

# Stereochemistry Exam Preparation Pack

## 24 Key Problem Types - Beginner / Intermediate

note - all problems can also be found [here](#) (link)

### Section A: Assigning relationships

Link to answer

<https://bit.ly/39Or4N7>

Decide if these molecules are enantiomers or diastereomers  
**based on the name alone.**

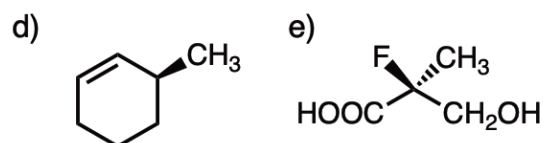
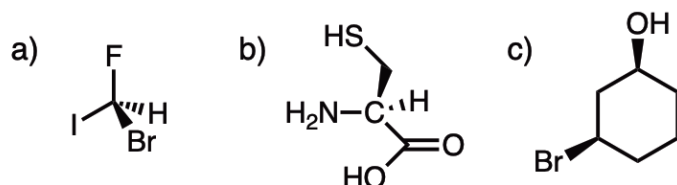


- 1) (*R*)-Butan-2-ol and (*S*)-Butan-2-ol
- 2) (*2R,3R*)-2-Bromo-3-chlorobutane and (*2S,3S*)-2-Bromo-3-chlorobutane
- 3) (*R,R*)-Tartaric acid and (*R,S*)-Tartaric acid
- 4) (*2R,4R*)-2,3,4-Pentanetriol and (*2S,4S*)-2,3,4-Pentanetriol
- 5) (*R,R,R,R,R*)-BigComplicatedMoleculicine and (*R,R,R,R,S*)-BigComplicatedMoleculicine
- 6) (*E*)-Hex-3-ene and (*Z*)-Hex-3-ene
- 7) (*R,E*)-4-Hexen-2-ol and (*S,Z*)-4-Hexen-2-ol
- 8) (*R,E*)-4-Hexen-2-ol and (*R,Z*)-4-Hexen-2-ol
- 9) (*R,E*)-4-Hexen-2-ol and (*S,E*)-4-Hexen-2-ol
- 10) (*1R,2S*)-1,2-Dimethylcyclohexane and (*1S, 2R*)-1,2-Dimethylcyclohexane
- 11) *cis*-1,2-Dimethylcyclohexane and *trans*-1,3-Dimethylcyclohexane
- 12) (*R,S*)-2,3-Dichlorobutane and (*S,R*)-2,3-Dichlorobutane

## Section B: Assigning R/S

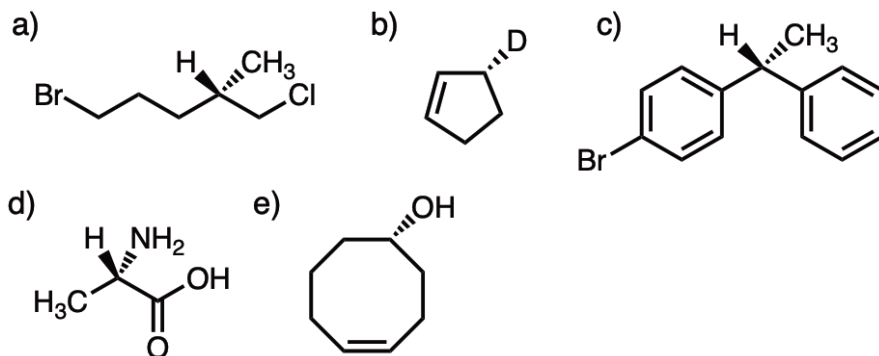
**B-1** Assign all chiral centers as R or S

