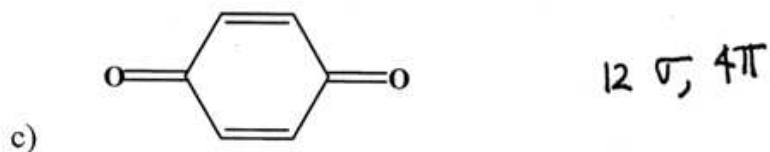


Chemistry 3311-100
Organic Chemistry/Dr. Barney Ellison
Thursday: Feb. 14 @ 7:00pm → 9:00/1st Exam/Math 100

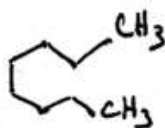
Name: Key (please print)

1. (10 pts) How many σ and π bonds are present in each of the following?

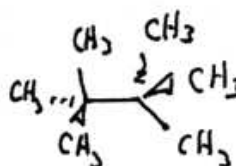


2. (10 pts) Which C_8H_{18} isomer:

a) Has the highest boiling point? \rightarrow

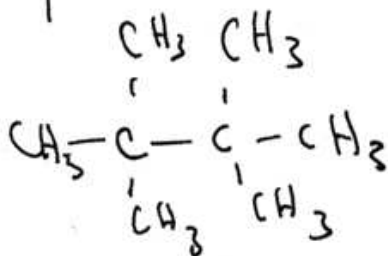
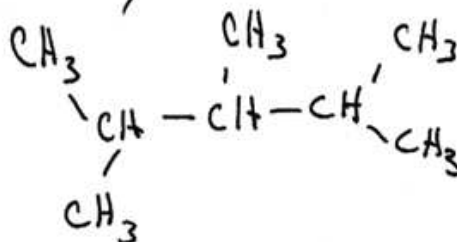


b) Has the lowest boiling point? \leftarrow



c) Has the largest number of tertiary carbons?

d) Has only primary and quaternary carbons?



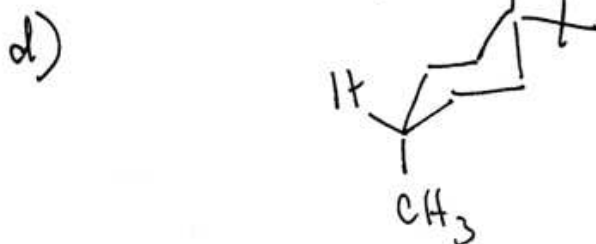
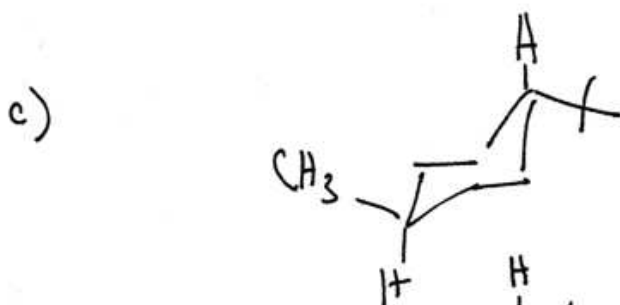
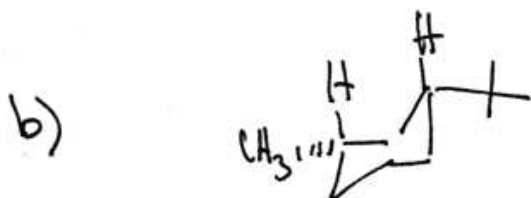
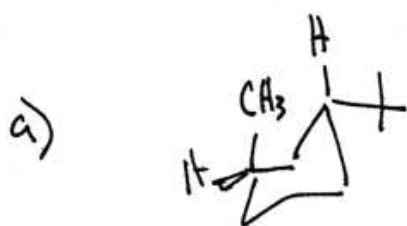
3. (10 pts) Write structural formulae for the most stable conformation of each of the following compounds.

a) *trans*-1-*tert*-butyl-3-methylcyclohexane

b) *cis*-1-*tert*-butyl-3-methylcyclohexane

c) *trans*-1-*tert*-butyl-4-methylcyclohexane

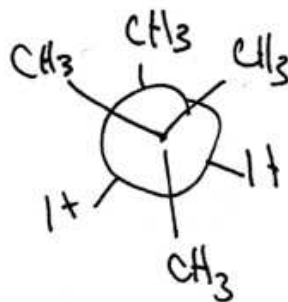
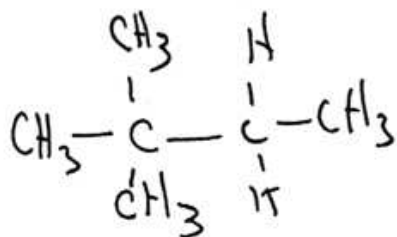
d) *cis*-1-*tert*-butyl-4-methylcyclohexane



