

Names of all students (please print) \_\_\_\_\_

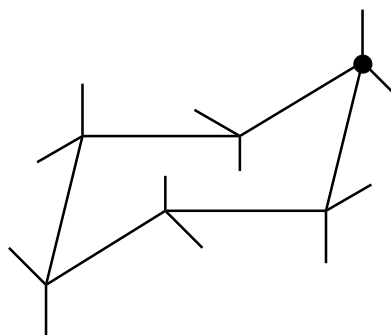
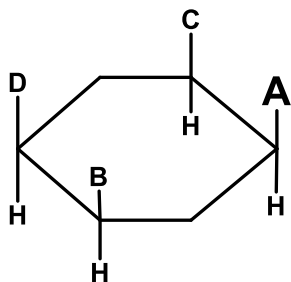
CHEM 243 Organic Chemistry I      BONUS \_\_\_\_\_ (6 max)      Points \_\_\_\_\_ (10 max)

**Worksheet #9: September 29, 2021.** Complete the following worksheet by collaborating with a group of 3-4 students. You can use a text book or your lecture video notes. You must work together, with the names of all students included on **ONE** sheet and turned in for a group grade.

**My worksheets are designed with the assumption that you have (1) watched the videos, (2) taken notes, and (3) have your notebook open on your bench.**

**(1) Converting a “2D” Cyclohexane to a “3D” Cyclohexane “Chair” Structure: Axial vs Equatorial.**

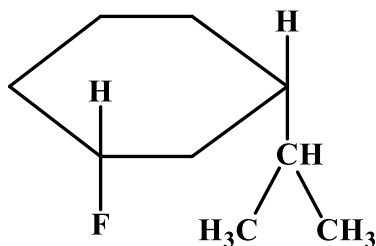
(a) Complete the chair conformer on the right by adding the *general substituents A, B, C, D* from the 2D structure. Be careful about proper position and geometry. Lets assume that “**A**” is the **largest substituent** and should be added first to the (●) carbon. All the axial and equatorial bonds have been drawn for you.



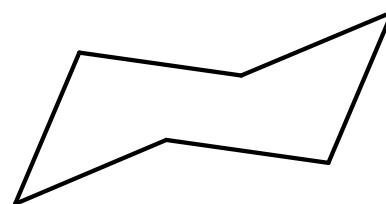
(b) Did you place substituent “A” on an axial or equatorial position? **EXPLAIN your reasoning.**

**(2) Drawing Cyclohexane Ring Structures.** The 2-D structure for a cyclohexane compound is drawn below.

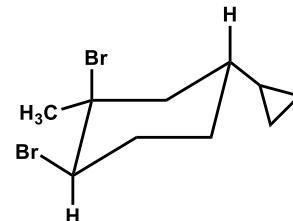
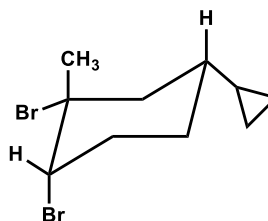
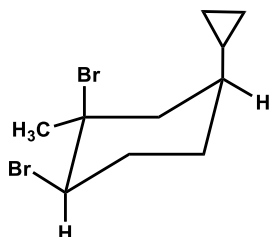
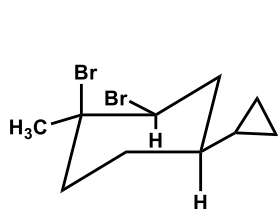
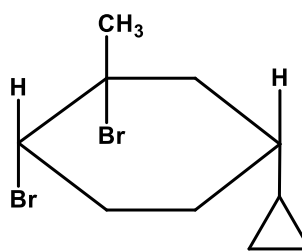
(a) Write an accurate IUPAC name. Don't forget to use **cis** or **trans** when you have two substituents on a ring.



(b) Using the chair template at the right, draw the **most stable** chair conformer for this compound. NOTE: You must include hydrogen atoms (H) on any ring carbon with a substituent!

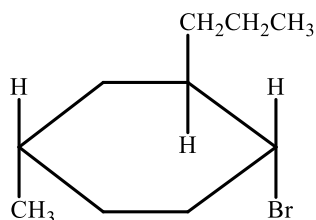


(3) Cyclohexane “Chair” Conformations. Which **ONE** of the following structures most accurately represents the **most stable** chair conformer of the 2D compound drawn to the right? **CIRCLE your ONE answer.**

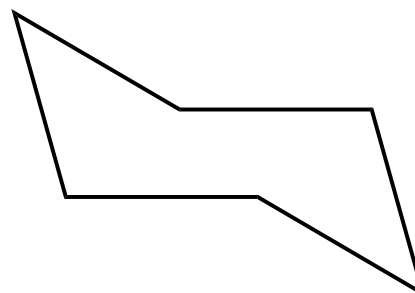
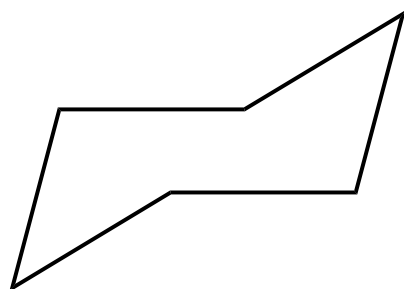


(4) Cyclohexane Nomenclature and Structure. Consider the 2D line structure drawn below.

(a) Give an accurate IUPAC name. Ignore cis/trans designations since we have more than two substituents.



(b) Now draw the two chair conformers for the compound above. Use the chair templates below.

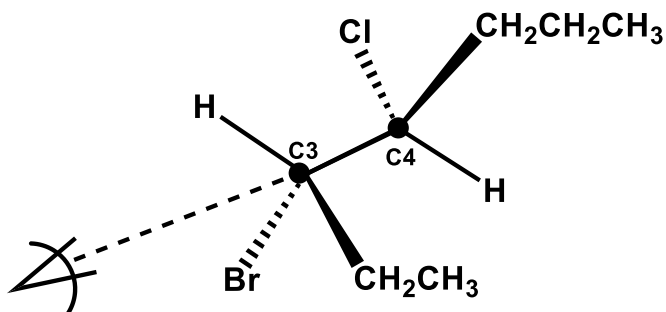


(c) **CIRCLE** the most stable conformer and **EXPLAIN** your reasoning.

## BONUS POINTS!

Each member of your group can earn up to **6 Bonus Points** for answering the questions below. **Please Note: You may NOT ask for help from Dr. Brush or the Peer Leaders.**

**Alkane Conformations.** Consider the molecule drawn at the right, and the view looking at the C3-C4 bond. **Feel free to use the molecular models provided.**



(a) Based on the structure above, draw a Newman Projection looking at C3 and down the C3 – C4 bond:

(b) Now, rotate your Newman Projection to make the more stable conformer (largest groups anti to each other):

(c) Give an accurate IUPAC Name for this compound.