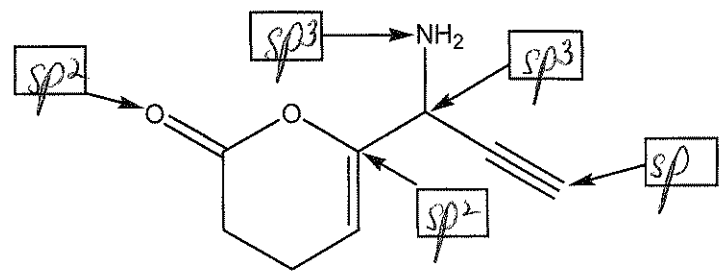


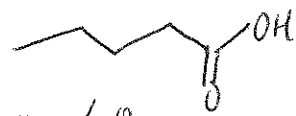
Partial Credit (Fill out the remaining questions on the exam itself. Show all work, provide complete explanations, and circle the answer(s) to be graded.)

16. What type of hybridization is used by each atom indicated with an arrow in the compound below.
 (5) Fill in the boxes with the correct hybridization.

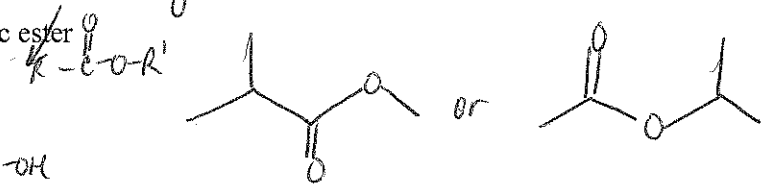


17. Consider the chemical formula $C_5H_{10}O_2$. Draw a structure (line or structural) designating a constitutional isomer with the following functional groups. NOTE: Other functional groups may be present to satisfy the chemical formula.

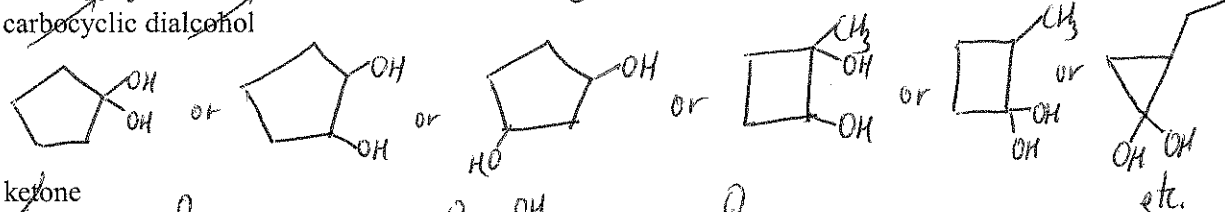
A. ~~no branched~~ straight chain acyclic carboxylic acid ~~no rings~~
 (2)



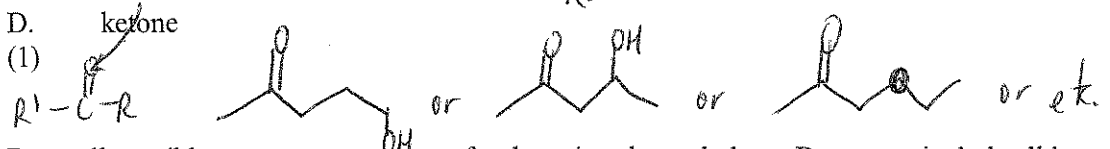
B. ~~branched~~ branched chain acyclic ester
 (2)



