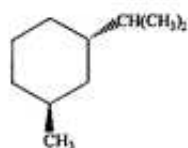


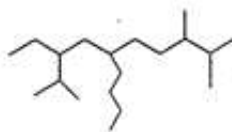
(24 points) 1. Name the following compounds.

a)



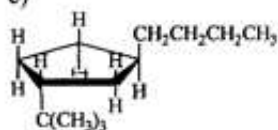
trans-1-isopropyl-3-methylcyclohexane

b)



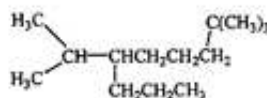
6-butyl-8-isopropyl-2,3-dimethyldecane

c)



trans-1-butyl-3-tert-butylcyclopentane
or if they think the red H is a methyl
it is okay

d)



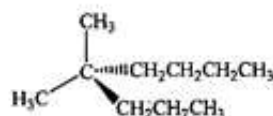
6-isopropyl-2,2-dimethylnonane

e)



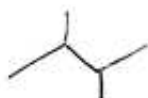
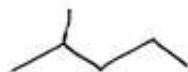
1-tert-butyl-3-ethyl-7-isopropyl-5-methylcyclooctane

f)



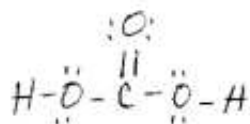
4,4-dimethyloctane

(6 points) 2. Give three constitutional isomers for the molecular formula C_6H_{14} .

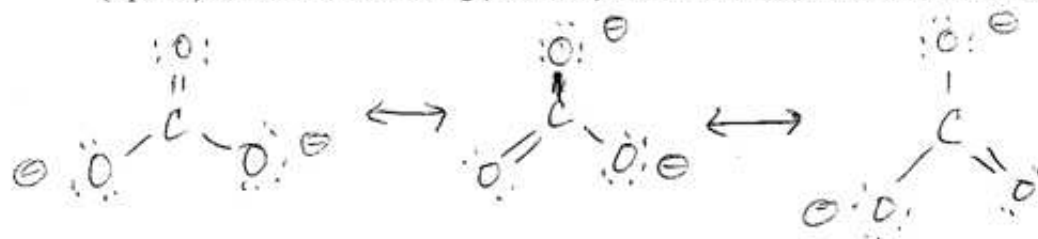


(any that are correct
are fine)

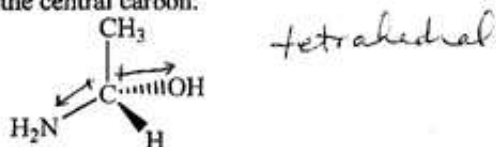
(4 points) 3. Draw an acceptable Lewis structure for carbonic acid, the carboxylic acid that has the formula H₂CO₃.



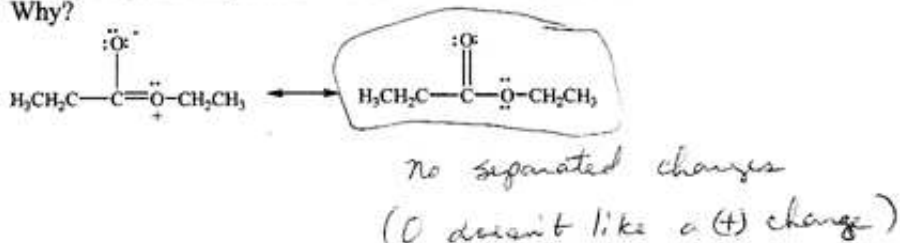
(6 points) 4. Draw the contributing (resonance) structures for CO₃²⁻. Show all formal charges.



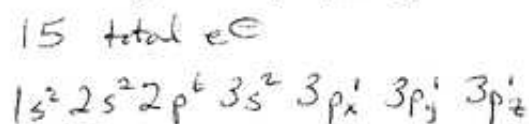
(6 points) 5. What is the geometry about the central C in the following compound? Show the bond dipoles about the central carbon.



(5 points) 6. Which of the following resonance structures contributes the most to the overall structure of the molecule? Why?



(4 points) 7. What is the electron configuration for phosphorus?



(6 points) 8. Which of the following has the stronger C-C bond? Why? Which is the shorter C-C bond? Which one has the most acidic hydrogens?

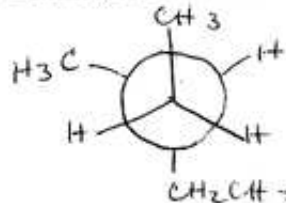
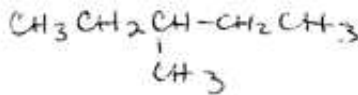


