

Name KEY

Please print your name & circle last name

Chemistry 331 A (Dr. BARTON)

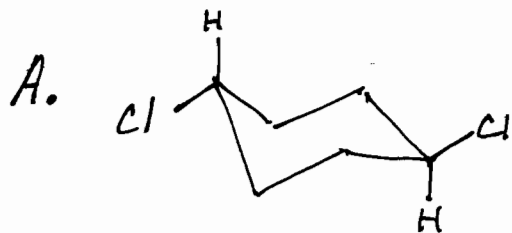
Exam I

Wednesday, September 17, 2008

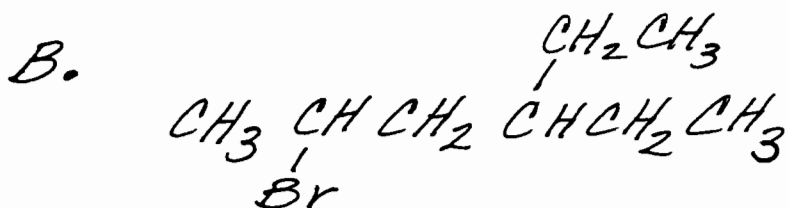
<u>I.</u> (9 pts)	_____
<u>II.</u> (12 pts)	_____
<u>III.</u> (20 pts)	_____
<u>IV.</u> (9 pts)	_____
<u>V.</u> (9 pts)	_____
<u>VI.</u> (5 pts)	_____
<u>VII.</u> (5 pts)	_____
<u>VIII.</u> (20 pts)	_____
<u>IX.</u> (10 pts.)	_____
<u>X.</u> (1 pt)	_____

TOTAL (100 pts) _____

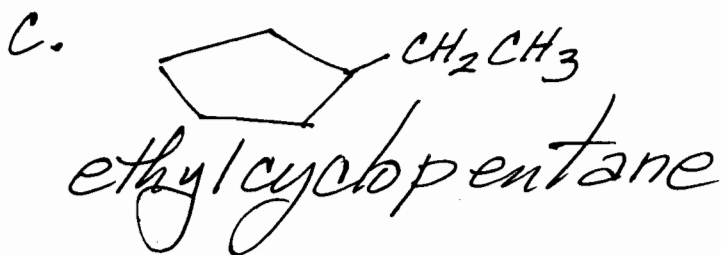
I. (9 pts.) Provide a complete and proper name for each of the following structures.



trans-1,4-dichlorocyclohexane

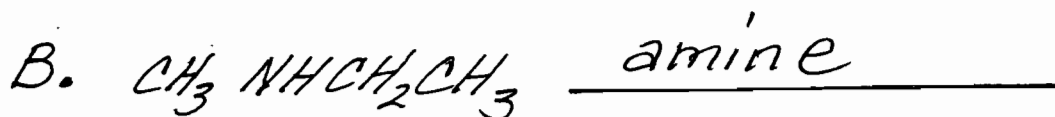


2-bromo-4-ethylhexane



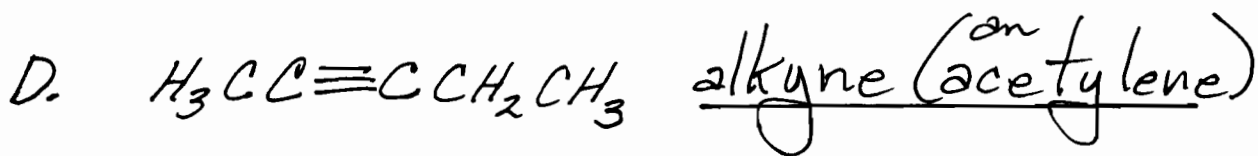
ethylcyclopentane

II. (12 pts.) Based on their functionalities, state the type of each compound listed here.





alcohol

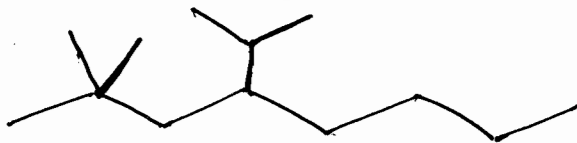


III. (20 pts.) A covalent bond is formed through sharing of electrons. The carbons in an alkane are sp^3 hybridized, while the carbons in acetylene (ethyne) are sp hybridized and those in ethylene (ethene) are sp^2 hybridized. The proton (H^+) is a Lewis acid because it can accept a pair of electrons. In Valence Bond Theory covalent bonds are formed by orbital overlap. The electronic configuration of carbon is $1s^2, 2s^2, 2p^2$

The ring strain of cyclopropane is due to both angle strain and torsional strain.

