

Review:

- what's an enantiomer? Main difference between them?
- what's a diastereomer?

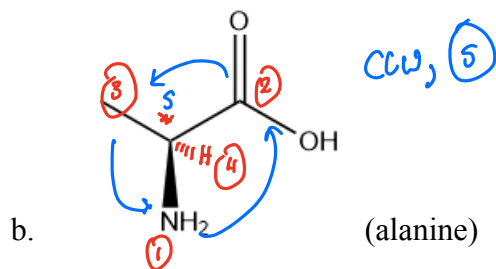
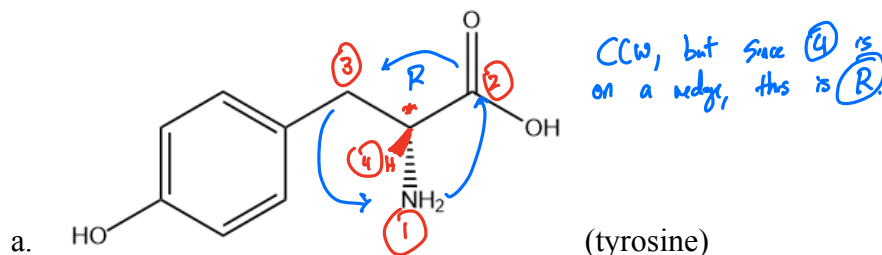
CHEM 223 (2024) SI Session #9

Learning Objectives: By the end of this session, students should be able to:

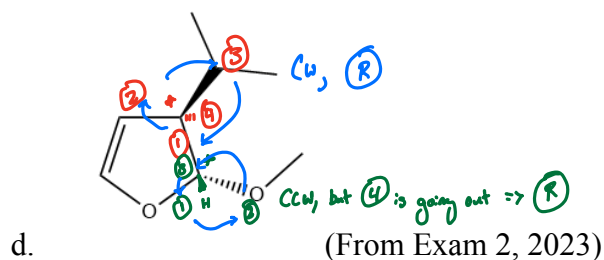
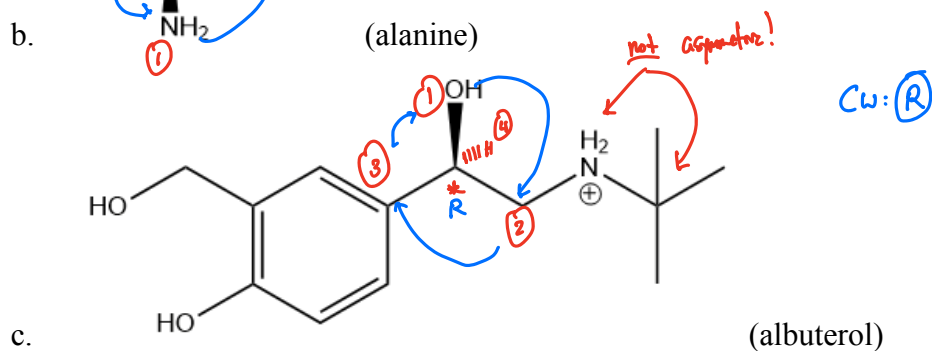
- Use the Cahn-Ingold-Prelog rules to label chiral molecules.
- Explain the connection (or lack thereof) between R/S and D/L naming
- Apply your knowledge of enantiomers to practice exam questions
- Draw and label R/S configurations on fischer projections

Section 1: R/S Naming Practice

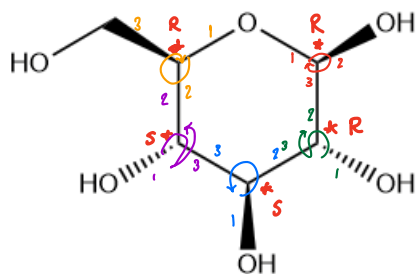
1. Label each of the chiral centers in the molecules below as R/S.



sp^2 carbons cannot be asymmetric.



2. (From Exam 2, 2021) Label each of the chiral centers in the compound below as R or S.



Remember: break ties by moving through the ring of possible

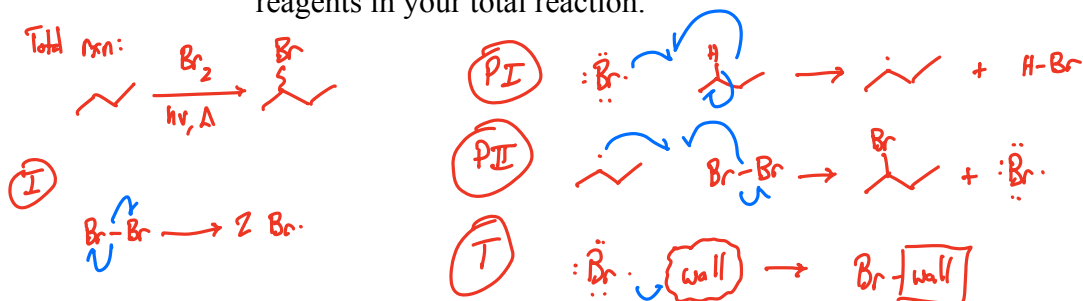
a.

