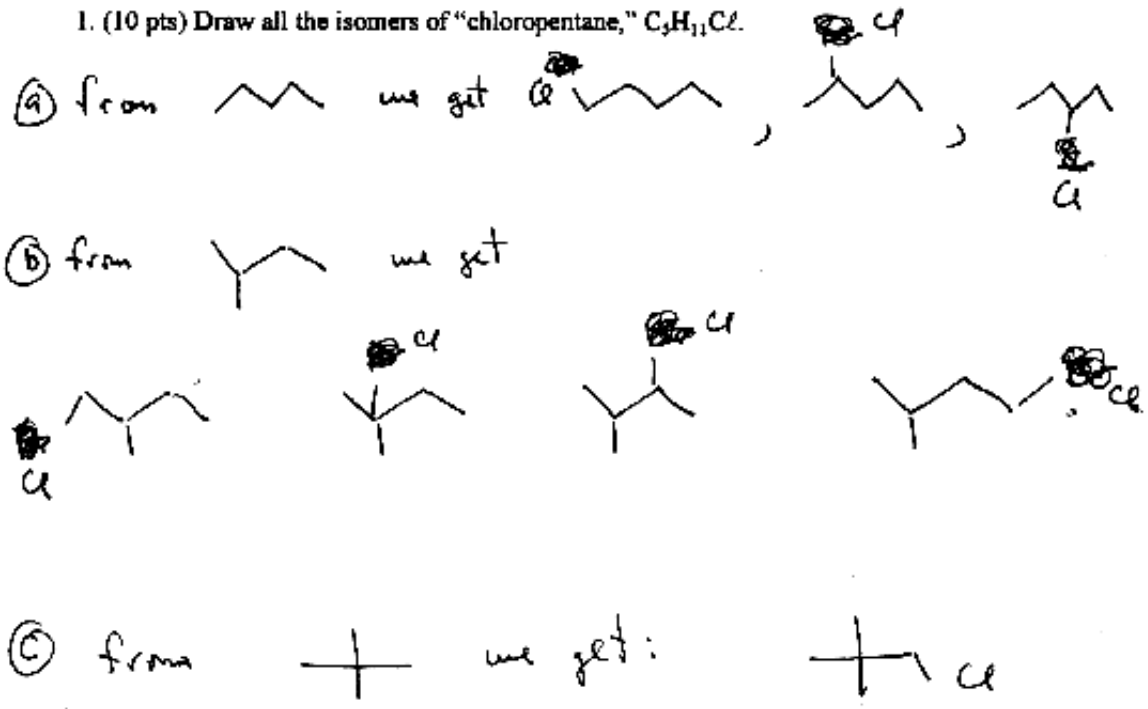
Chemistry 3311-100
Organic Chemistry/Dr. Barney Ellison
Thursday: Feb. 18 @ 19:00 → 21:00/1st Exam/Math 100

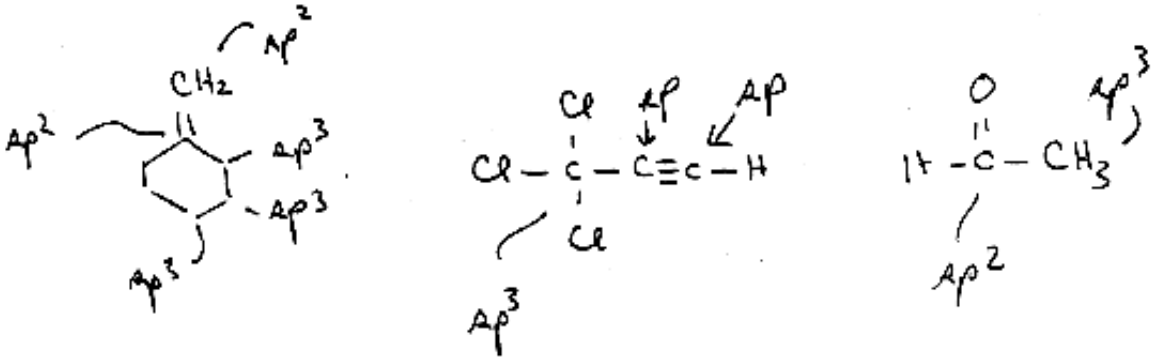
Name: Key (please print)

1. 2. 3. 4. 5. 6. 7. 8. Total_____

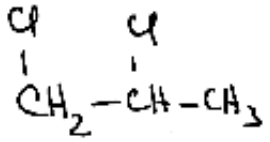
1. (10 pts) Draw all the isomers of "chloropentane," $C_5H_{11}Cl$.