IV. (9 pts.) Provide the structures which correspond to each of the following names.

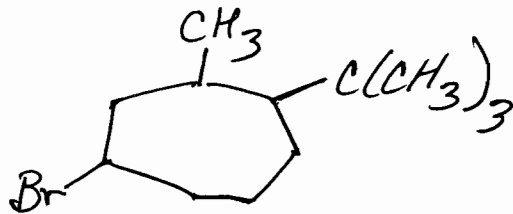
A. 4-isopropyl-2,2-dimethyloctane



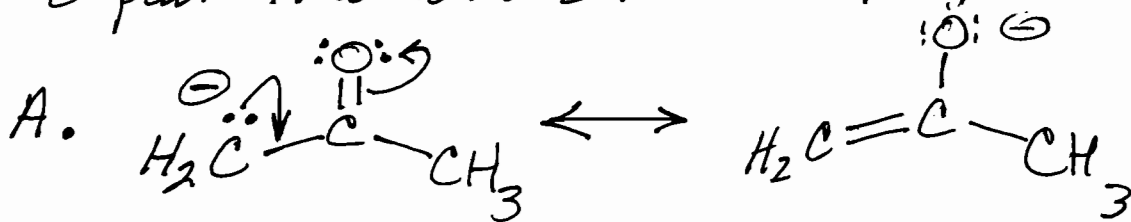
B. 1-bromo-3-*t*-butylcyclopentane



C. 4-bromo-1-*t*-butyl-2-methylcycloheptane

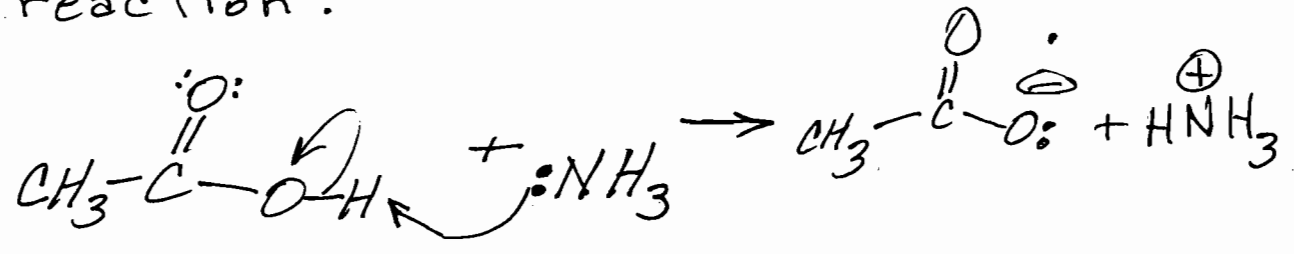


V. (9 pts.) Draw legitimate resonance structures for each of the following. Illustrate the e-pair flow with curved arrows.



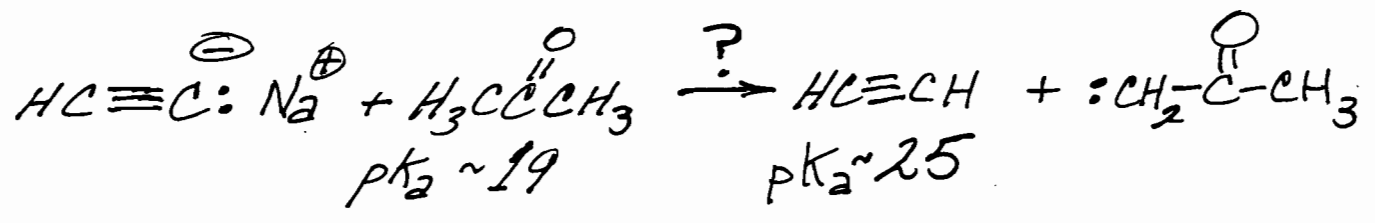


VI. (5 pts) Predict the products and show e-pair movement for this reaction.



VII. (5 pts) Will the following reaction proceed in the direction shown?

Yes No



VIII. (20 pts) Provide an example of:

A) A molecule with a completely nonpolar covalent bond.