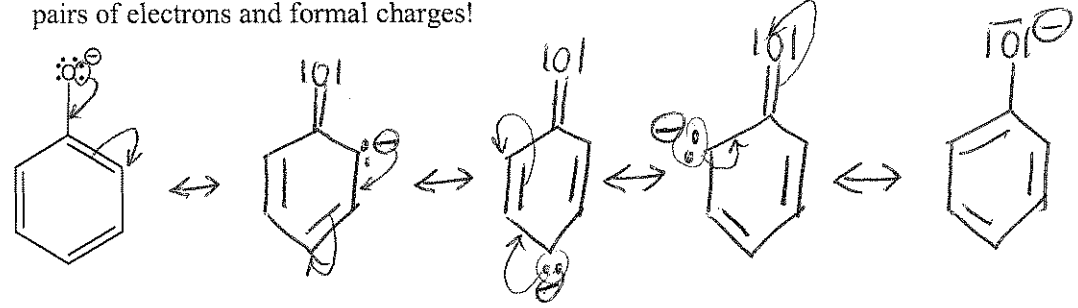
C. ~~ring of carbons~~ carbocyclic dialcohol
 (1)



D. ketone
 (1)



18. Draw all possible resonance structures for the anion shown below. Be sure to include all lone pairs of electrons and formal charges!



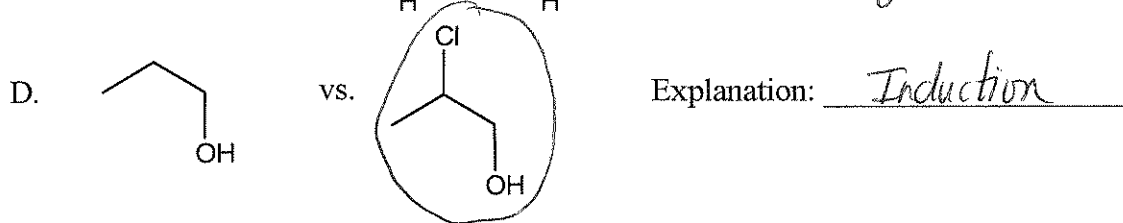
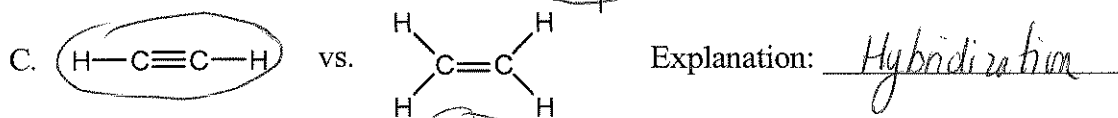
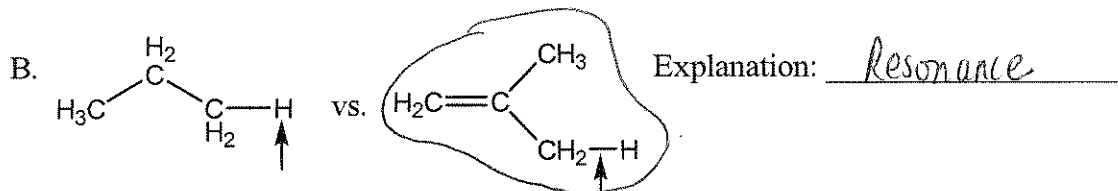
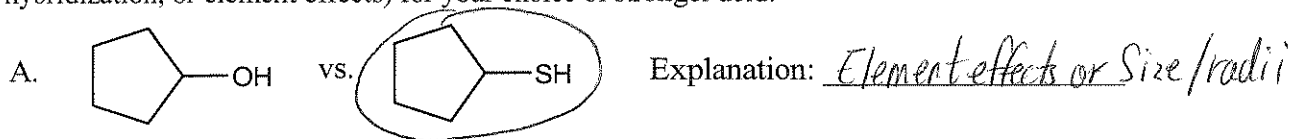
Name: _____