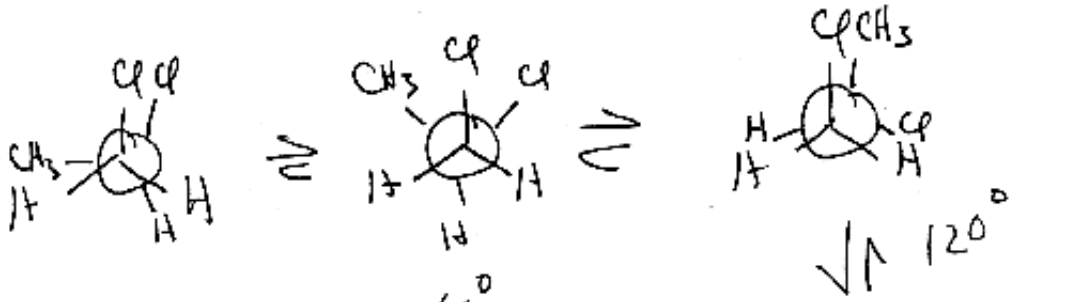


2. (10 pts) What is the approximate hybridization of carbon in each of the following compounds?



3. (10 pts) Draw Newman projections of *all* the eclipsed and staggered conformations of 1,2-dichloropropane by looking down the C_1—C_2 bond.



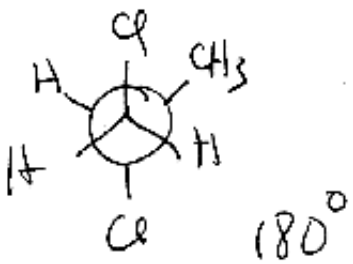


$\phi = 0°$

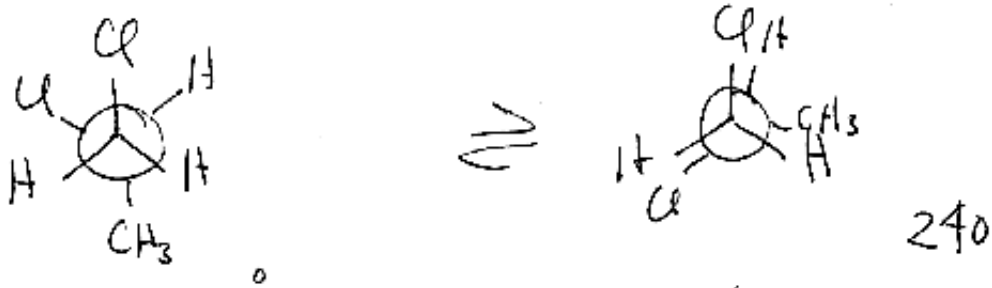
$360°$

$60°$

$120°$



$180°$



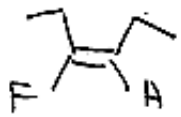
$240°$

$300°$

- Wrong Structure −2
- Leaving out the graph −2

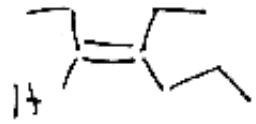
4. (10 pts) A. Draw structures for:

i) (E)-3-fluoro-3-hexene



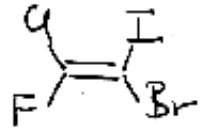
2

ii) (E)-4-ethyl-3-heptene



2

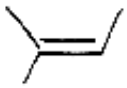
iii) (Z)-1-bromo-2-chloro-2-fluoro-1-iodoethylene