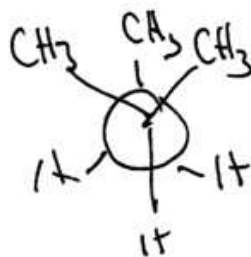
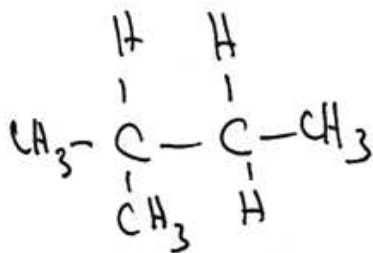
4. (10 pts) Sight down the C-2 — C-3 bond and draw Newman projection formulae for:

- a) the most stable conformation of 2,2-dimethylbutane
- b) the two most stable conformations of 2-dimethylbutane
- c) the two most stable conformations of 2,3-dimethylbutane

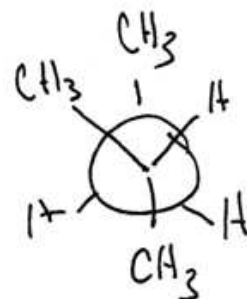
a



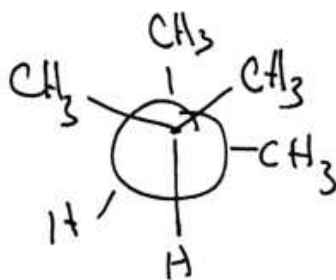
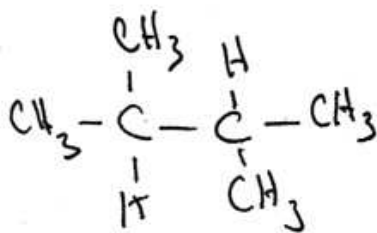
b



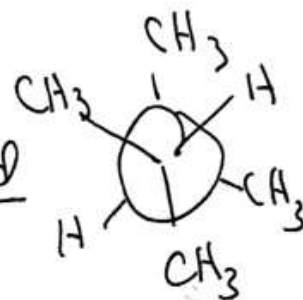
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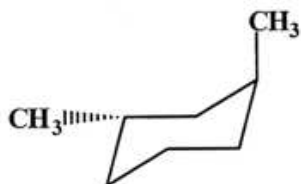
c



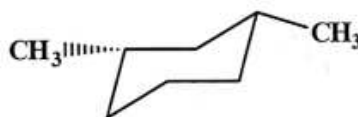
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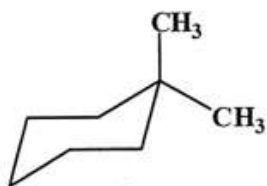
5. (10 pts) Consider the compounds A, B, C, and D.



