

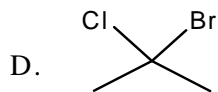
Chem 233: Problem Set #4 (on Chapter 4)

1. Name or draw structures for the following compounds. (Where appropriate, give both common and IUPAC names and show or label cis/trans stereochemistry.)

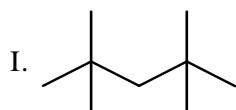
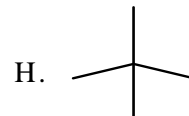
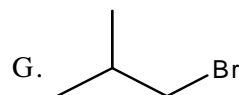
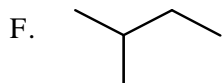
A. chloromethane

B. CH_2Br_2

C. methylene iodide

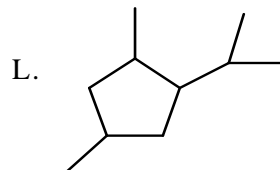


E. 1-chloro-2-ethylcyclobutane

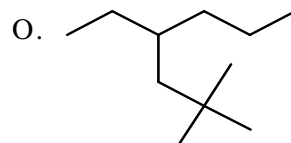
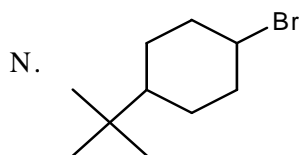


J. 4-ethyl-4-methylheptane

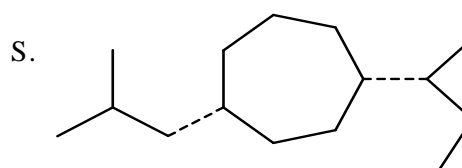
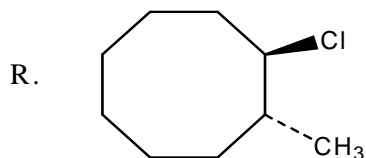
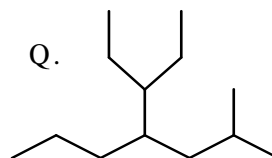
K. 2, 6-dimethyl-4-propyloctane



M. chloroform

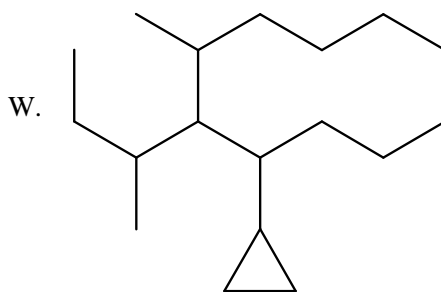
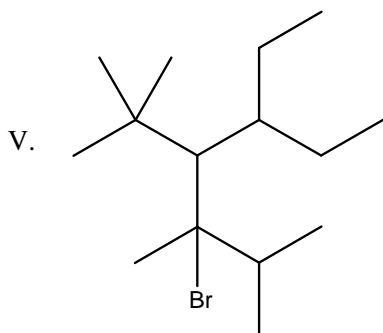


P. 4-chloro-5-isopropyl-6-methylnonane

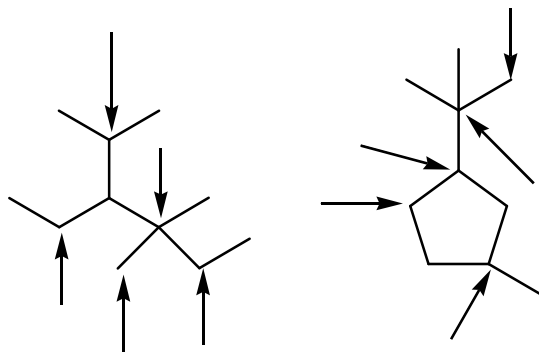


T. *cis*-1,3-diethylcyclohexane

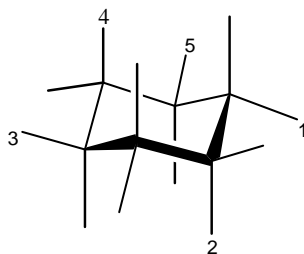
U. *trans*-1-methyl-2-propylcyclobutane



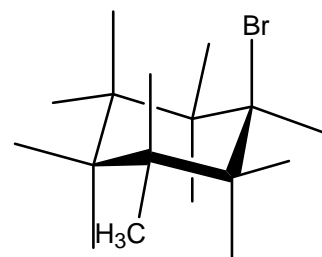
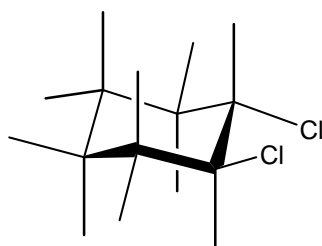
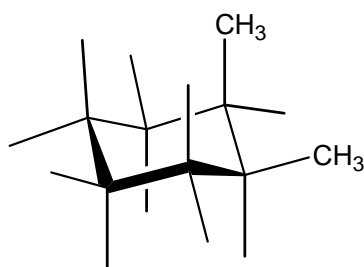
2. Classify the labeled carbons as primary, secondary, tertiary, or quaternary.



3. Consider the alkane 2,3-dimethylbutane.
 A. Draw a structural formula for 2,3-dimethylbutane.
 B. Focusing on the C2-C3 bond, draw Newman projections for all possible staggered and eclipsed conformations. Rank the conformations in order of decreasing stability.
4. Consider the alkane 3-methylpentane.
 A. Draw a structural formula for 3-methylpentane.
 B. Focusing on the C2-C3 bond, draw Newman projections for all possible staggered and eclipsed conformations. Rank the conformations in order of decreasing stability.
5. Label the numbered positions as axial or equatorial.



6. Label the following as cis or trans:



7. Draw both chair conformations for each of the following cyclohexanes. Indicate which chair conformation is more stable and why.

A. bromocyclohexane

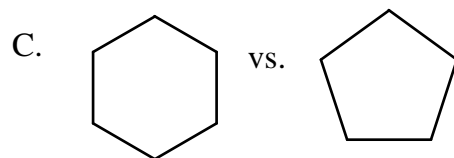
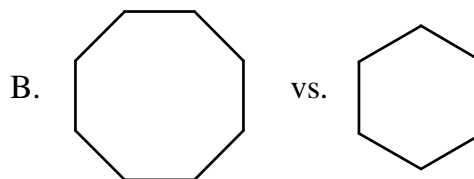
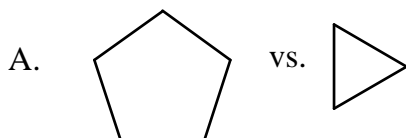
B. *cis*-1,2-dibromocyclohexane

C. *trans*-1,2-dibromocyclohexane

D. *cis*-1-bromo-3-methylcyclohexane

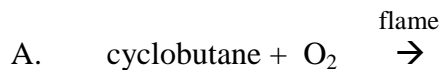
E. *trans*-1-isopropyl-3-methylcyclohexane

8. In each of the following pairs, which flat (or planar) cycloalkane has the higher amount of angle strain? torsional strain?



9. When puckered to the most stable conformation, which cycloalkane of each pair in question #8 has the least amount of ring strain (i.e. which is most stable)?

10. Alkanes undergo very few reactions. In fact, combustion is one of the few reactions that alkanes undergo. Predict products and write balanced equations for each combustion reaction shown below.



11. Classify each transformation as an oxidation, reduction or neither.