Last

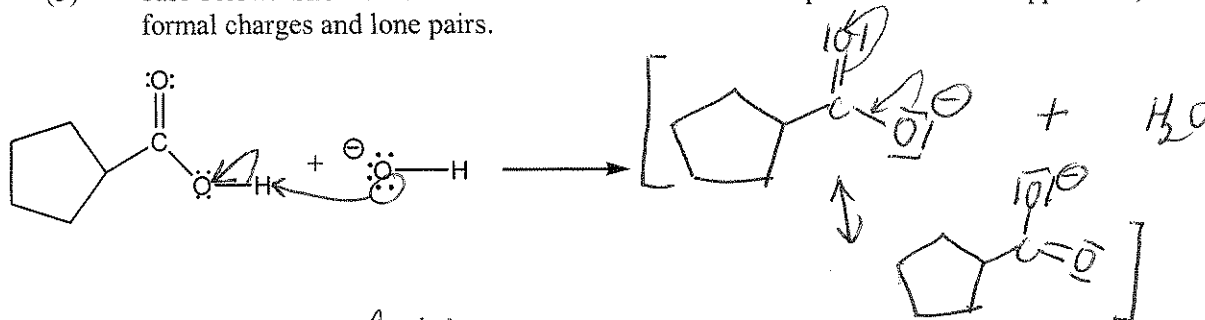
First

MI

19. Circle the stronger acid and give a brief 1-2 word explanation (e.g., resonance, induction, hybridization, or element effects) for your choice of stronger acid.

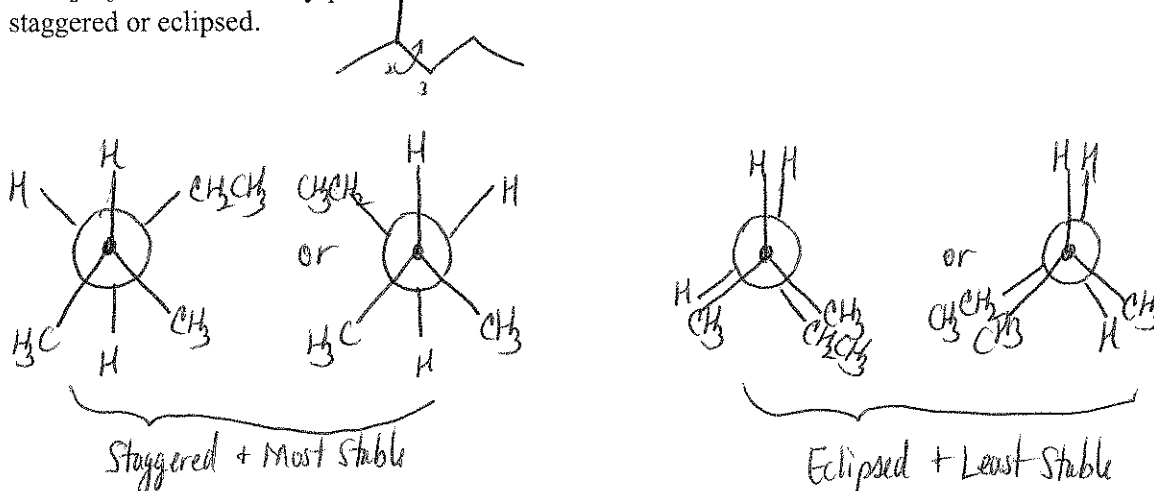


20. Predict products and use curved arrows to show the reaction between the Lewis acid and Lewis base below. Show all stable resonance structures for the products. Where applicable, show formal charges and lone pairs.



