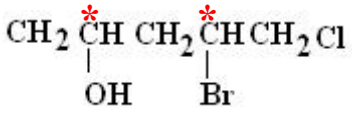
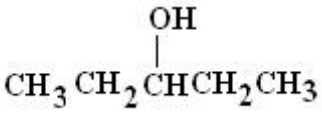
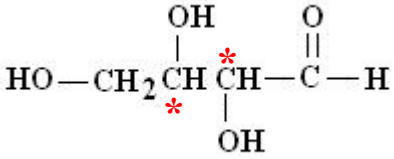
REVIEW QUESTIONS

Chapter 26

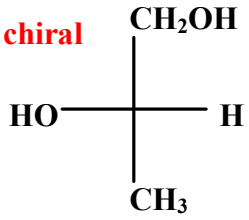
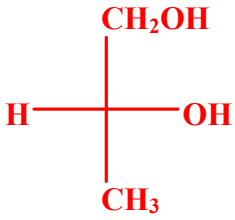
1. Identify any chiral carbon(s) in each compound shown below:
   Chiral carbons have 4 different groups attached to them, and are indicated by an asterisk (*)

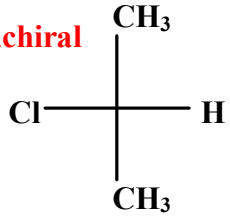
a) 

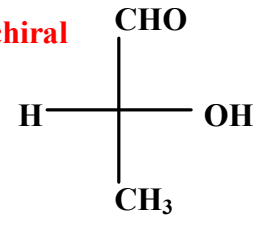
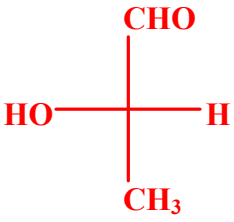
b)  **No chiral carbons**

c) 

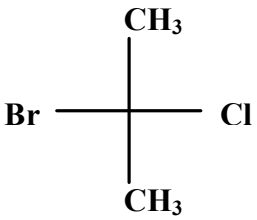
2. Determine if each of the Fisher projections shown below is a chiral compound. If so, draw the mirror image.

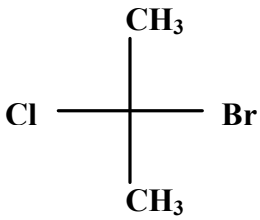
a)  **chiral**  **Mirror image**

b)  **achiral**

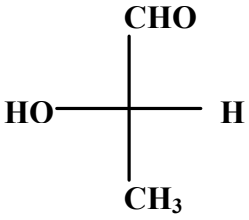
c)  **chiral**  **Mirror image**

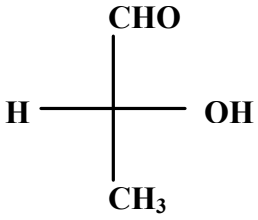
3. Indicate whether each pair of Fisher projections represent enantiomers or identical structures:

a) 

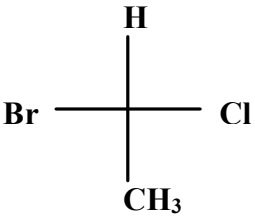
and 

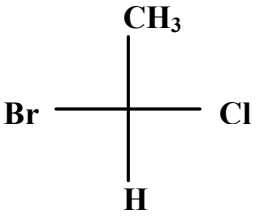
Identical molecules since they are achiral

b) 

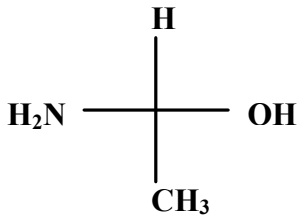
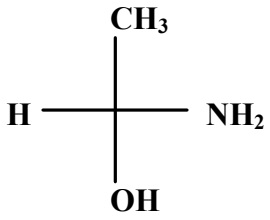
and 

Enantiomers since they are chiral and require one change (H and OH) to interconvert

