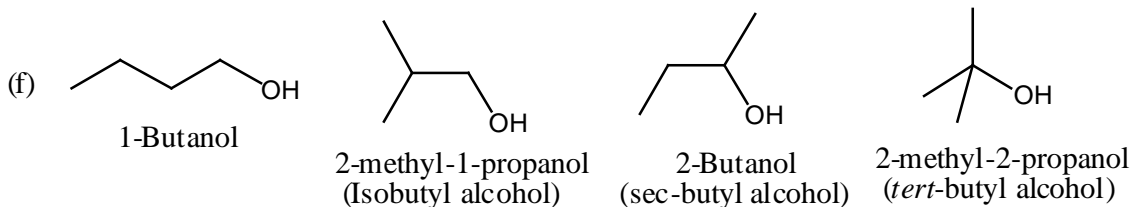
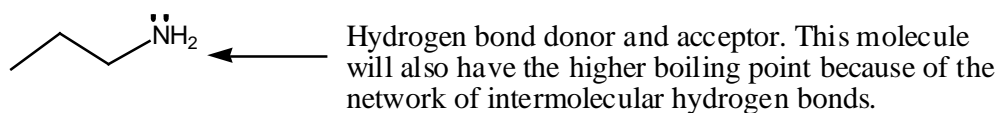
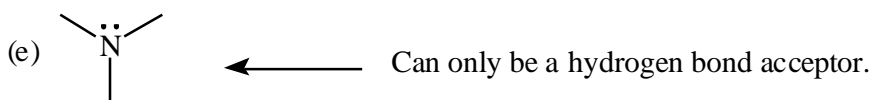
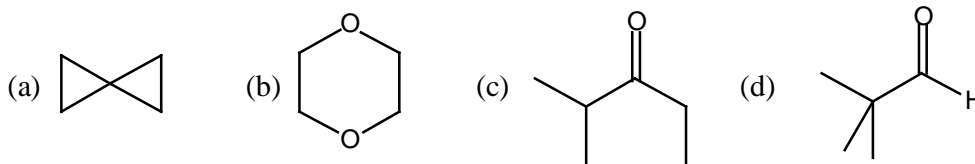
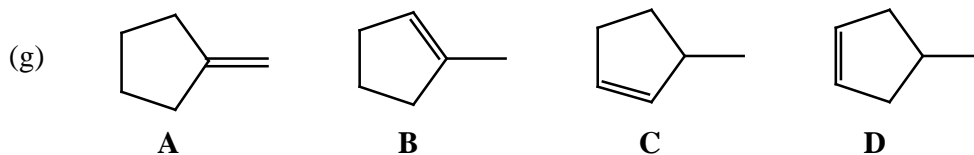


Answers to Problem Set #3
CH241-2001F

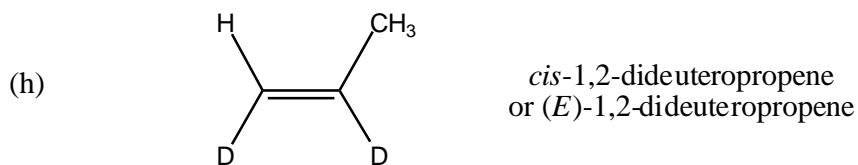
- [1] Some answers are given below. You might have other answers that are also right. Figuring out the degree of unsaturation from the molecular formula can be helpful in solving some of the structures.



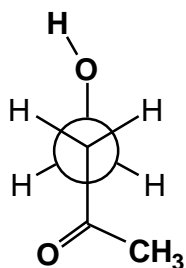
Hydrocarbons, which are held together by van der Waals forces, are nonpolar and typically do not dissolve in water. Hence the expression oil and water don't mix. This is because dissolving a hydrocarbon in water would necessitate that the hydrogen bonds in water be disrupted to accommodate the hydrocarbon. Thus, *tert*-butyl alcohol which has the most compact hydrocarbon chain among the four alcohols is the most water soluble. By contrast, 1-butanol that has an extended hydrocarbon chain is the least soluble.



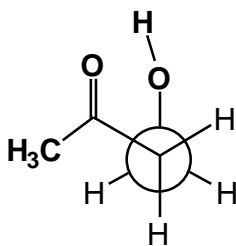
All of the above alkenes will give methylcyclopentane upon adding H_2 . The trisubstituted alkene **B** is the most stable among the four. Note that the other three are disubstituted.



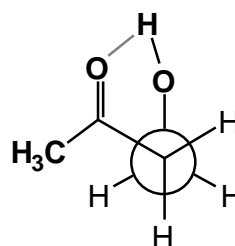
[2]



(a) Anti conformer



(b) Gauche conformer



(c) Gauche conformer is stabilized by internal hydrogen bonding.

[3] Same old idea, brand new situation! As the H begins to pop over, the C-H bonding orbital (which contains a pair of electrons) must overlap with the p orbital on the adjacent carbon. In the cation, the p orbital is empty so that a favorable interaction occurs between a filled orbital and an empty orbital. In the anion, the interaction would be between two filled orbitals which, as you know, is awful. These ideas are schematically shown below. Please learn to recognize such common patterns.