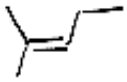
2

B. Which of the following alkenes is capable of (Z/E) isomerization?

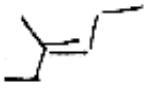
4



no

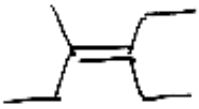


no



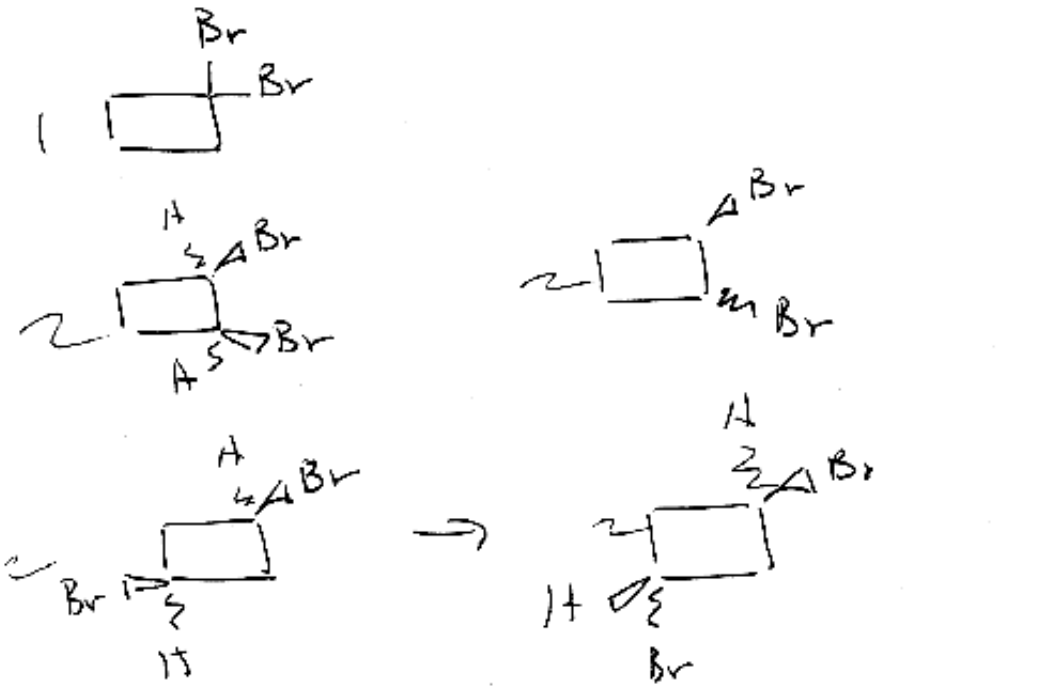
yes

yes



no

5. (10 pts) Write structures for all the isomers of dibromocyclobutane. Which ones have zero dipole moment?

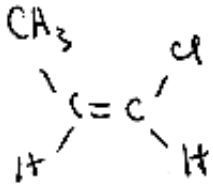


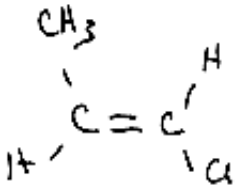
1 $\mu_D = 0$ here

-1 for reagents

6. (15 pts) Contrast $CH_3CH_2CH_2C\ell$ and $CH_3CH{=}CHC\ell$.

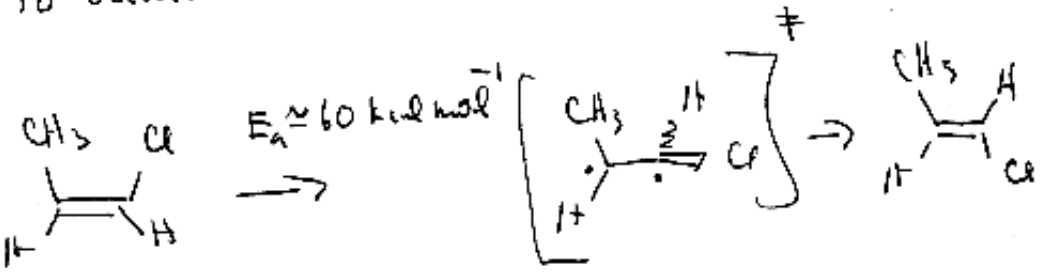
- How many isomers of $CH_3CH_2CH_2C\ell$ are there (separate molecules that can be put in a bottle)? Name them. 1-chlorobutane is the only isomer
- How many isomers of $CH_3CH{=}CHC\ell$ are there? Name them. Why don't these alkenes interconvert at room temperature?





