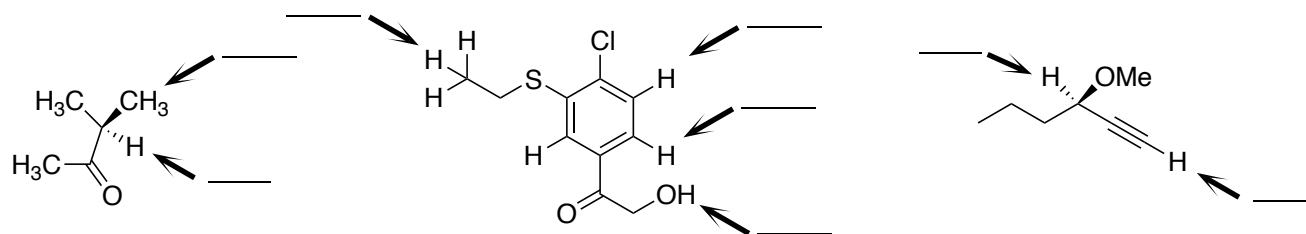
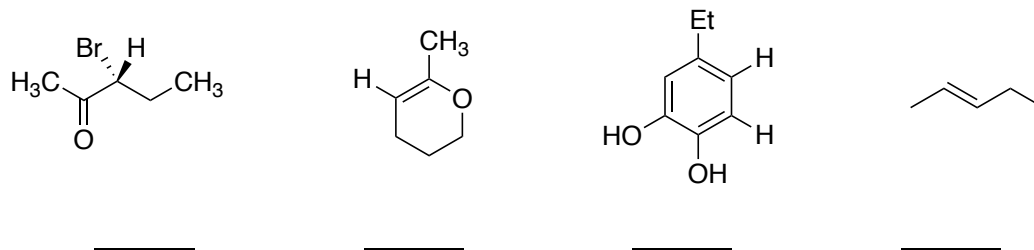


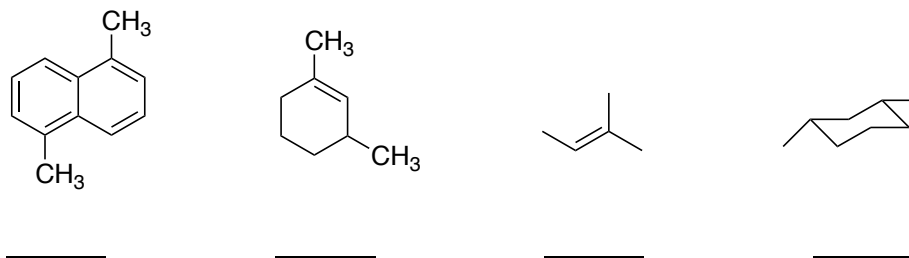
1. Predict the coupling/splitting pattern for the indicated hydrogen atoms. For non-equivalent hydrogens splitting the same proton, assume their coupling constants are different enough to result in complex splitting patterns.



2. Predict the number of signals that would be observed in the  $^1\text{H}$  NMR spectrum of each of the compounds below.



3. Predict the number of signals that would be observed in the  $^{13}\text{C}$  NMR spectrum of each of the compounds below.



4. Indicated the magnitude of the coupling constants for the following compounds.