(beta-D-glucose)

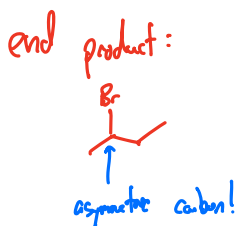
↳ FQ: what does "D" or "L" mean?
Does it correlate w/ R/S?
↓
NO!!!

3. (Integrated for Ch4&5) Consider the bromination of butane.

- a. Draw the total reaction and a mechanism for the production of the major product (include at least 1 termination step in your mechanism). Include any required reagents in your total reaction.



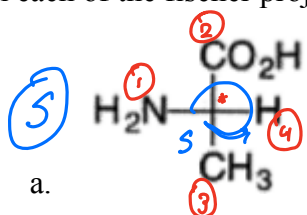
- b. Will the end-product be optically active? Explain.



No, we will produce a racemic mixture of the major product, as the starting reagents are not optically active.

Section 2: Fischer Projections

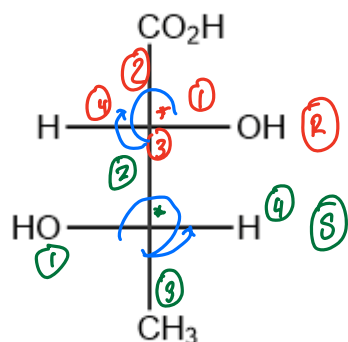
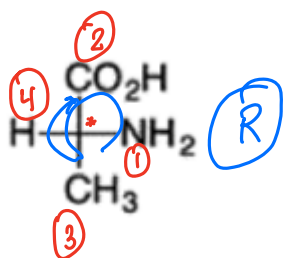
4. In each of the fischer projections below, provide R/S labeling to all asymmetric carbons.



most oxidized carbon on top!

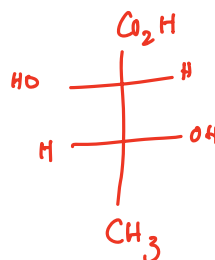
FQ: what do the lines in a fischer mean?

horizontal = out of the page
vertical = into the page



FQ: draw the enantiomer of (c)

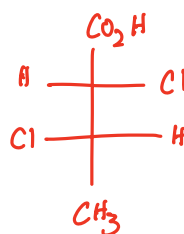
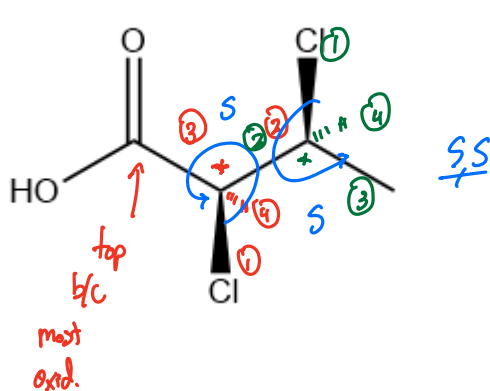
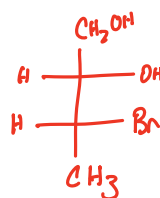
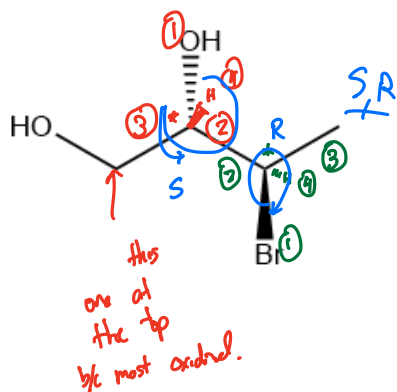
A:

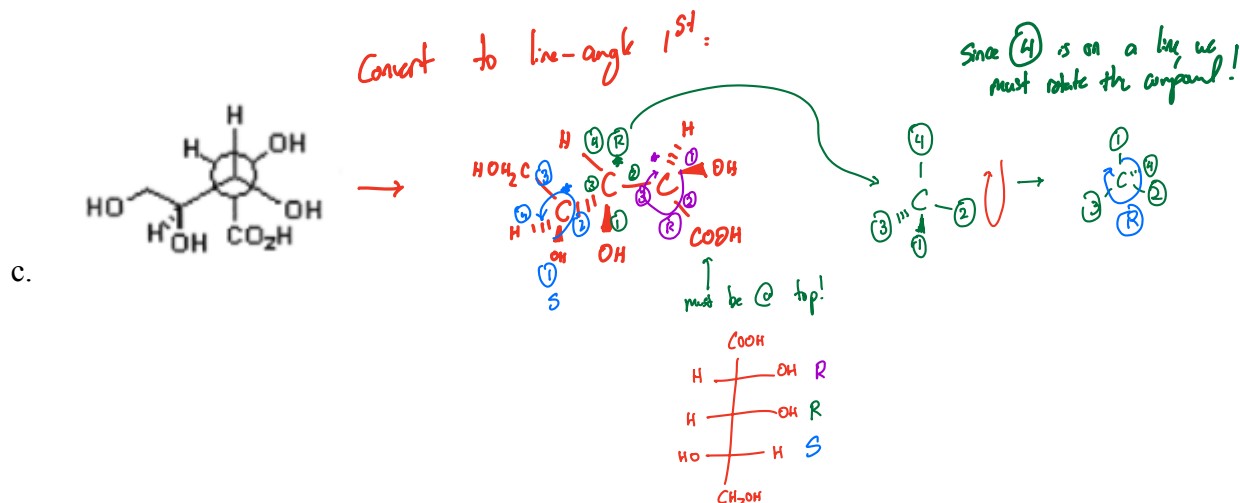


c.

5. Convert each of the following diagrams to fischer projections.

label R/S 1st, then convert.





Section 3: Short answer practice with Fischer Projections & R/S configurations

6. Would a 50:50 mixture of (2R,3R) 2-chloro-3-bromobutane and (2S,3S) 2-chloro-3-bromobutane be optically active? Explain.

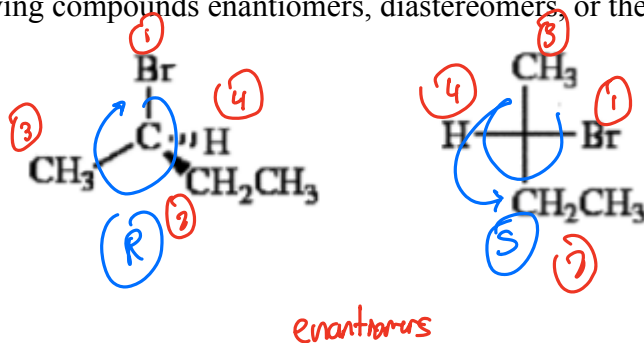
No; they are enantiomers. \wedge Equal mix of enantiomers is a racemic solution, which is not optically active.

7. Would a 50:50 mixture of (2R,3R) 2,3-dibromobutane and (2R,3S) 2,3-dibromobutane be optically active? Explain.

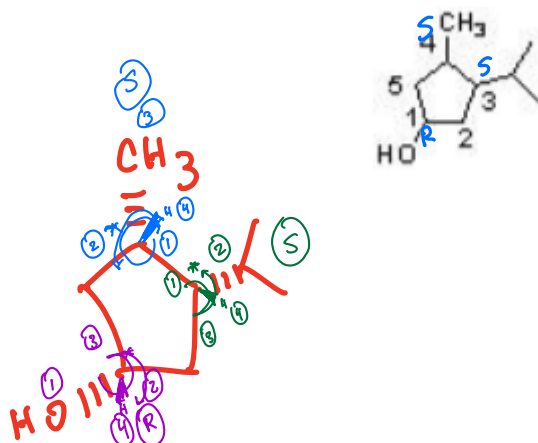
Yes; they are diastereomers. \rightarrow optically active

MeSO! No optical rotation at all.

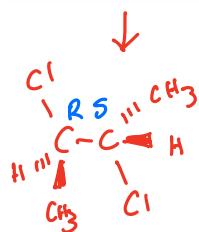
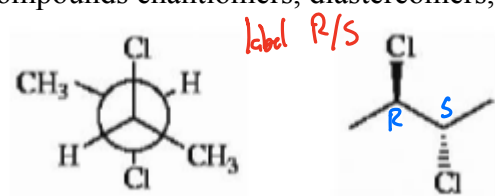
8. Are the following compounds enantiomers, diastereomers, or the same compound?



9. For the structure below, draw the stereoisomer with a configuration of (1R,3S,4S).



10. Are the following compounds enantiomers, diastereomers, or the same compound?



Same Compound.