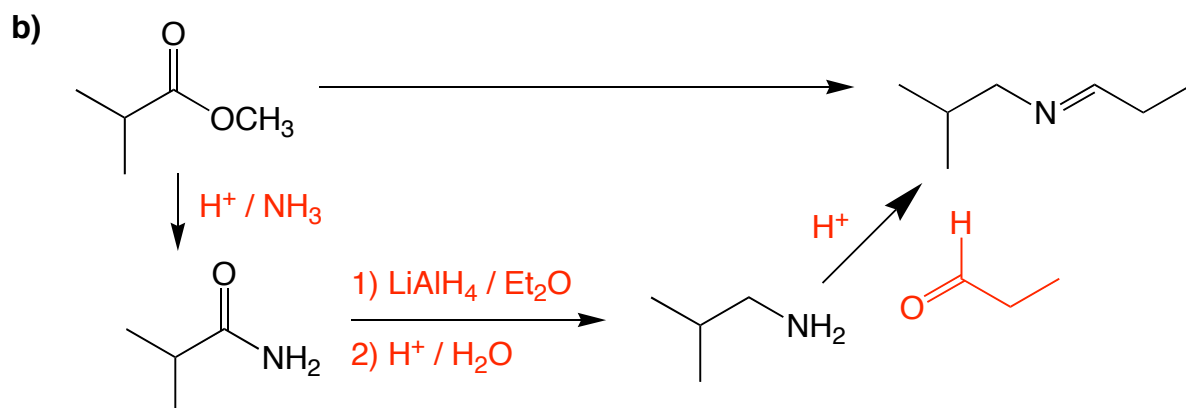
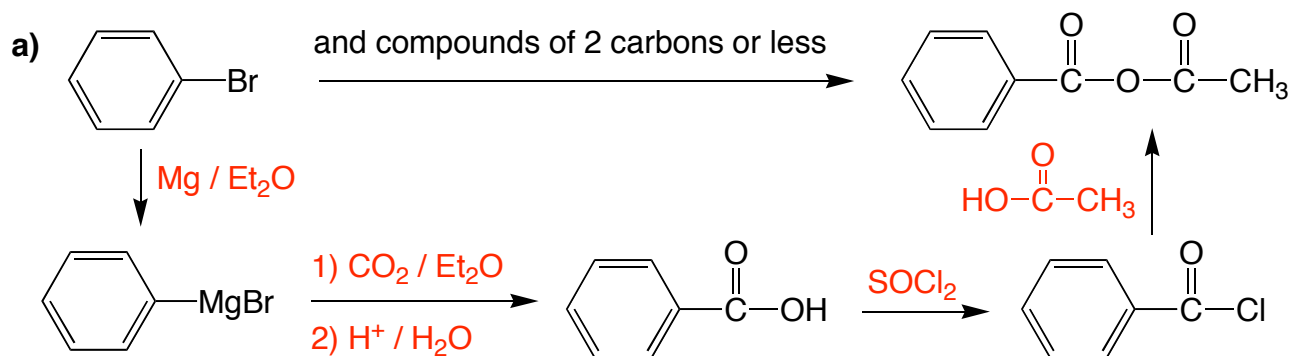
3. Provide a mechanism for the following reaction. Be sure to show all charges and lone pairs of electrons in your structures. Also provide the structures of all intermediates. (12 points)



4. Complete the following reactions by providing either the starting materials or products. If you provide more than one product, circle the major product(s). (26 points)



5. Provide syntheses for the following transformations. For full credit, be sure to draw all intermediary products along the way. (27 points) **Note: these are but one possible set of answers.**



6. A compound with the molecular formula $C_6H_{12}O$ gives the following spectra. Provide a structure and assign peaks in each spectrum for full credit. *Circle your answer.* (14 points)