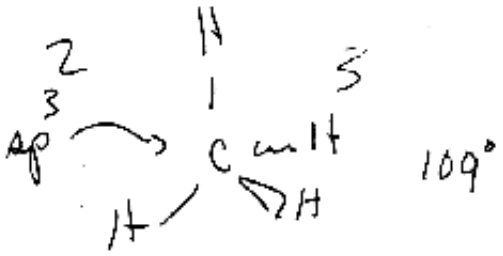
Z-1-Chloro-1-propene E-1-chloro-1-propene

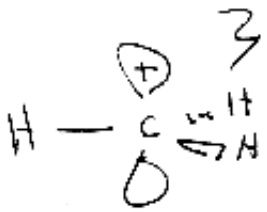
These isomers cannot interconvert because the double bond must be broken for rotation to occur.



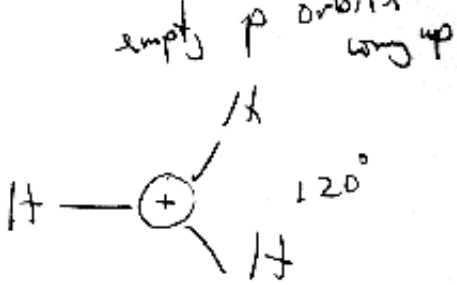
7. (15 pts) Consider the molecules: CH_4, CH_3^+, and CH_3^-

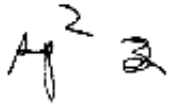
- Draw an explicit structure for each species.
- What is the hybridization of each carbon?

