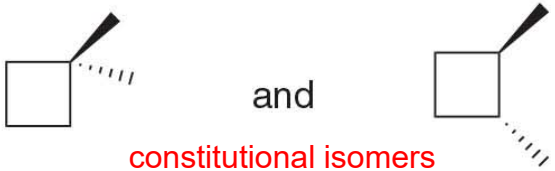
Define if constitutional isomers or stereoisomers.

a.  and

constitutional isomers

b.  and

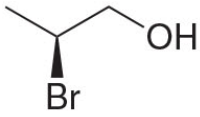
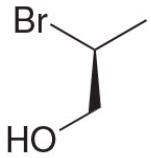
constitutional isomers

c.  and

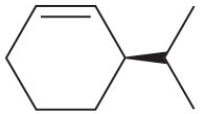
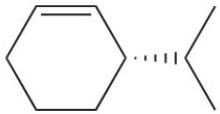
constitutional isomers

d.  and

diastereoisomers

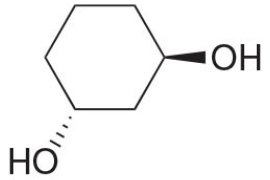
a.  and 

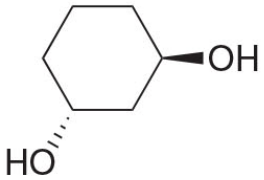
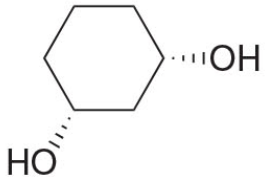
omomers

b.  and 

enantiomers

constitutional isomers

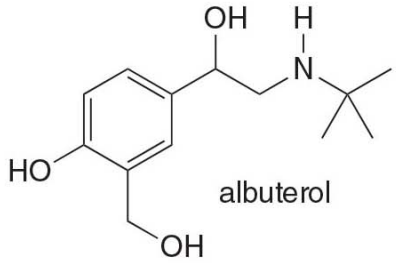
c.  and 

d.  and 

diastereoisomers

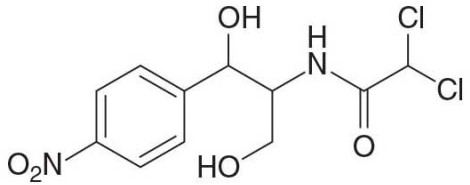
Locate the stereogenic centers in each drug. Albuterol is a bronchodilator—that is, it widens airways—so it is used to treat asthma. Chloramphenicol is an antibiotic used extensively in developing countries because of its low cost.

a.



albuterol

b.

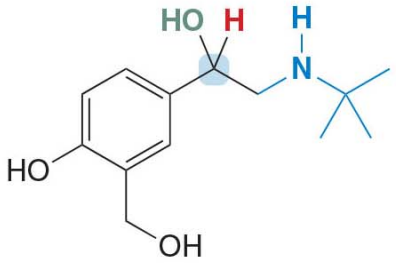


chloramphenicol

Solution

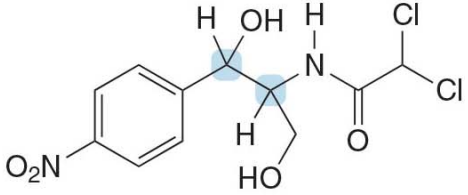
Omit all CH_2 and CH_3 groups and all doubly bonded (sp^2 hybridized) C's. In albuterol, one C has three CH_3 groups bonded to it, so it can be eliminated as well. Draw in H atoms on tetrahedral C's in skeletal structures to more clearly see the groups. This leaves one C in albuterol and two C's in chloramphenicol surrounded by four different groups, making them stereogenic centers.

a.



one stereogenic center

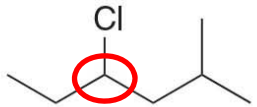
b.



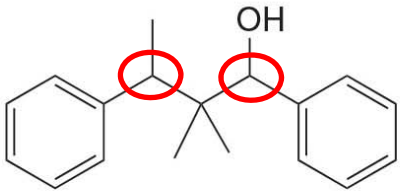
two stereogenic centers

Locate the stereogenic centers in each molecule.

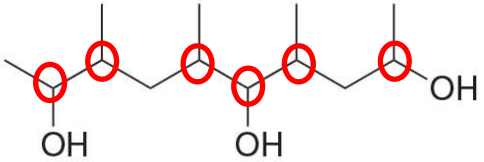
a.



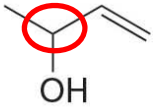
c.



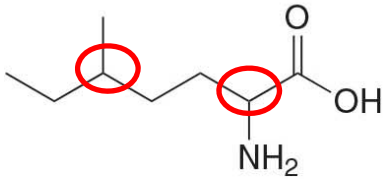
e.



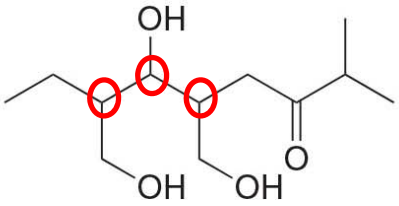
b.