Acid \rightarrow e^- pair acceptor
Base \rightarrow e^- pair donor

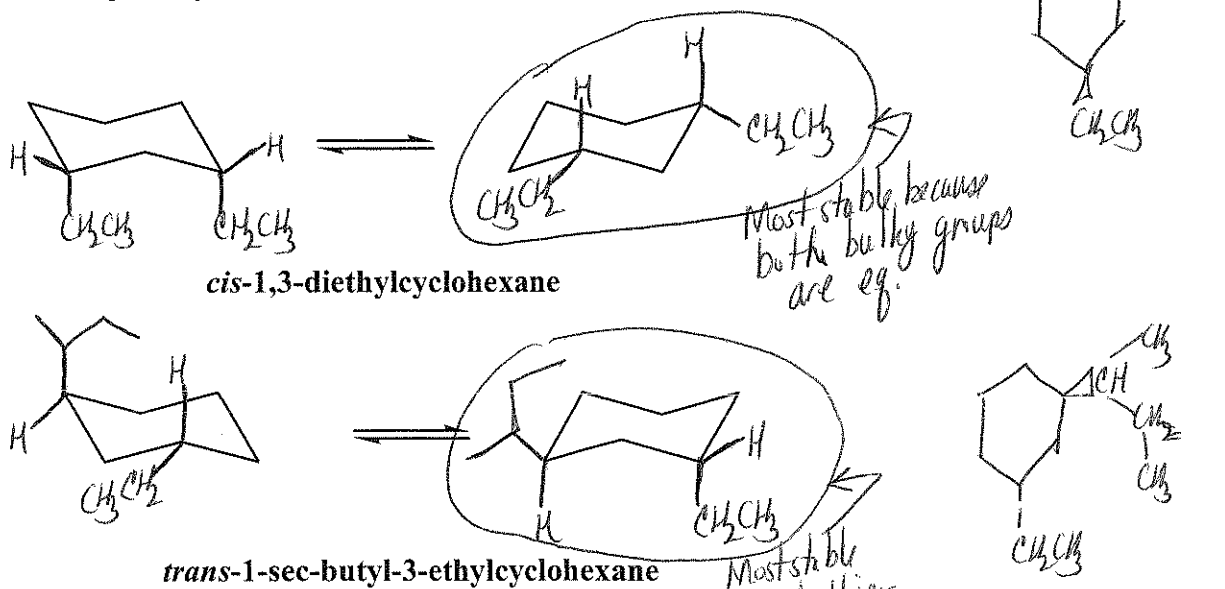
21. Draw Newman projections for the most stable and the least stable conformers for rotation about the C₂-C₃ bond of 2-methylpentane. Label each conformer as most or least stable AND as staggered or eclipsed.



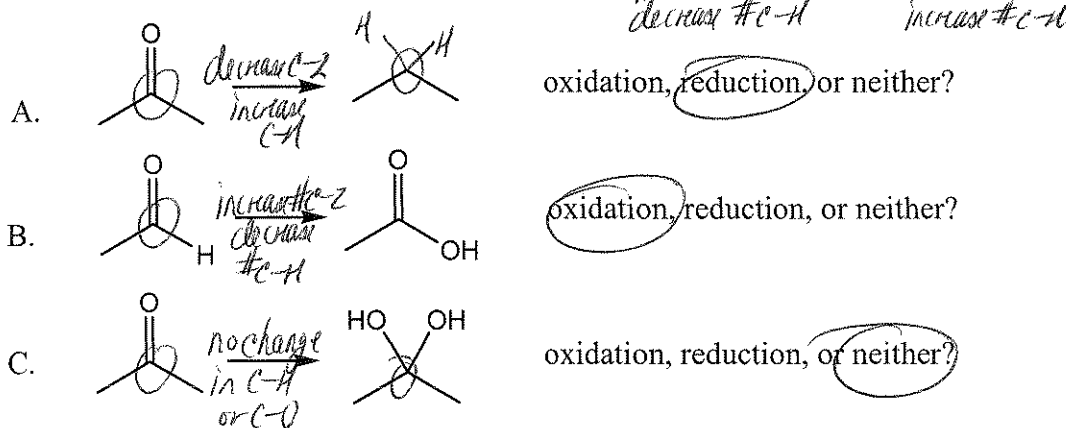
Name: _____

Last First MI

22. (6) Using the templates given below, draw both chair conformations for *cis*-1,3-diethylcyclohexane and *trans*-1-sec-butyl-3-ethylcyclohexane. For each, circle the more stable chair conformation. Bonds must be pointing in the correct direction (up/down/out-to-side) for credit.



