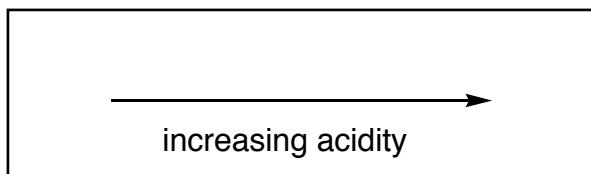
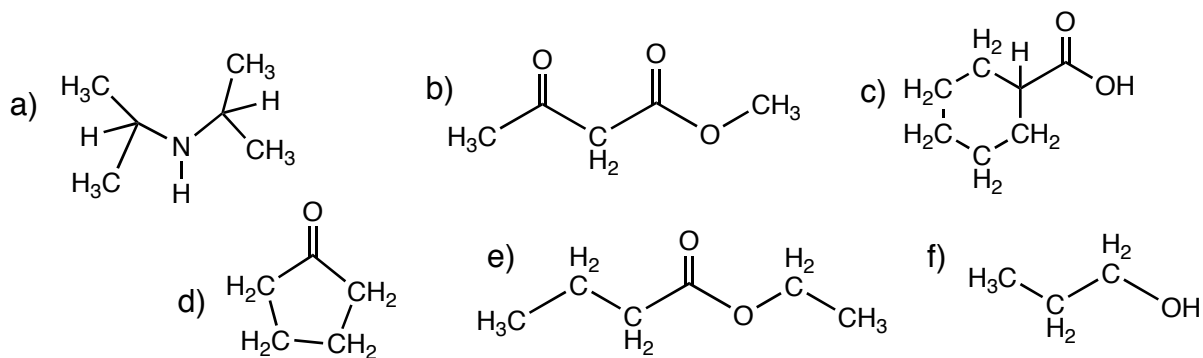


3. (12 points) Arrange the following molecules in order of increasing acidity and for each compound, circle the most acidic proton or set of equivalent protons.



4. (17 points) Compound A has the formula  $C_{12}H_{20}$  and is a meso compound. It reacts with  $H_2$  and Pd/C to give two diastereomers,  $B_1$  and  $B_2$ ,  $C_{12}H_{22}$ . Ozonolysis of A gives only C,  $C_6H_{10}O$ , which is racemic. Compound C shows a strong IR band at  $1745\text{ cm}^{-1}$  and reacts with hydroxylamine to give D,  $C_6H_{11}NO$ . When C is treated with DCl in  $D_2O$  for several hours and then analyzed by mass spectrometry, it is found to have a molecular weight of 102. The NMR spectrum of C shows that it has only one methyl group, which appears as a doublet at 1.3 ppm with  $J=6.5\text{ Hz}$ . Give structures for compounds A through D consistent with the data? Explain your reasoning.