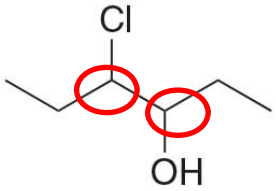
d.



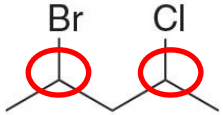
f.



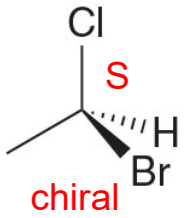
a.



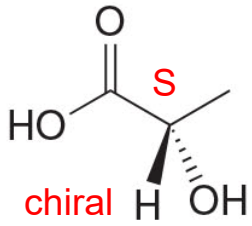
b.



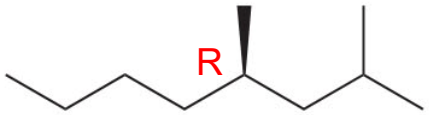
Assign R or S configuration at each stereocenter and determine if the molecule is chiral.

a. 

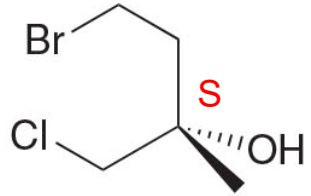
chiral

b. 

chiral

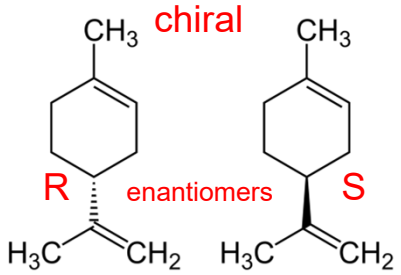
c. 

chiral

d. 

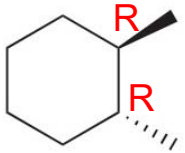
chiral

Limonene

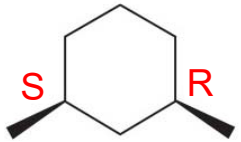


chiral

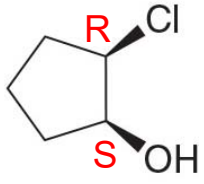
fragrance of oranges turpentine-like odor

a. 

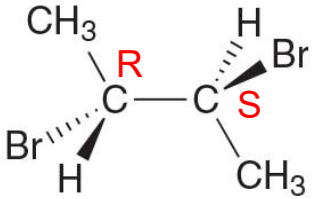
chiral

b. 

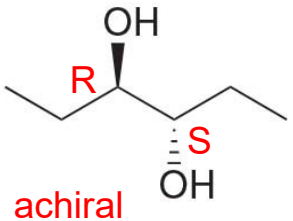
achiral
(meso form)

c. 

chiral

a. 

achiral
(meso form)

b. 

achiral
(meso form)

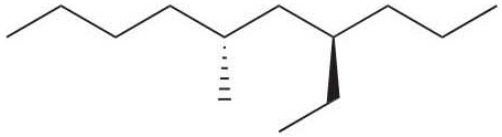
Draw the following molecules (skeletal representation including stereochemistry).

a. (*R*)-3-methylhexane
b. (4*R*,5*S*)-4,5-diethyloctane
c. (3*R*,5*S*,6*R*)-5-ethyl-3,6-dimethylnonane
d. (3*S*,6*S*)-6-isopropyl-3-methyldecane

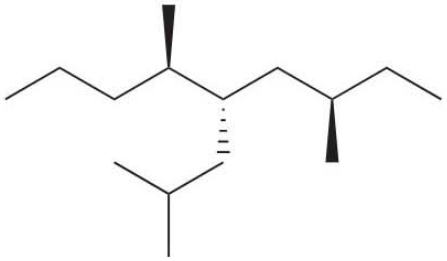
Assign the IUPAC name to the following molecules.

a. 

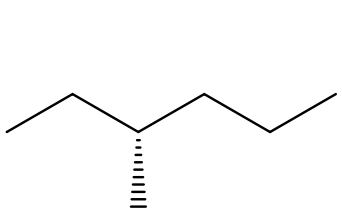
(S)-3-methylhexane

b. 

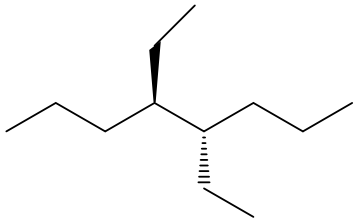
(4R,6R)-4-ethyl-6-methyldecane

c. 

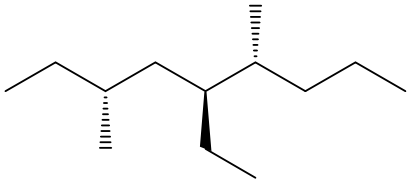
(3R,5S,6R)-5-isobutyl-3,6-dimethylnonane



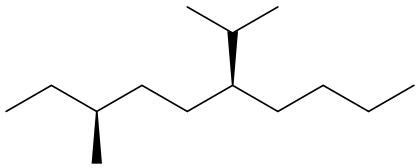
a.



b.



c.



d.