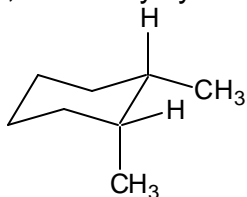


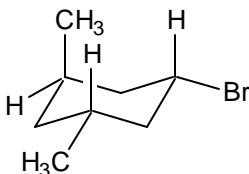
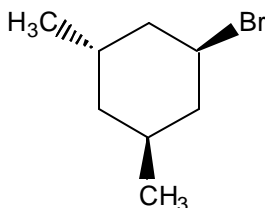
CHE 230-001 – Organic Chemistry
Exam 2, October 18, 2006

1. (2x5=10) Draw the lowest energy chair conformation for each of the following. To get full credit you must draw the chair conformation and substituent bond angles clearly and well.

a) *cis*-1,2-dimethylcyclohexane



b)

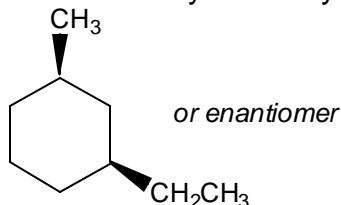


2. (4+5+3=12)

a) How many configurational stereoisomers exist for 1-ethyl-3-methylcyclohexane?

__four__

b) Use wedged bonds (solid or hashed) on the ring below draw the most stable stereoisomer of 1-ethyl-3-methylcyclohexane.

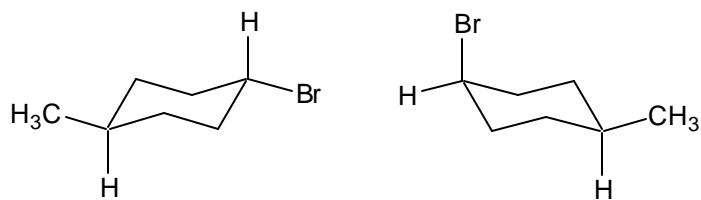


c) Is the isomer you drew the *cis*- or the *trans*-isomer? __cis__

If you mistakenly drew the wrong answer for part (b) you could get credit in part (c) for an answer that is consistent with part (b).

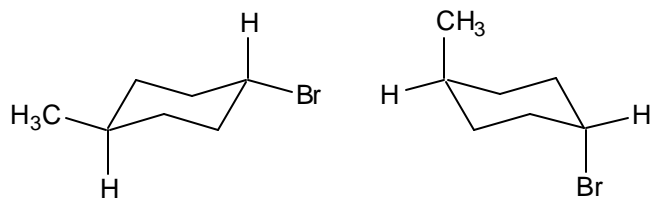
3. (3x4=12) Use one of the following terms to describe the relationship between the two compounds in each pair below: *identical*, *structural isomers*, *conformational enantiomers*, *conformational diastereomers*, *configurational enantiomers*, *configurational diastereomers*.

a)



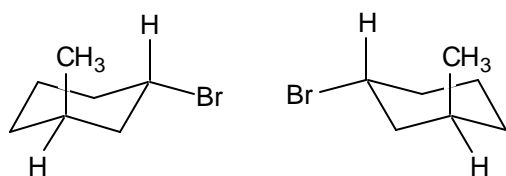
_ *configurational diastereomers* _

b)



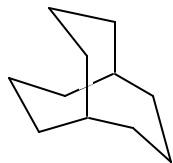
_ *conformational diastereomers* _

c)



_ *configurational enantiomers* _

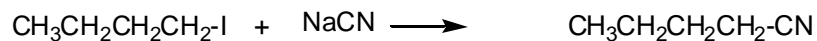
4. (6) Write the correct name for:



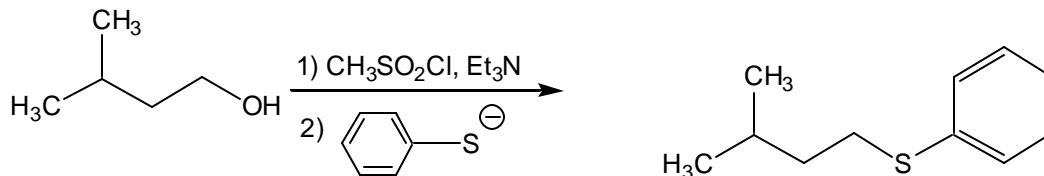
_ *bicyclo[3.3.3]undecane* _

5. (4x5=20) Write the major organic product of each substitution reaction. Where stereochemistry is shown in the reactant, the correct stereochemistry should be shown in the product.