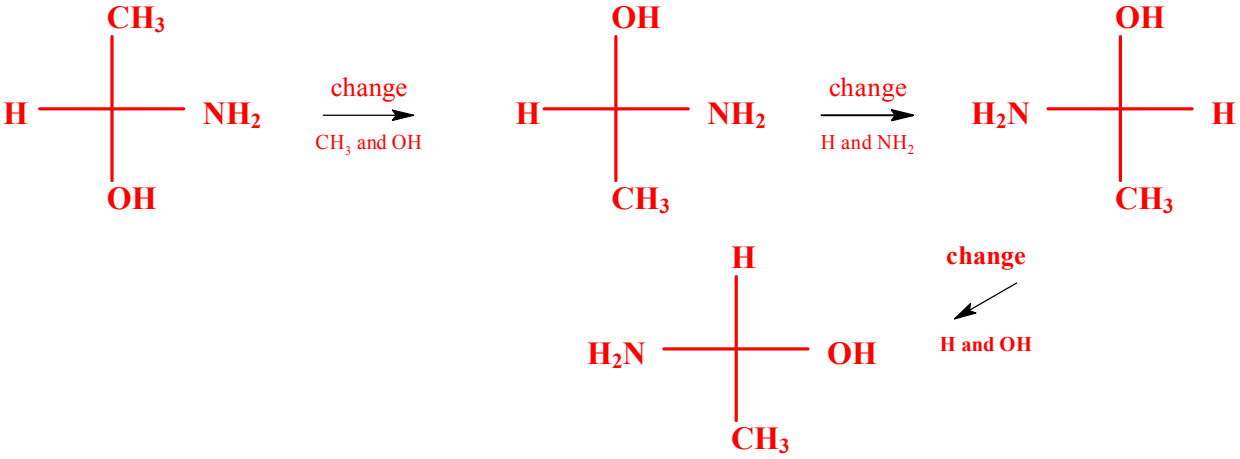
c) 

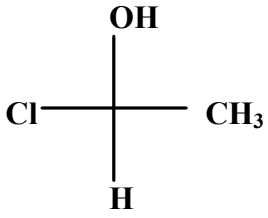
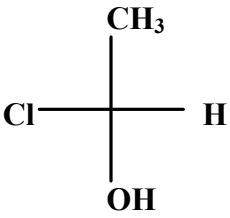
and 

Enantiomers since they are chiral and require one change (H and CH_3) to interconvert

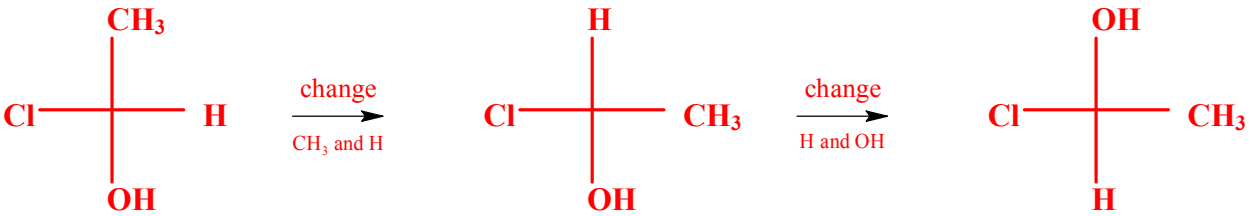
d)  and 

Enantiomers since they are chiral and require 3 change to interconvert

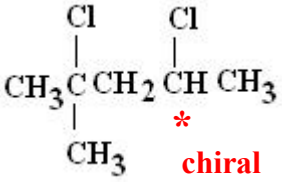


e)  and 

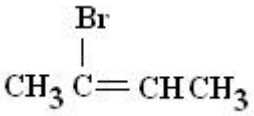
Identical molecules since they are chiral and require 2 change to interconvert



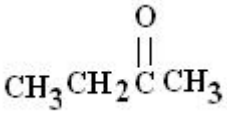
4. Identify each compound below as chiral or achiral. If chiral, indicate the chiral carbon. (**Chiral carbons are indicated with an asterisk)**

a) 

