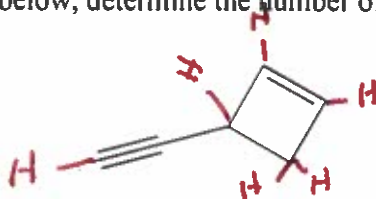
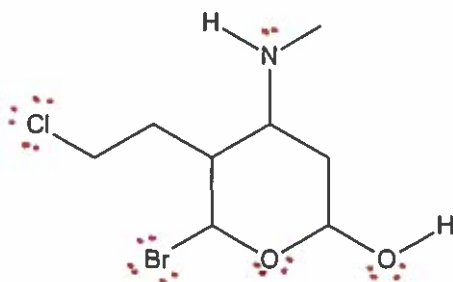


1. In the molecule below, determine the number of pi bonds and sigma bonds.



3- pi bonds
12- sigma bonds

2. How many lone pairs of electrons would there be in the following molecule?
3.

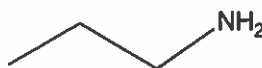


11 lone pairs

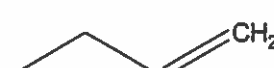
4. Which of the following compounds is most soluble in water? Which is least? Explain your answers in detail.



dipole-dipole



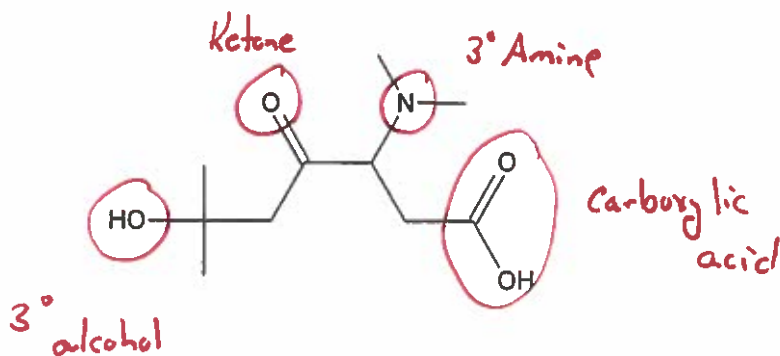
hydrogen bonding
most soluble



London Dispersion
least soluble

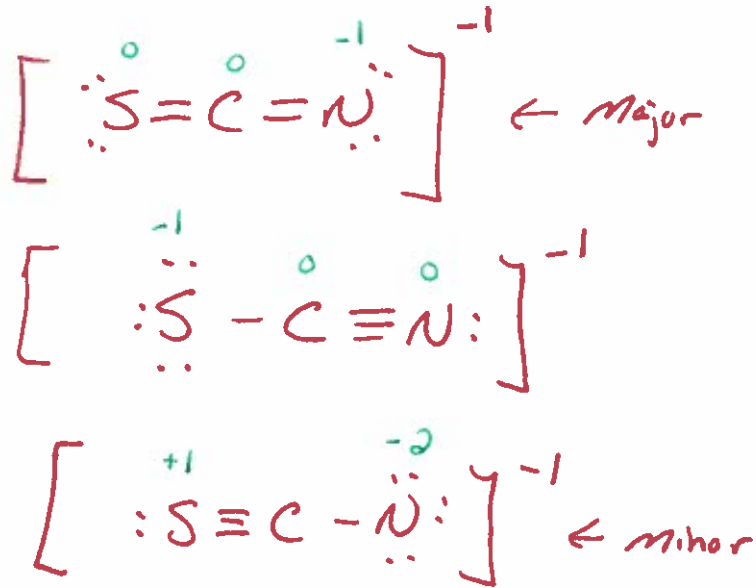
← Polar solvent

5. Circle and identify the functional groups in the following molecule. When appropriate, determine if functional group is primary, secondary or tertiary.

