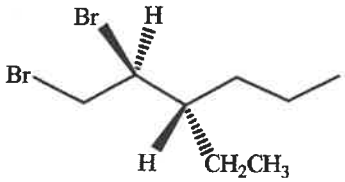
Names of all students (please print) Answer Key

CHEM 243 Organic Chemistry I **Points** _____ **(10 max)**

Worksheet #13: October 8, 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.

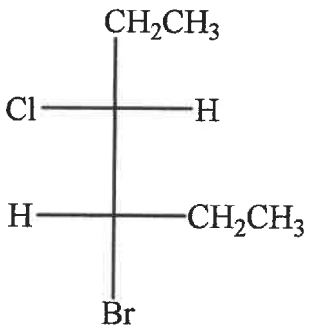
(1) Nomenclature. Give an IUPAC name for compound (a) drawn below. Don't forget R/S designations.



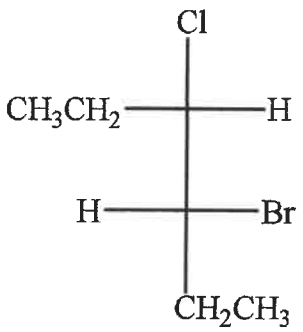
(2S,3S)-1,2-dibromo-3-ethyl hexane

(2) Fisher Projections.

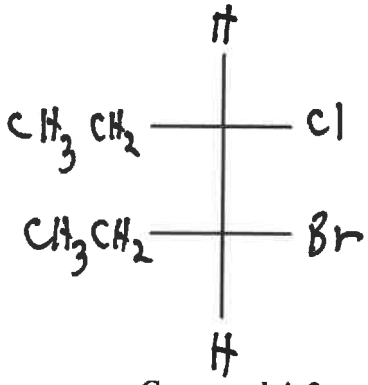
(a) Using the two blank templates on the right, **re-draw** the Fisher Projections for compounds A-1 & B-1 such that the **H atoms** are on the **vertical axis (top & bottom)**.



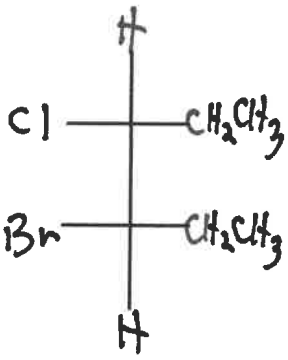
Compound A-1



Compound B-1



Compound A-2



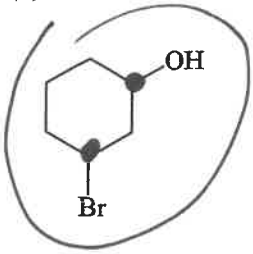
Compound B-2

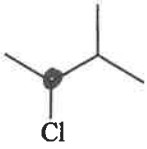
(b) Compare the **new Fisher Projections (A-2 and B-2)** and determine if they are (circle):

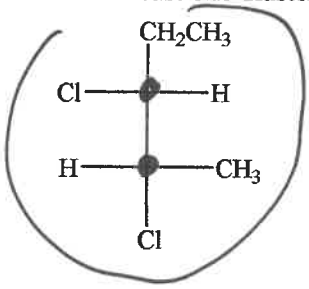
Identical **or** **Enantiomers** **or** **Diastereomers**

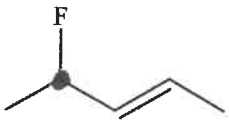
(≥ 2 chiral centers)

(3) Diastereomers. Which of the following molecules will have at least one diastereomer? Circle your choice(s).

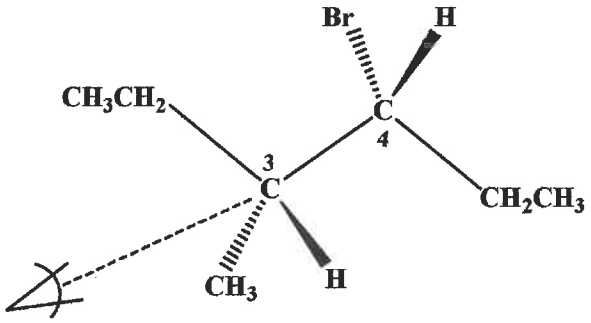








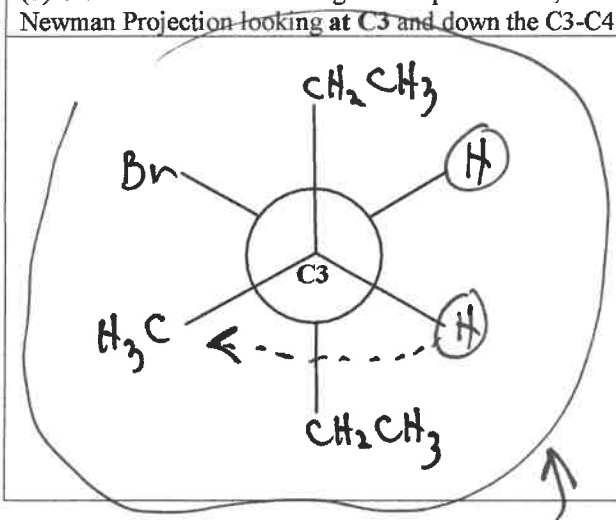
(4) Alkane Conformations. Consider the 3D "zig-zag" structure for the compound drawn at the right, and the view looking at C3 and down the C3-C4 bond:



