

CHM2210

Exam One Study Sheet

The following topics are considered 'fair game' for the first exam. You will want to review your quizzes, homework, recommended problems, and class notes.

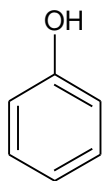
- Lewis structures
 - Formal charges
- Valence and core electrons
- Covalent bonding
 - Polar covalent bonds
- Molecular orbitals and hybridization
 - Sigma and Pi bonds
- Acid dissociation constants (K_a)
 - Trends
 - Inductive
 - Delocalized electrons
 - Equilibrium effects
 - Favored species at equilibrium
- Henderson Hasselbach Equation (will be given)
- Nomenclature
 - Alkanes
 - Alkyl Halides
 - Cycloalkanes
 - Amines
 - Alcohols
 - Ethers
- Boiling Point
 - Trends
- Newman Projections for single bond rotation
- Cyclohexane conformers

Sample Questions: The following questions are examples of test questions.

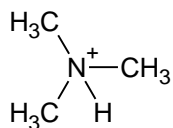
1. Draw both conformers and determine which is more stable for each of the following:
 - a. *cis*-1-ethyl-3-methylcyclohexane
 - b. *trans*-1-ethyl-2-isopropylcyclohexane
2. Draw skeletal structures for the following:
 - a. 2-methyl-4-(1-methylethyl)octane
 - b. 3-ethoxy-2-heptane
 - c. 4-(1,1-dimethylethyl)heptane
 - d. Isohexyl alcohol
 - e. N-ethyl-2-butanamine

3. Consider the C2-C3 bond in n-pentane:
 - a. Draw a Newman projection for the molecule.
 - b. Show its most unstable conformation.
 - c. Show its most stable conformation.
 - d. Show one gauche conformation.

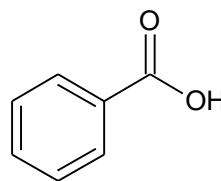
4. You are given a mixture of the following compounds with their pKa's shown beneath them:



pKa = 10.0



pKa = 10.6



pKa = 4.2

Using ether, water, acid, and base, draw a flowchart that will separate each of these compounds from the mixture.

5. What is the best possible Lewis Structure for NOF. Justify your structure with formal charges for each atom. (HINT: You have the freedom to decide what the central atom is.)