When remove an H, the e^- go into an sp orbital

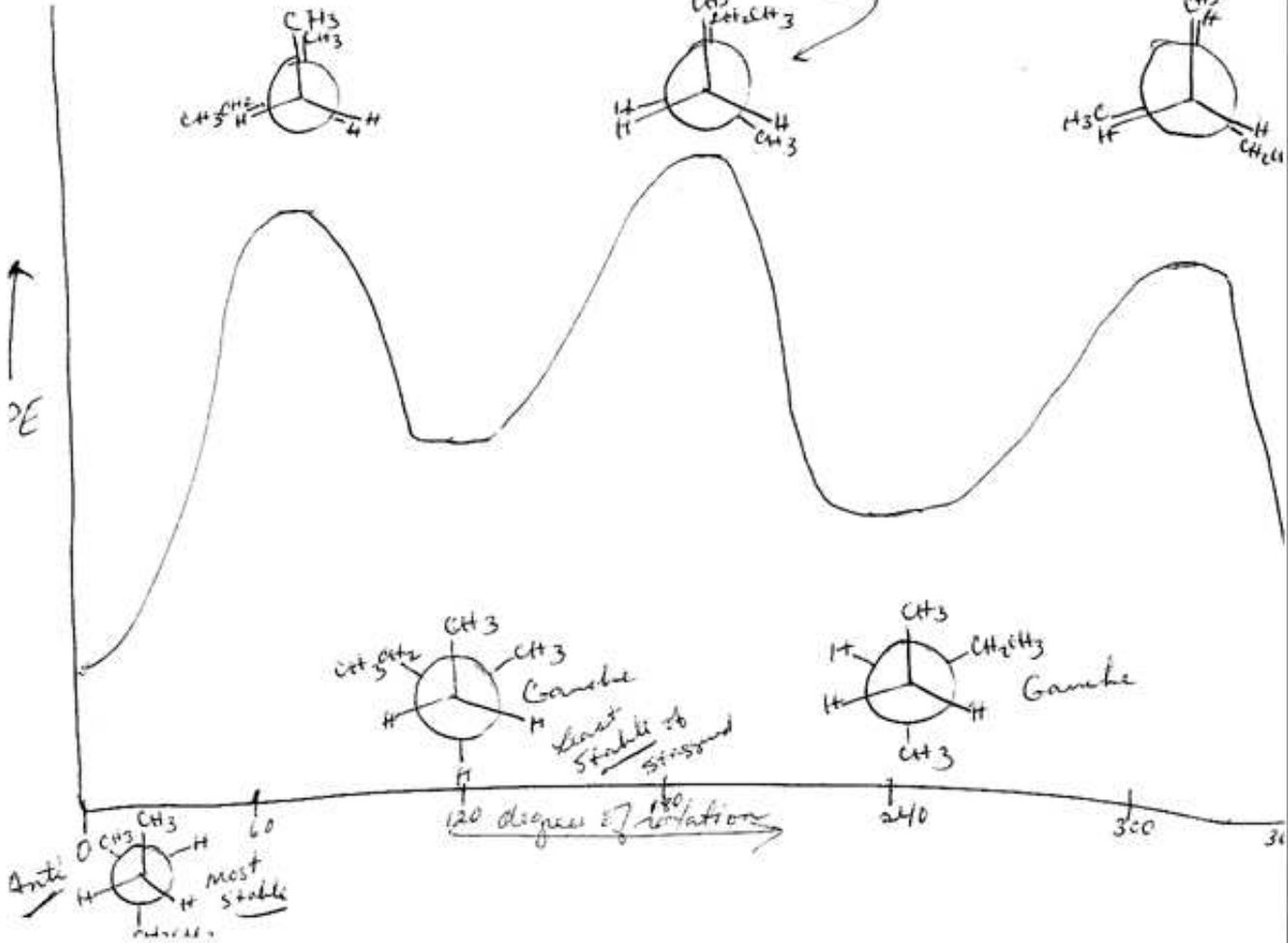
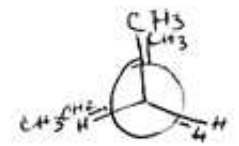
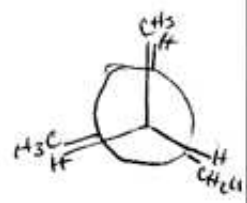
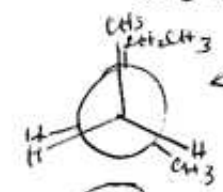
Stronger,
shorter, &
more acidic H's

b/c the C-C of hybrid has $\therefore e^-$ are held closer to nucleus
50% s character in the σ bond

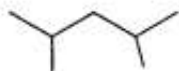
(12 points) 9. Draw the potential energy diagram for 3-methylpentane looking down the C_2-C_3 axis. Put in all of the Newman Projections represented. Be sure to label the more stable and the less stable conformations as well as any gauche conformations. (Be sure to label the axes on the diagram.)



Highest energy Eclipsed



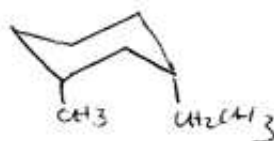
(4 points) 10. Which of the following will have the lower boiling point? Why?



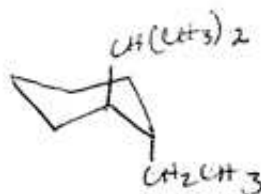
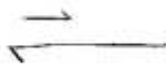
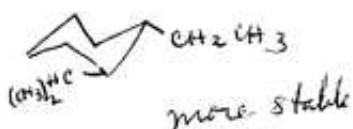
most branching
least surface area
can't pack as well
harder to polarize e⁻

(8 points) 11. Draw the two chair conformations of each of the following compounds and indicate which conformer is more stable:

cis-1-ethyl-3-methylcyclohexane

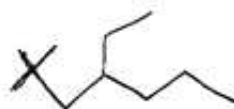


trans-1-ethyl-2-isopropylcyclohexane

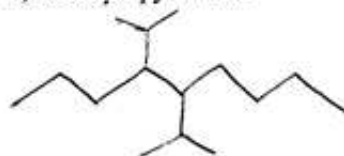


(15 points) 12. Give the correct structure for the compounds having the following IUPAC names.

a) 3-ethyl-2,2-dimethylheptane



b) 4,5-diisopropylnonane



c) cyclopentylcyclohexane