<https://bit.ly/3kNsSfq>



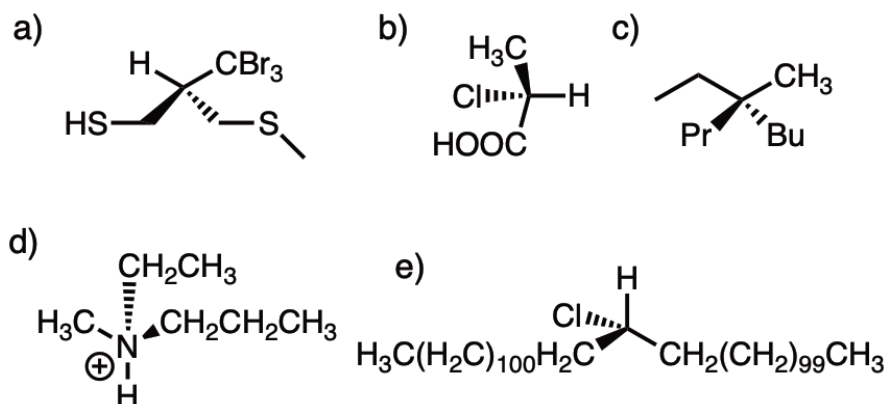
**B-2** Assign all chiral centers as R or S

<https://bit.ly/3zTr9JU>

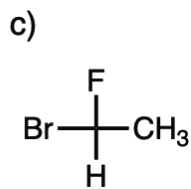
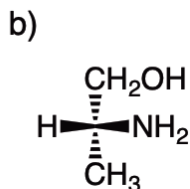
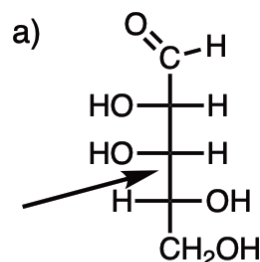


**B-3** Assign R or S to all chiral centers

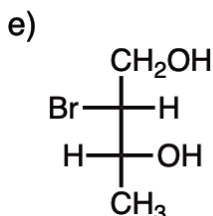
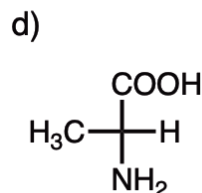
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**B-4** Assign R or S to the indicated chiral center in these Fischer projections

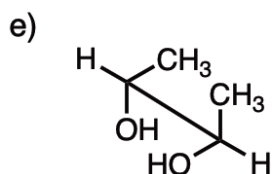
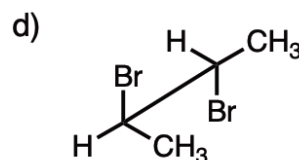
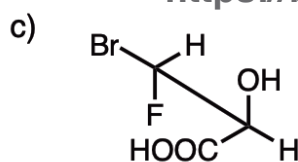
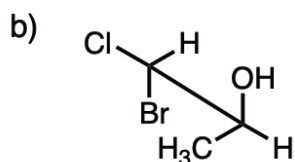
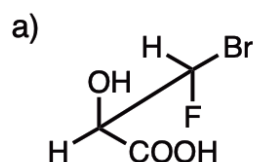


<https://bit.ly/2XTf9e8>



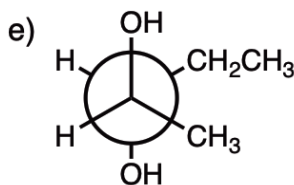
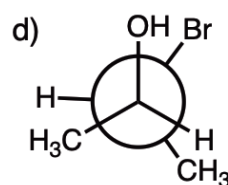
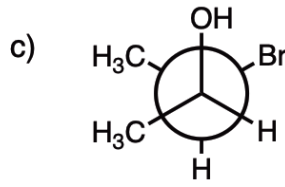
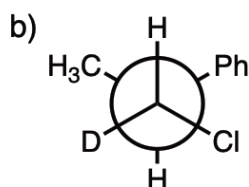
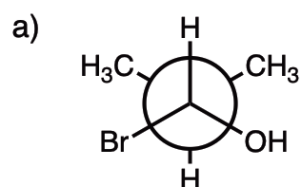
**B-5** Assign R or S to the chiral centers in these Sawhorse projections

<https://bit.ly/3kOt1iV>



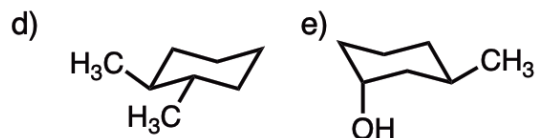
**B-6** Assign R or S to the chiral centers in these Newman projections