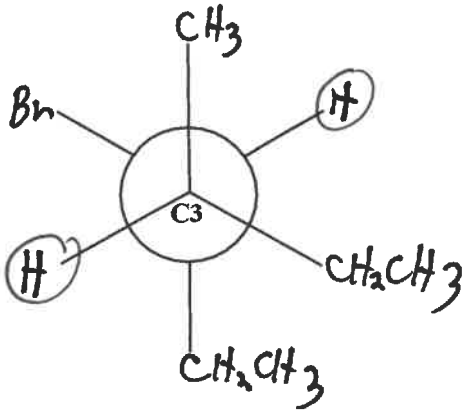
(a) Give an IUPAC name for this compound:

(3R, 4R)-4-bromo-3-methyl hexane

(b) **CONFORMER A.** Using the template below, draw a Newman Projection looking at C3 and down the C3-C4 bond.



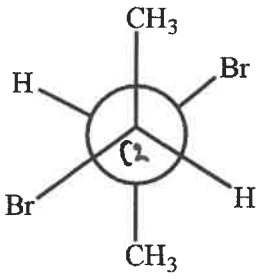
(c) **CONFORMER B.** Rotate Conformer A so that the **H atoms are anti** to each other:

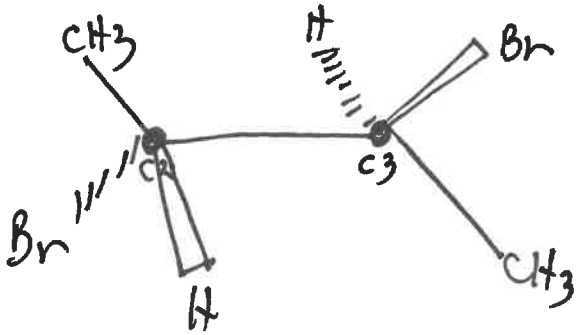


(d) **CIRCLE** the most stable conformer.

(5) Stereochemistry, Newman Projections, Meso Compounds.

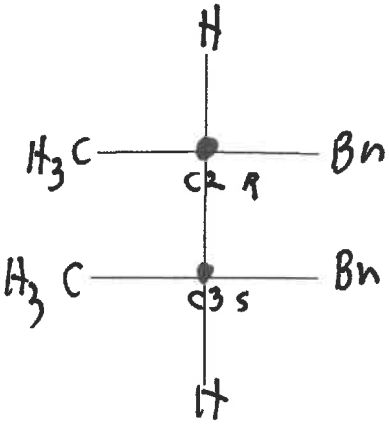
(a) Draw a zig-zag structure <u>and</u> give an IUPAC name for the organic compound represented by the Newman Projection drawn below. You must show the correct 3D configuration for all chiral centers using wedge and dash bonds.





(2R, 3S)-2,3-dibromo butane

(b) Now draw a Fisher Projection for this compound using the template at the right.



(c) Is this a Meso Compound? CIRCLE: **YES** or **NO**

plane of symmetry & R,S configurations

(6) Calculations: % Yield. Be sure to use correct significant figures and units.

Compound A (C_5H_8) was reacted with **HBr** and converted into Compound B (C_5H_9Br):

$$C_5H_8 + HBr \longrightarrow C_5H_9Br$$

(this equation is balanceed)

0.2409 g of **pure** Compound A were reacted with 10.00 g of HBr and converted into 0.4790 g of Compound B.

Complete the following table to determine the Limiting reactant and to calculate the % Yield.

Compound	Molecular mass	grams	moles
Pure (A) C_5H_8	68.11 g/mole	0.2409 g	0.003537 mole
HBr	80.91 g/mole	10.00 g	0.1236 mole
CIRCLE the Limiting Reactant from above.			
Compound (B) C_5H_9Br	149.0 g/mole	0.4790 g	0.003215 mole
Theoretical Yield = 0.003537 mole			**% Yield =** 90.90 %

$$0.2409\ g\ A \times \frac{1\ mole}{68.11\ g} = 0.003537\ mole$$

$$10.00\ g\ HBr \times \frac{1\ mole}{80.91\ g} = 0.1236\ mole$$

$$0.4790\ g\ B \times \frac{1\ mole}{149.0\ g} = 0.003215\ mole$$

$$\frac{0.003215\ mole\ B\ (exp)}{0.003537\ mole\ B\ (theo)} \times 100 = 90.90\ \%$$