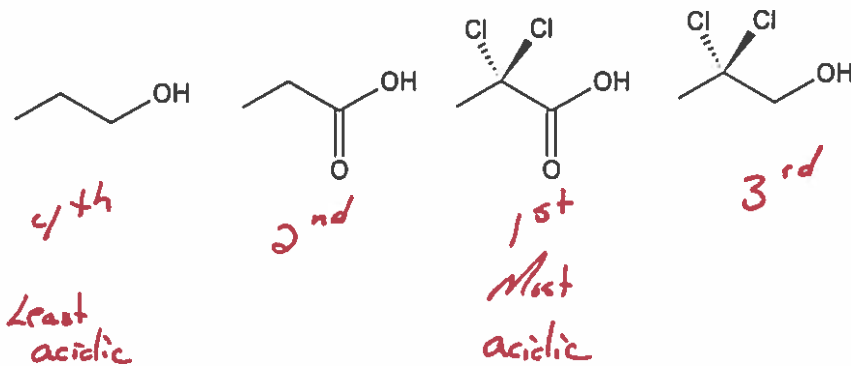


6. Draw all the resonance structures of SCN^- . Identify the major and minor contributors. Explain your reasoning in detail. The electronegativities are as follows: sulfur = 2.58; carbon = 2.55; nitrogen = 3.04, fluorine = 3.98

formal charge

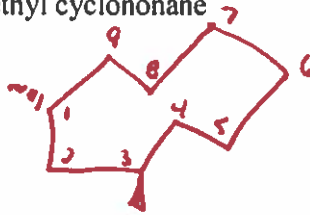


7. Arrange the following molecules from the least to most acidic.

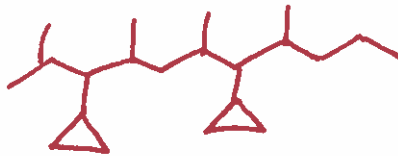


8. Draw all the following compounds.

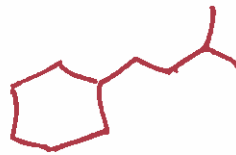
a) *trans*-1,3-dimethyl cyclononane



b) 3,7-dicyclopropyl-2,4,6,8-tetramethyl undecane



c) isopentyl cyclohexane



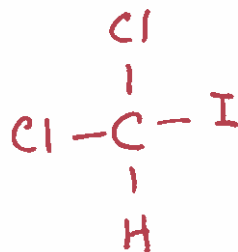
d) 5-(1,1,2-trimethyl propyl) decane



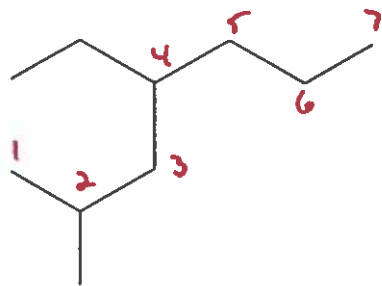
e) 5-*tert*-butyl-3-methyl octane



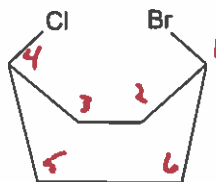
f) dichloriodomethane



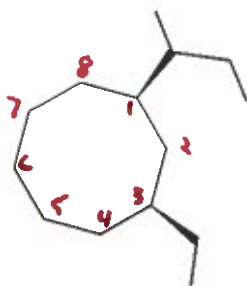
9. Name the following organic compounds.