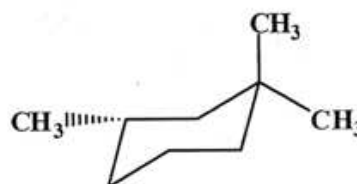
A



B



C

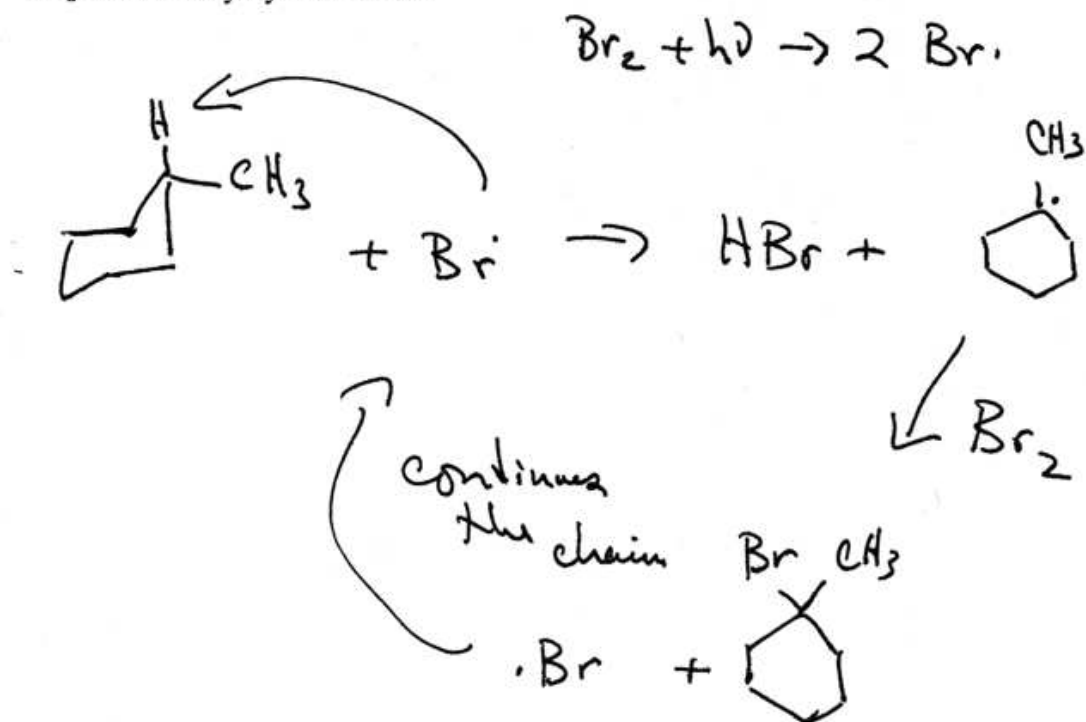


D

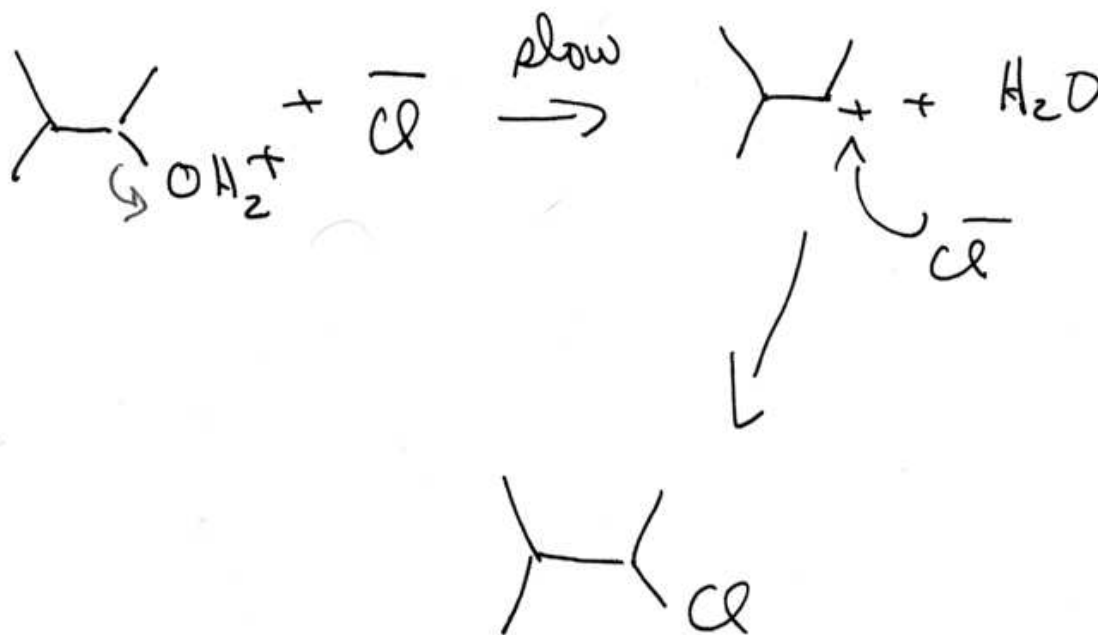
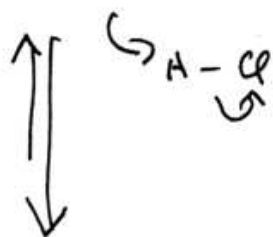
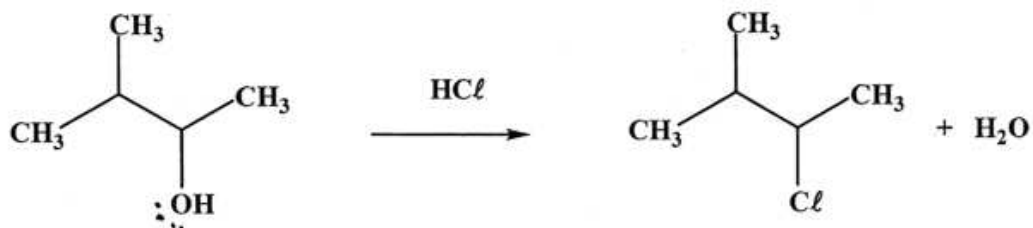
6.