<https://bit.ly/39JlueX>

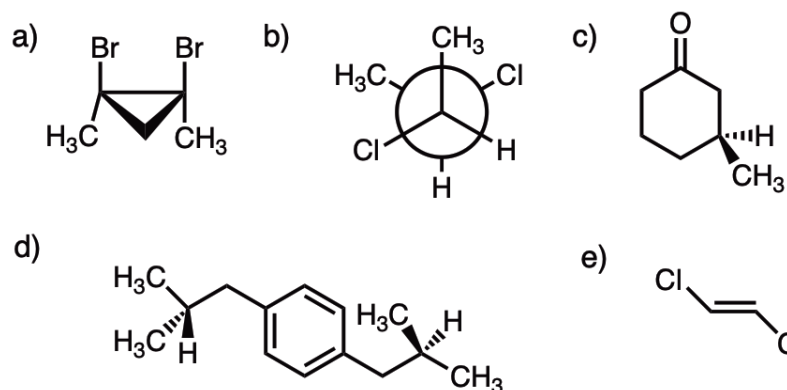


**B-7** Assign R or S to the chiral centers in these cyclohexane chairs

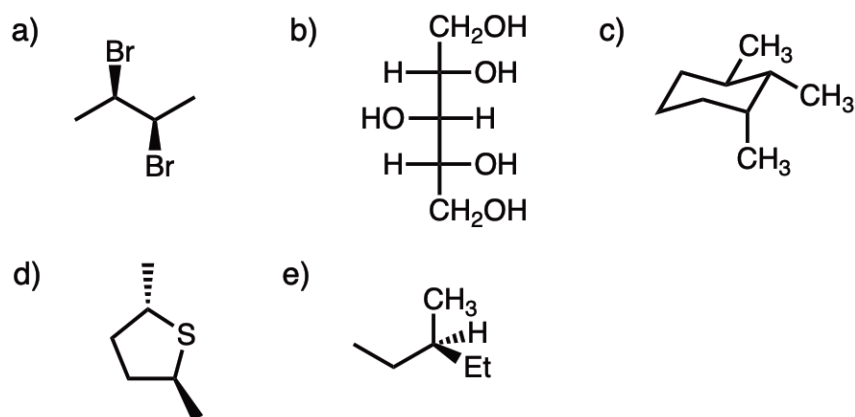
a)  b)  c)  <https://bit.ly/2XZQhSx>



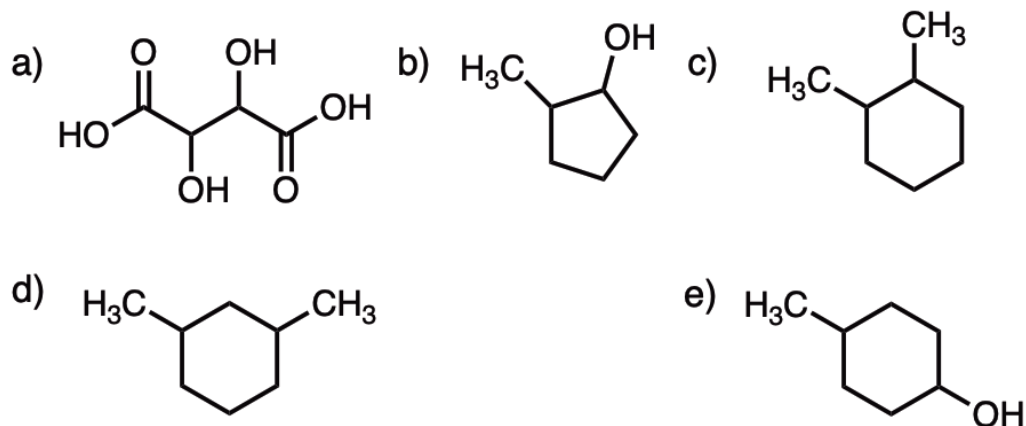
**C-1** Are these chiral or achiral molecules? <https://bit.ly/3kQEZIA>