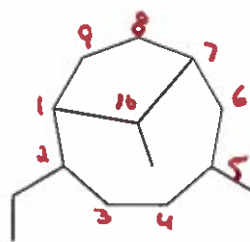
4-ethyl-2-methyl heptane



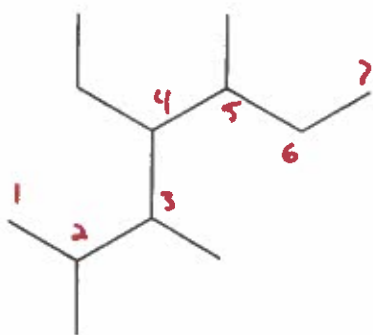
Cis-1-bromo-4-chloro
cyclohexane



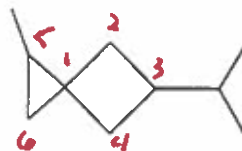
Cis-1-sec-butyl-3-ethyl
cyclooctane



2-ethyl-5,10-dimethyl
bicyclo [5.2.1] decane

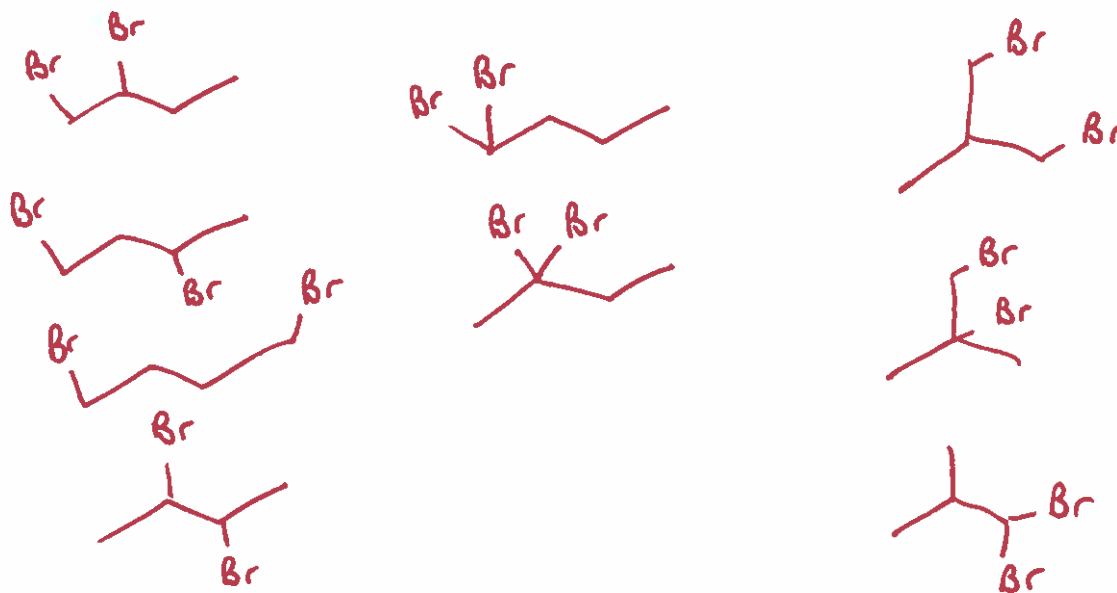


4-ethyl-2,3,5-trimethyl
heptane

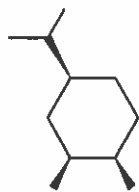


3-isopropyl-5-methyl-
spiro [3.2] hexane

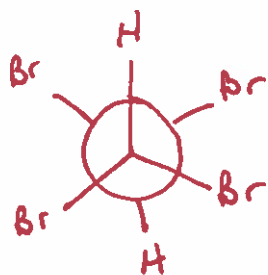
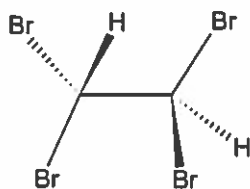
10. Draw all possible constitutional isomers of $C_4H_8Br_2$.



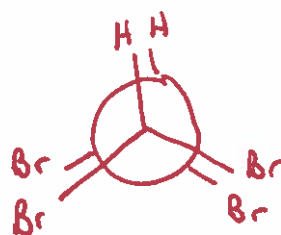
11. Draw the molecule below in the lowest energy state using the appropriate boat or chair conformer.



12. Draw the Newman projection, looking down the carbon-carbon bond, of the highest and lowest energy state conformers of the following molecule.



lowest



highest