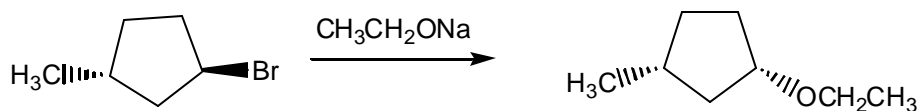
a)



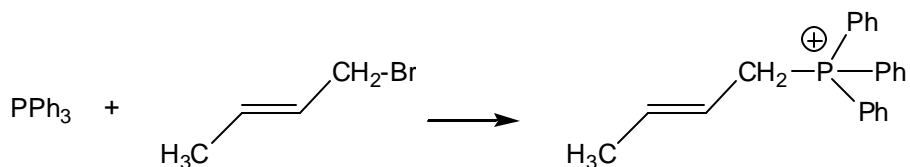
b)



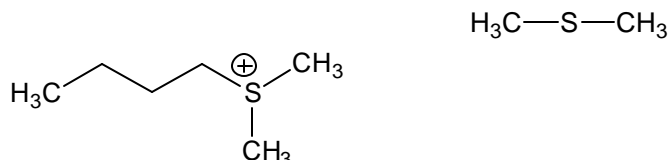
c)



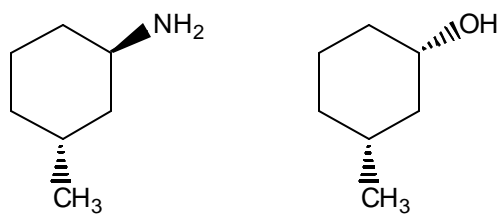
d)



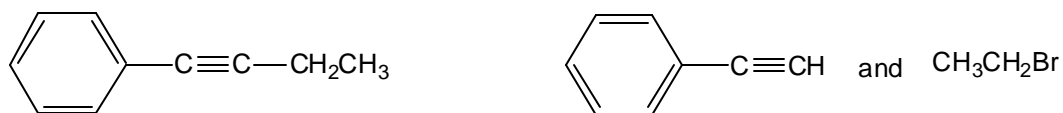
6. (5) What nucleophile could be used to react with butyl bromide (1-bromobutane) to prepare the following compound?



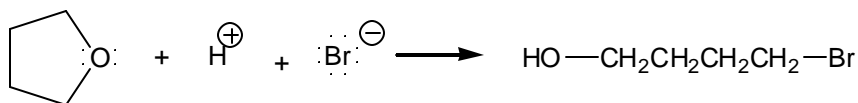
7. (6) An alcohol is converted to its tosylate and then allowed to react with a nucleophile to give the following compound. Draw the starting alcohol (and show its stereochemistry with wedged bonds).

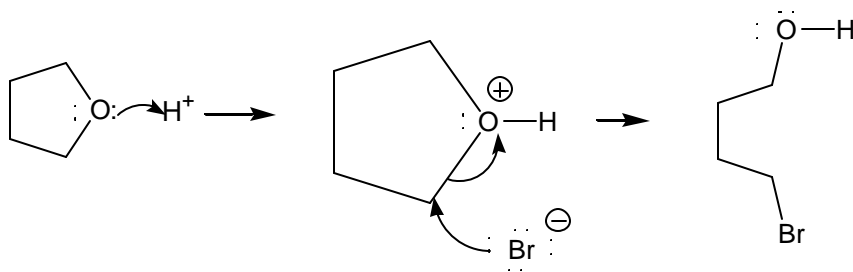


8. (6) Draw a simpler alkyne and an alkyl bromide that could be combined to give the alkyne shown.



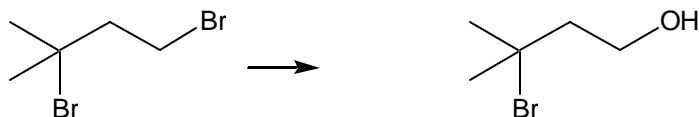
9. (6) Write the mechanism for the following reaction using the arrow formalism.





10. (2x4=8) Each of the following molecules contains two different kinds of halogen. Draw the product in each case if only the more reactive of the two halogens is replaced by OH in an S_N2 reaction.

a)



b)



11. (3x3=9) Circle the stronger base in each pair. Assume that basicity is measured in a polar, protic solvent.

Acidity measurements are reported as K_a values, which are measured in water, a polar protic solvent. Acidity increases to the right in a row of the periodic table and increases going down in a column of the periodic table. Solvent effects on acidities were never discussed. Basicity trends are the reverse of acidity trends. The trends for nucleophilicities may be different from those of basicities and in some instances depend on the nature of the solvent.

