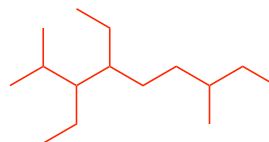
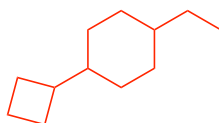


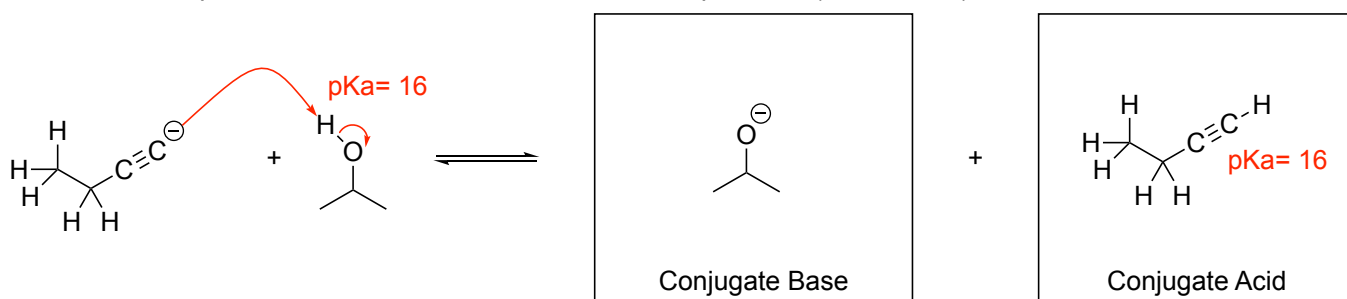
1. (8 points) Provide structures for the following names.



4-cyclobutyl-1-ethylcyclohexane

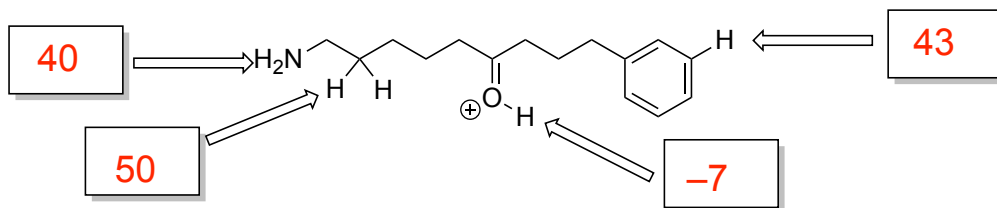
3,4-diethyl-2,7-dimethylnonane

2. (8 points) **A.** Use curly arrows to show the movement of electrons in the following acid-base reaction.
B. Provide the structures for the conjugate base and conjugate acid in the boxes provided.
C. Use pKa values to determine the direction of equilibrium (circle below).

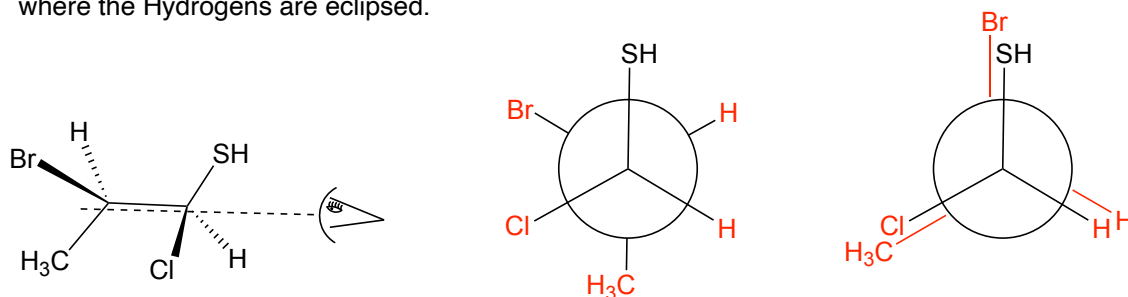


Circle 1: quant. left mostly left 50:50 mostly right quant. right

3. (4 points) Estimate the pKa values for the indicated protons in the given structure.

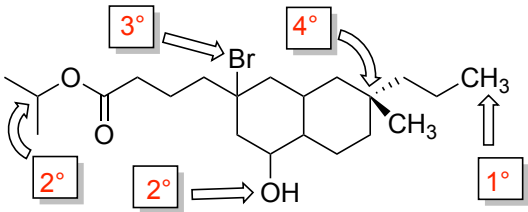


4. (8 points) **A)** Complete the Newman projection along the indicated bond for the structure given below. Use the conformation that is shown. **B)** Finish the 2nd Newman projection to show the conformation where the Hydrogens are eclipsed.

Reproduce
Structure at left

H's eclipsed

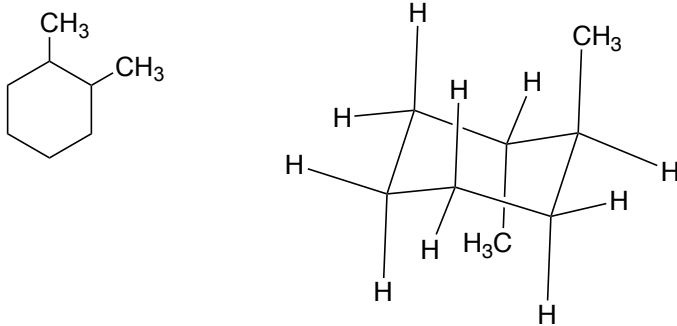
5. (8 points) Give 1°, 2°, 3°, 4° for the indicated things/groups in the following molecule
 Bonus: On the lines, list the 3 functional groups in the molecule



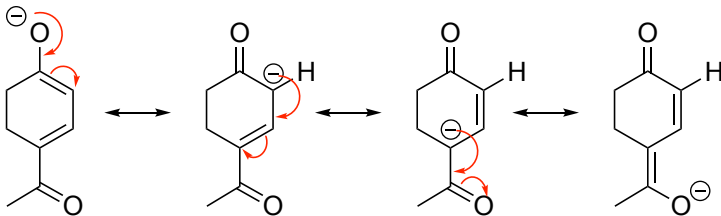
ester _____
 3° alkyl bromide _____
 2° alcohol _____

6. (6 points) Draw your very best rendition of the structure below in chair form. Being sure to do the following:

1. Draw in all bonds to all hydrogens on the cyclohexane ring.
2. Place the 2 methyl groups in an axial position being sure they are on adjacent carbons.



7. (6 points) Using curly arrows and structures, show the 3 correct resonance structures for the anion/base.



8. (5 points) Draw lines to match the compound name with the structure.

sec-butyl bromide	tert-butyl bromide	isobutyl bromide	1-propyl bromide	isopropyl bromide