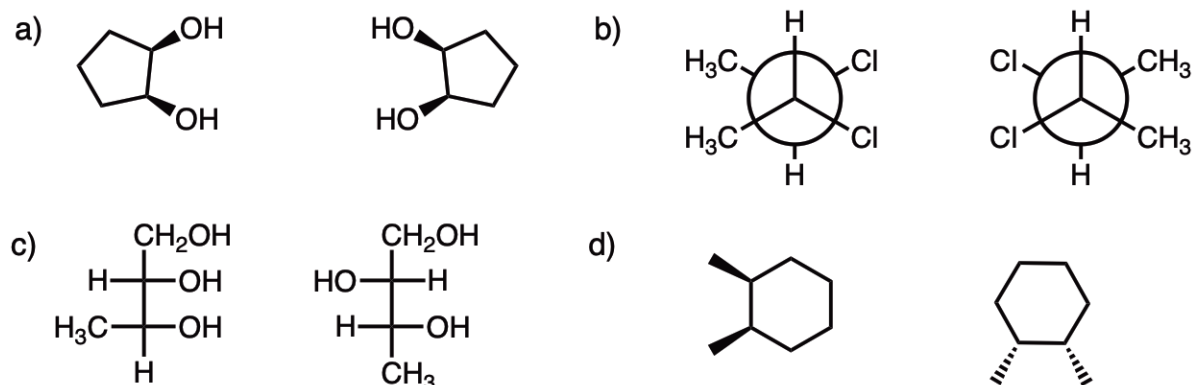
**C-2** Another set. Chiral or achiral molecules? <https://bit.ly/39Ltigk>



**D-1** Decide if a molecule has chiral centers and if so, how many stereoisomers each has. If there is a meso compound, draw the structure using wedge/dash  
<https://bit.ly/2WiLk6e>

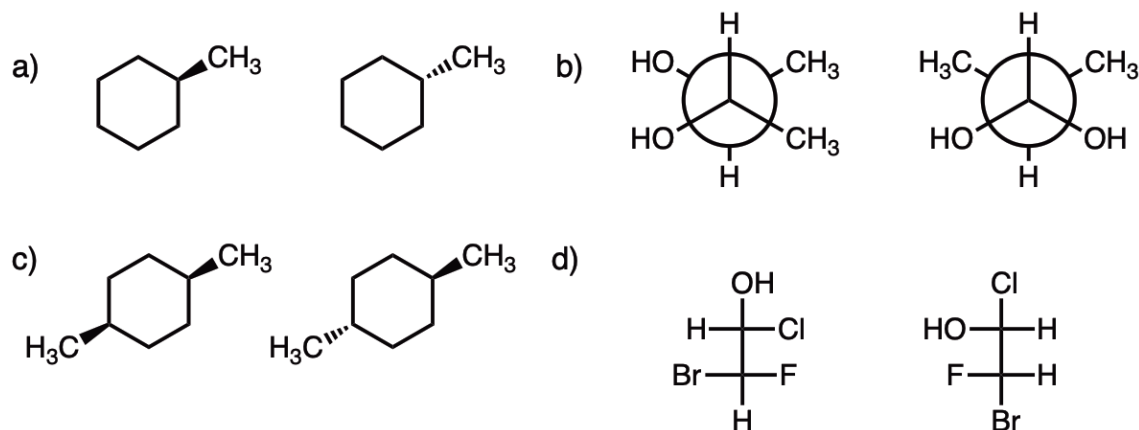


**E-1** Decide if these molecules are enantiomers, diastereomers, the same, or constitutional isomers [*pssst - this is a very common class of exam problem!*]  
<https://bit.ly/3uh7JO0>