- a) Which one is a constitutional isomer of two others? **C**
- b) Which two are stereoisomers of one another? **A+B**
- c) Which one has the highest heat of combustion? **D**
- d) Which one has the stereochemical descriptor *trans* in its name? **A**

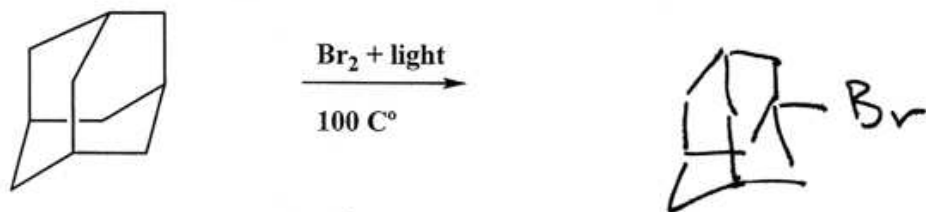
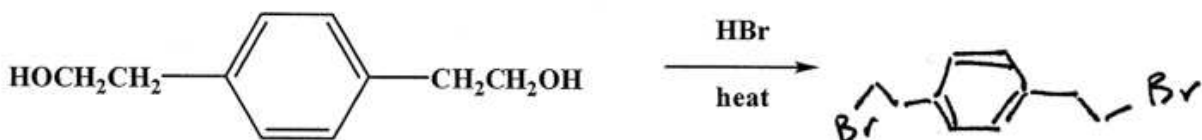
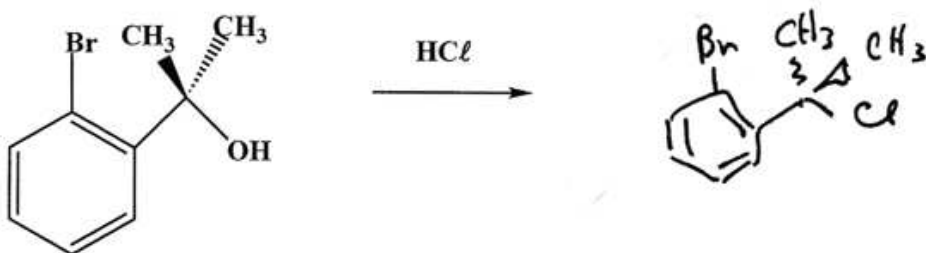
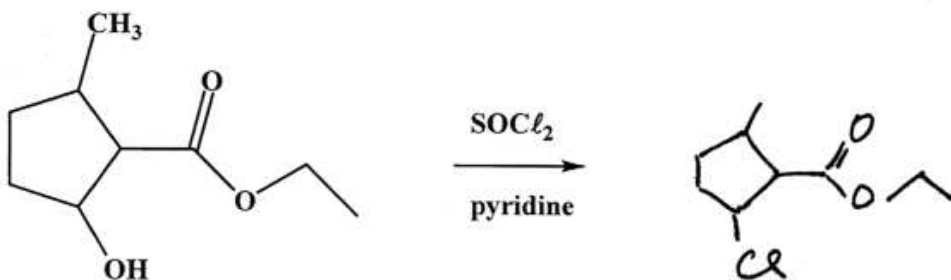
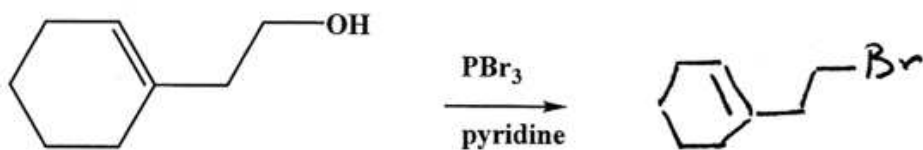
6. (10 pts) Write the propagation steps for the light initiated reaction of Br_2 with methylcyclohexane.



7. (10 pts) Write the mechanism for the reaction of HCl with 3-methylpropan-2-ol.



8. (10 pts) Write the structure of the principal organic product.



3° H's only

9. (10 pts) Select the compound in each of the following pairs that will be converted to the corresponding alkylbromide more rapidly on being heated with HBr.

a) 1-butanol or 2-butanol *more reactive*

b) 2-methyl-1-butanol or 2-butanol *more reactive*

c) 2-methyl-2-butanol or 2-butanol *more reactive*

d) 2-methylbutane or 2-butanol *more reactive*

e) 1-methylcyclopentanol or cyclohexanol *more reactive*

10. (10 pts) Cyclopropyl chloride has been prepared by free-radical chlorination of cyclopropane. Write a stepwise mechanism for this reaction.

