CHE 171
Fall, 2005
Specific Objectives for Quiz 3

1. Know the three types of alkanes we discussed in class: straight chain, branched and cyclic and they're corresponding empirical molecular formulas.

2. Be able to classify carbon atoms as 1°, 2°, 3°, or 4°; be able to classify hydrogen atoms as 1°, 2°, or 3°.

3. Know the IUPAC names for the straight chain alkanes with 1 to 11 carbon atoms (and the corresponding alkyl groups, e.g. methyl, ethyl, propyl, etc.).

4. Be able to name all kinds of alkanes using the IUPAC system.

5. Know the following common names: isopropyl, tert-butyl, sec-butyl.

6. Understand the trends associated with physical properties of alkanes (BP, MP, solubility).

7. Be able to draw and interpret Newman projections sighting down particular bonds of a molecule.

8. Be able to draw a diagram of and explain the energetics associated with rotation around σ bonds of a molecule (butane and other straight-chain or branched alkanes, for example).

9. Understand and be able to explain or define the following terms as they apply to conformational analysis: staggered, eclipsed, anti, gauche, torsional strain, steric strain, angle strain, energy barrier, "ring flipping," puckered, chair, boat.

10. Be able to accurately draw cyclohexane chair conformations with axial and equatorial substituents, and assess the relative energies of these. Understand why the cyclohexane chair conformation is so stable (low in energy).

11. Understand the differences between *cis* and *trans* isomers of di-substituted ring systems.

12. Be able to draw and understand the conformational analysis associated with di-substituted cyclohexanes [*cis*- or *trans*-(1,2); *cis*- or *trans*-(1,3); *cis*- or *trans*-(1,4)].