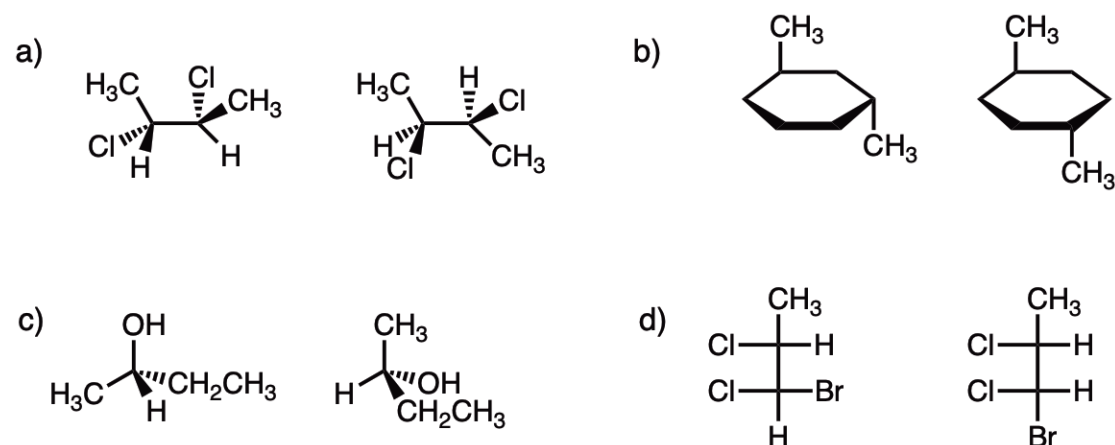
**E-2** Enantiomers, diastereomers, the same, or constitutional isomers?

<https://bit.ly/3kMNggF>



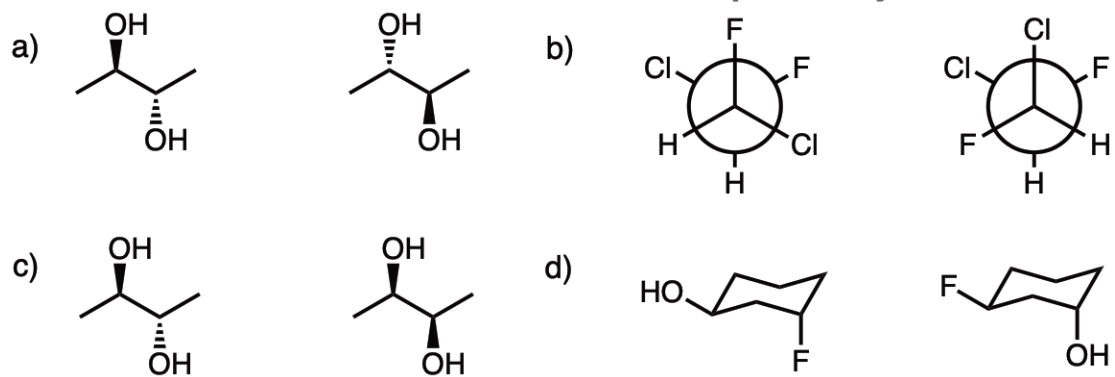
**E-3** Enantiomers, diastereomers, the same, or constitutional isomers?

<https://bit.ly/3ul99a3>

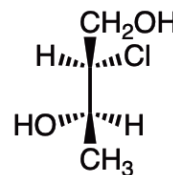
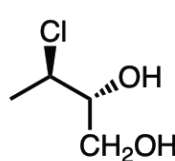
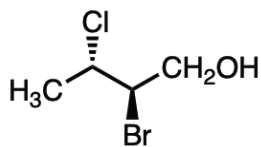
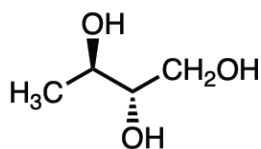


**E-4** Enantiomers, diastereomers, the same, or constitutional isomers?

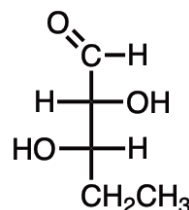
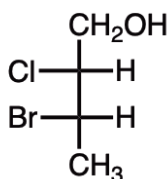
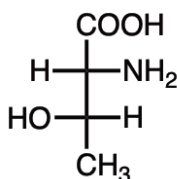
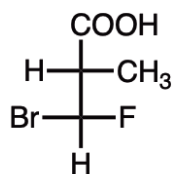
<https://bit.ly/3kLGZ58>



**F-1** Convert each of these line drawings (“perspective” drawings) to a Fischer projection.  
<https://bit.ly/39lOaoe>

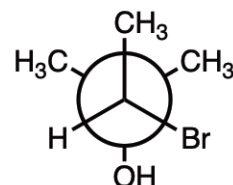
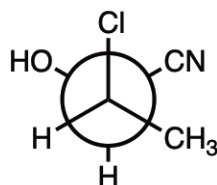
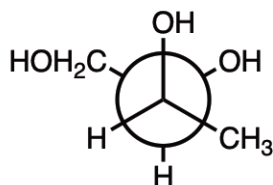
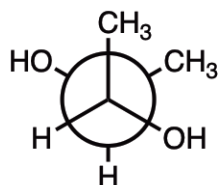