Cl_2

5

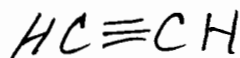
B) A hydrocarbon with only sp^3 -hybridized carbons.



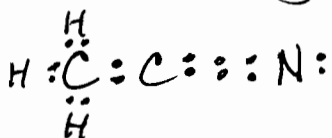
C) A Lewis acid that is not a Brønsted-Lowrey acid.



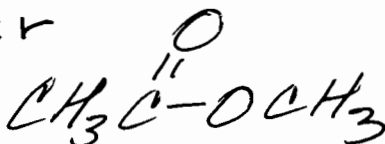
D) A hydrocarbon with only sp -hybridized carbons.



E) A Lewis (e-dot) structure of H_3CCN showing all valence-shell electrons.



F) An ester

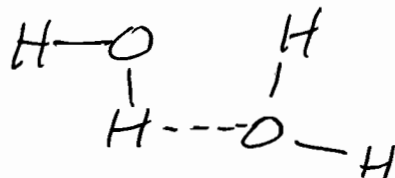


G) An aldehyde

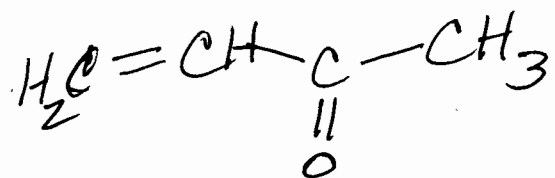


H) Two molecules

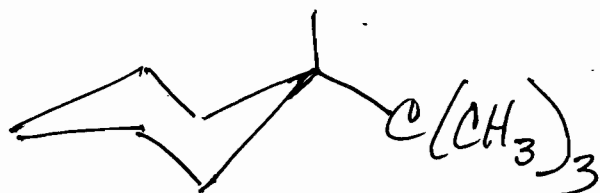
united by H-bonding



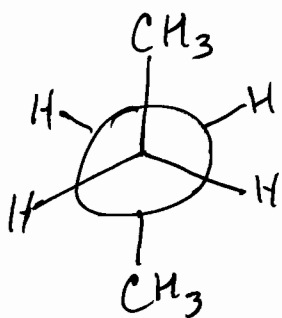
I. A 4-carbon molecule containing
3 sp^2 C's, 1 sp^3 C and 1 sp^2 oxygen.



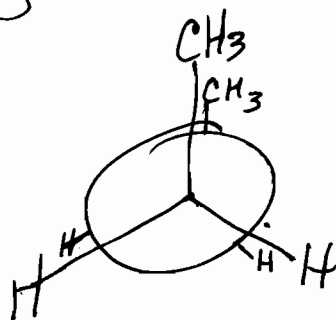
J) the chair form of a cyclohexane
locked in one conformation.



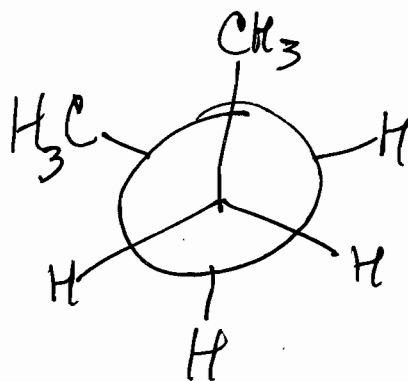
IV. (10 pts) A) Draw Newman projections
of the most stable, least stable
and gauche conformations of butane
sighting down the C_2-C_3 bond.



most
stable

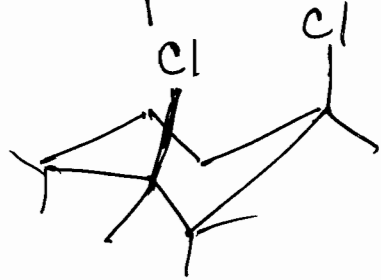


least
stable



gauche

B. Draw the structure of the least stable conformer of ⁷
cis-1,3-dichlorocyclohexane using a chair form and making the equatorial & axial bonding very clear.



X. (1pt.) What force keeps gecko lizards from falling into sleeping little boys' faces when running across the ceiling at night?

van der Waals