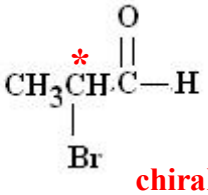
chiral

b) 

achiral

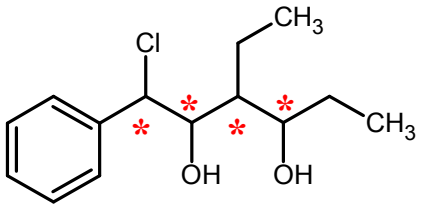
c) 

achiral

d) 

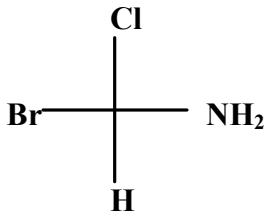
chiral

5. How many chiral carbons does the compound shown below possess? How many stereoisomers can this compound have?

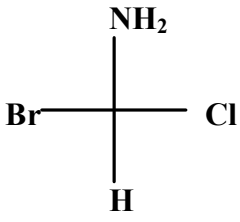


Four chiral carbons present (marked by asterisks)
Total number of stereoisomers = 16 (2^4)

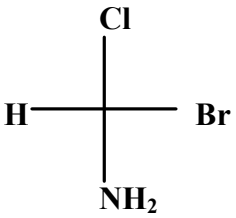
6. Three of the structures shown below are the same compound. The other is the enantiomer. Which is the enantiomer?



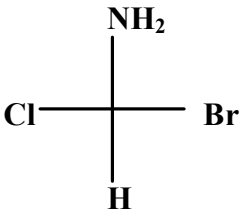
(a)



(b)



(c)

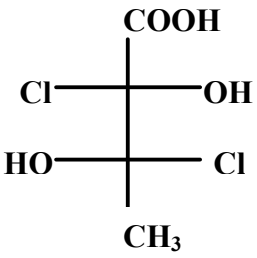


(d)

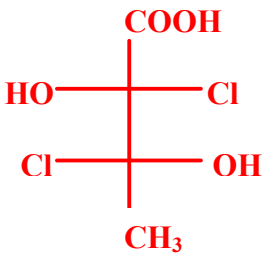
Structure (b) is the enantiomer, since it requires one change (Cl and NH_2) to interconvert to (a). Structures (c) and (d) are identical to (a) since they each require 2 changes to interconvert.

7. Draw all the stereoisomers possible for the structures below. Identify enantiomer pairs, diastereomer pairs and meso compounds.
Since the molecule has 2 chiral carbons, there are 4 stereoisomers possible.

a)



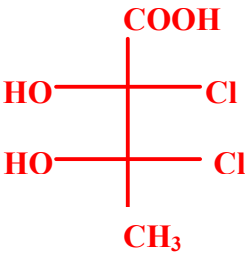
(I)



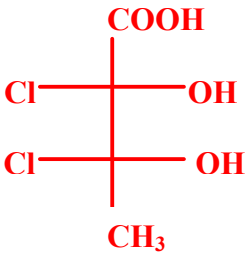
(II)

Enantiomers

I and II
III and IV



(III)



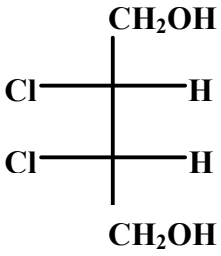
(IV)

Diastereomers

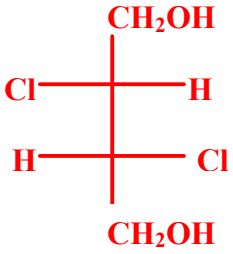
I and III
I and IV
II and III
II and IV

Since the molecule has 2 chiral carbons, there are 4 stereoisomers possible. However, due to the symmetry of the molecule one of the structures is meso.

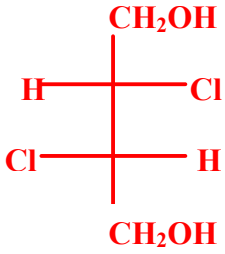
b)



(I)



(II)



(III)

Enantiomers: **II and III**

Diastereomers: **I and II**
I and III

Meso Compound: **I**