**G-1** Convert each of these Fischer projections to line drawings (use the template below)  
<https://bit.ly/3m0tEol>



**H-1** Convert each of these Newman projections to a Fischer projection.

<https://bit.ly/2YbJlw1>



**I-1** Given these names, draw the following molecules:

- (S)-2-Chlorobutane
- (2R,3R)-3-Chloropentan-2-ol
- (1R,2S)-2-Amino-1-phenylpropan-1-ol

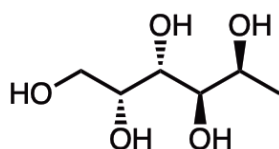
<https://bit.ly/3kM1Ox8>



**J-1** The structure below is one enantiomer of the molecule Fucitol.

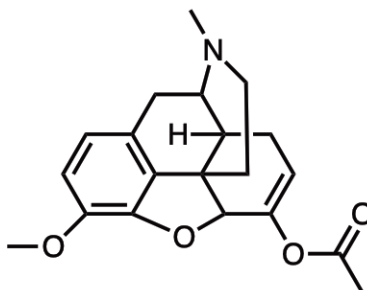
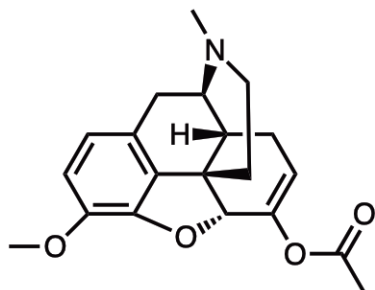
Draw the enantiomer of this molecule, which also goes by the name D-Fuc-ol.

<https://bit.ly/3uxJw6l>



**J-2** The structure below goes by the name Thebacon. How many chiral centers does Thebacon have? For bonus points draw the enantiomer using the template on the right.

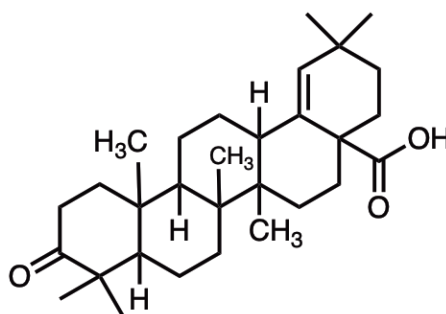
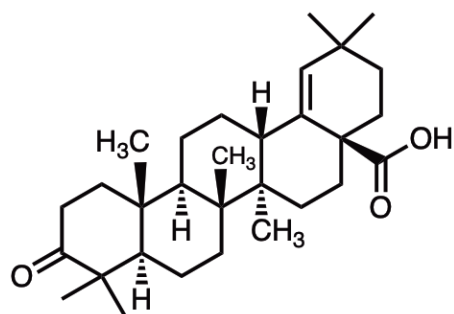
<https://bit.ly/3ukz5CJ>





**J-3** The molecule below is known as Moronic acid. How many chiral centers does it have? Try drawing the enantiomer using the template on the right.

<https://bit.ly/3zTtu7E>



**K-1** Optical rotation questions.

<https://bit.ly/3ohsqbl>

a) If the specific rotation of (+)-Fucitol is  $+50^\circ$ , and the rotation of a sample of Fucitol is measured to be  $-10^\circ$ , what is the per-cent composition of (+)-Fucitol and (–)-Fucitol in the sample?



b) A 5.0 mg sample of Thebacon is dissolved in 1.0 mL of methanol and the solution placed in a cell with a 2.0 cm path length. The observed rotation was  $+0.105^\circ$ .

What is the  $[\alpha]_D$  for Thebacon?

**L-1** [Assumes you have covered free-radical reactions of alkanes]

How many different monochlorinated isomers (including stereoisomers) are possible for each of these molecules?

<https://bit.ly/3zQaZBd>