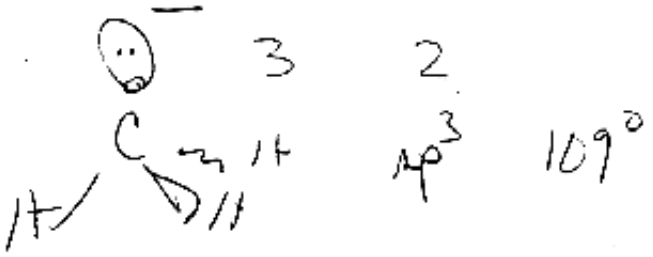




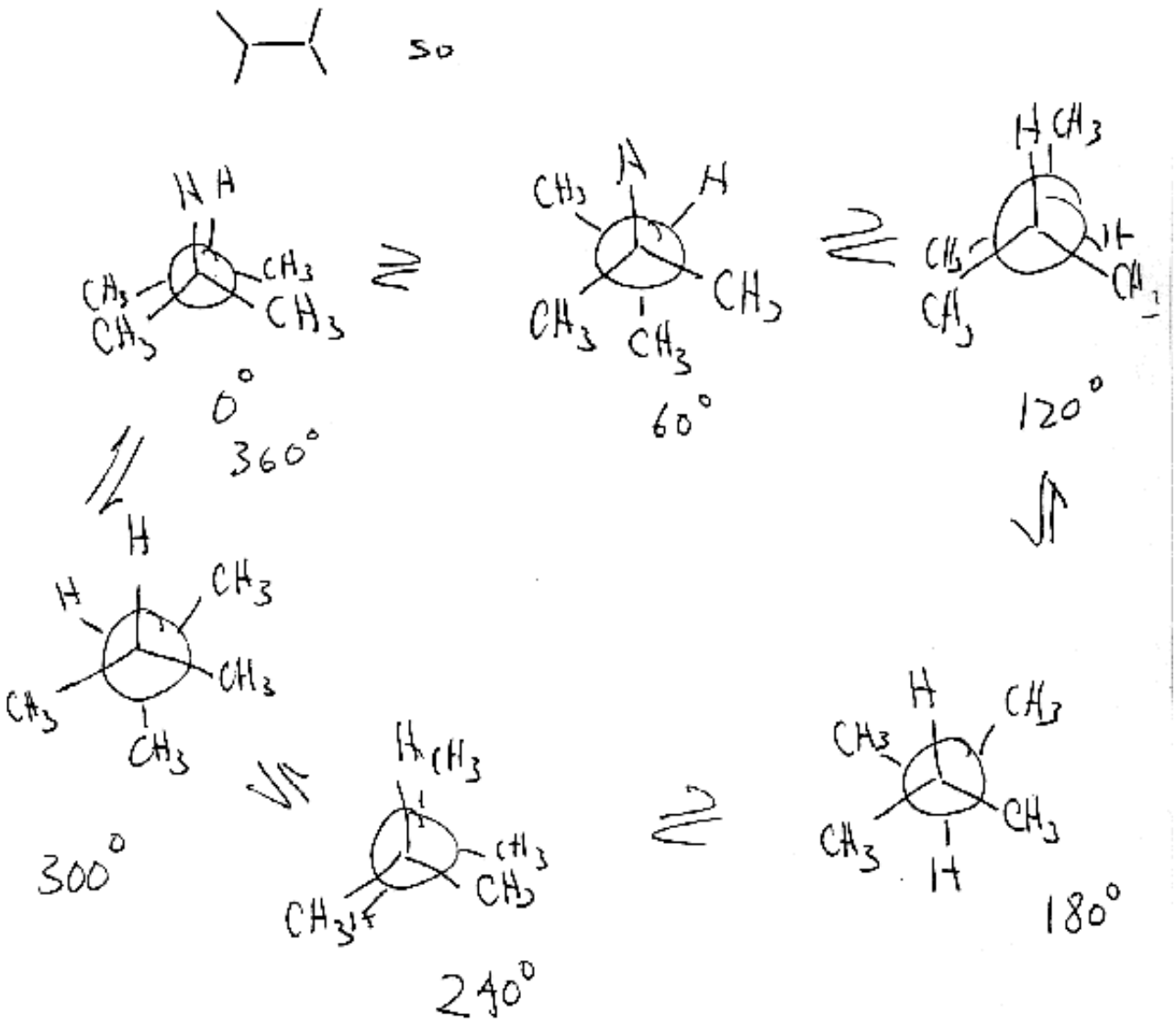
or

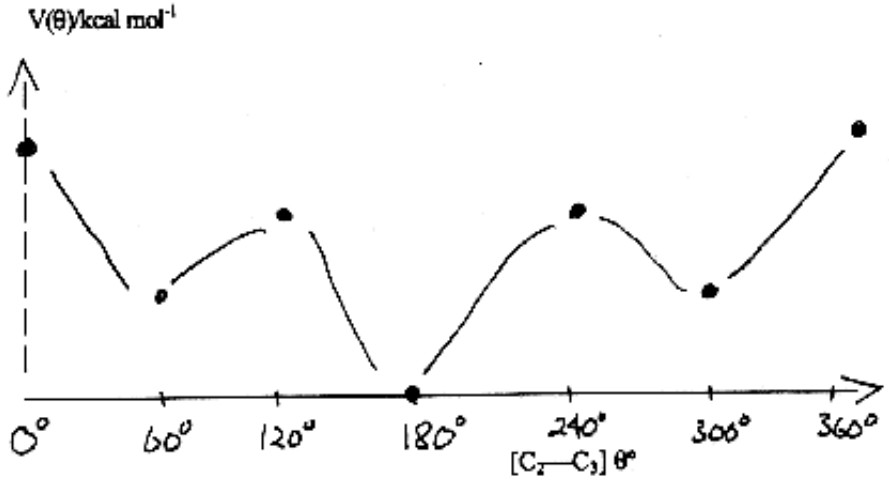






8. (15 pts) Draw the Newman projection for looking down the C_2—C_3 bond in 2,3-dimethylbutane. Make a graph of the conformational energy as a function of dihedral angle,θ. Start your graph at θ = 0°, the conformation that is symmetrically eclipsed.




V(θ)/kcal mol-1
0°
60°
120°
180°
240°
300°
360°
[C2—C3] θ°