23. (3) Determine whether each of the following transformations are oxidation, reduction, or neither. Circle the correct answer.



Name: _____

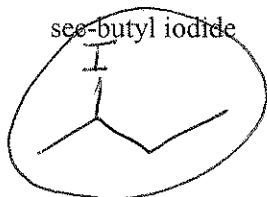
Last

First

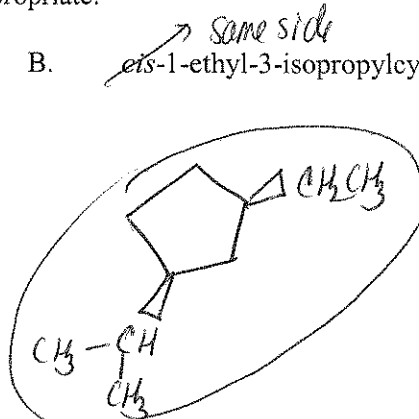
MI

24. Give a structure (line or structural) for each of the following compounds. Show cis/trans stereochemistry (3-D directionality) where appropriate.

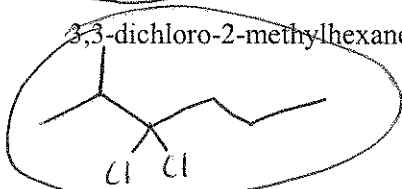
A. *sec*-butyl iodide



B. *cis*-1-ethyl-3-isopropylcyclopentane

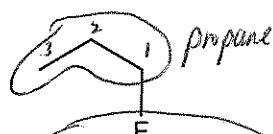


C. 3,3-dichloro-2-methylhexane



25. Give a correct IUPAC name for each of the following structures.

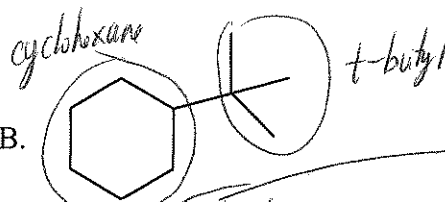
A.



IUPAC Name:

1-fluoropropane

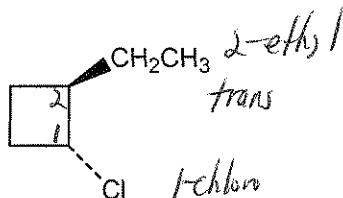
B.



IUPAC Name:

t-butylcyclohexane or 1-t-butylcyclohexane

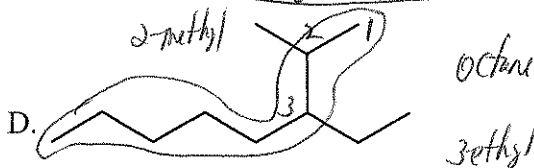
C.



IUPAC Name:

trans-1-chloro-2-ethylcyclobutane

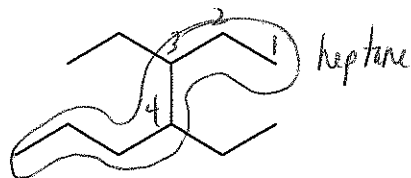
D.



IUPAC Name:

3-ethyl-2-methyloctane

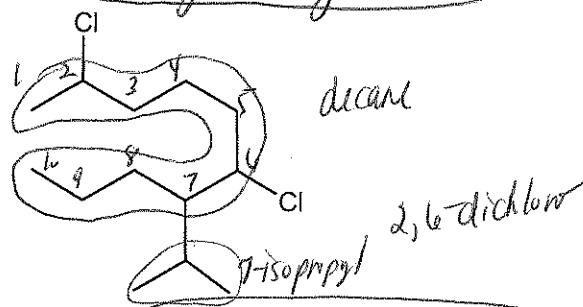
E.



IUPAC Name:

3,4-diethylheptane

F.



IUPAC Name:

2,6-dichloro-7-isopropyldecane