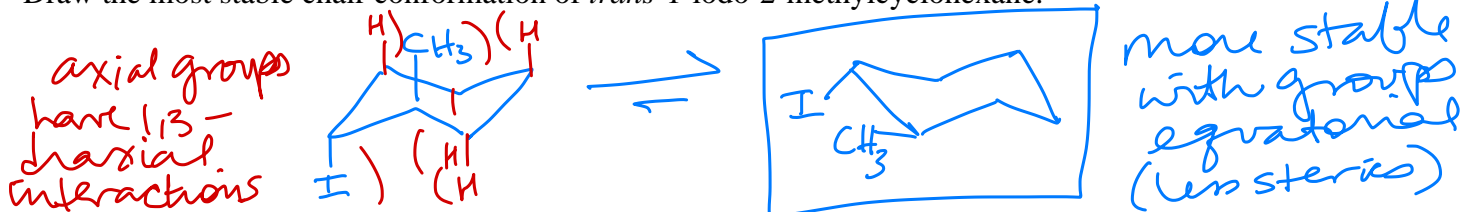


Exam II Review – Practice Problems

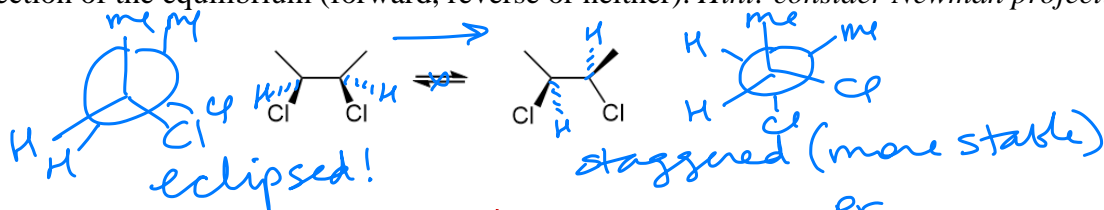
1

Draw the most stable chair conformation of *trans*-1-iodo-2-methylcyclohexane.



Predict the direction of the equilibrium (forward, reverse or neither). Hint: consider Newman projections.

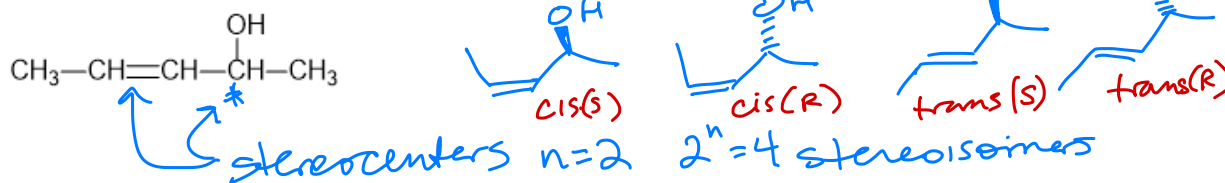
2



Draw a Fischer projection and line drawing of (*S*)-4-bromononane.

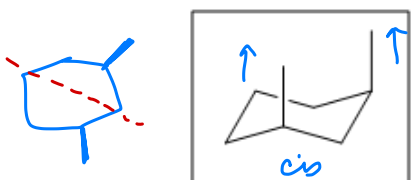
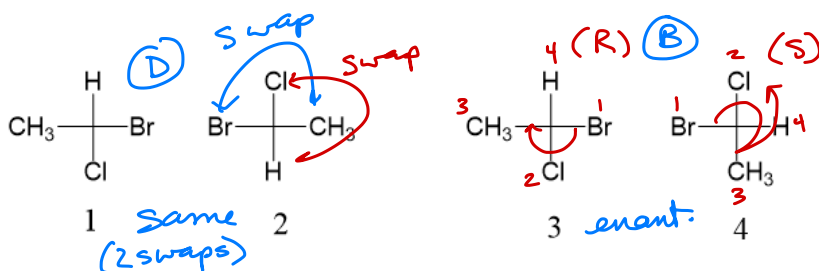


Draw all stereoisomers of the given compound:

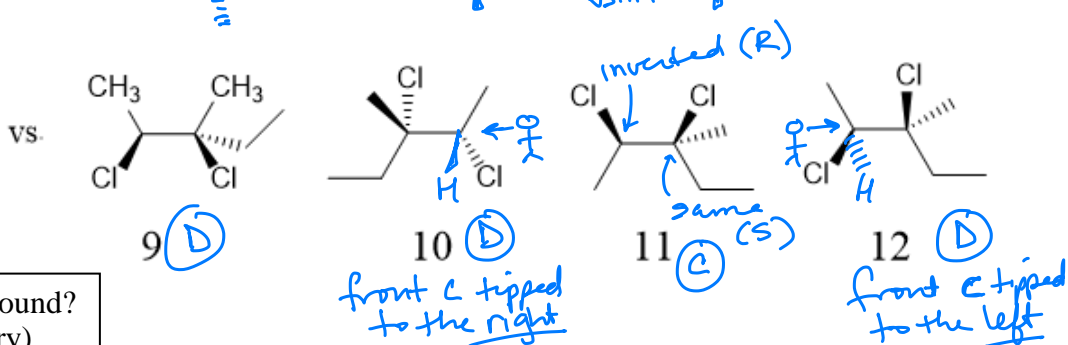
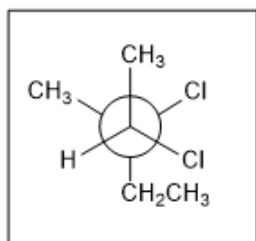
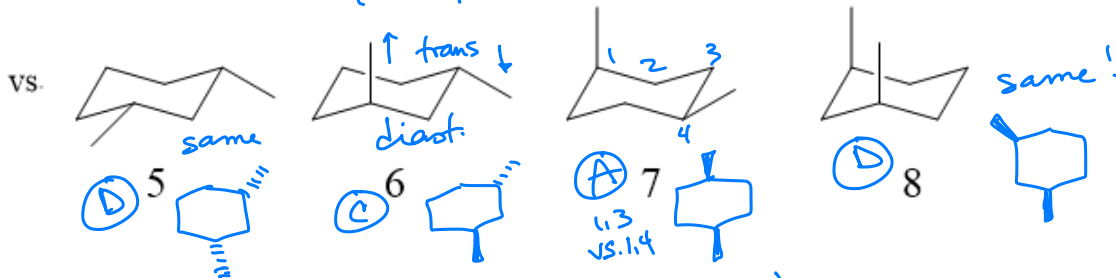


Determine relationship between given pairs:

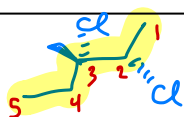
- A) constitutional isomers
- B) enantiomers
- C) diastereomers
- D) the same compound
- E) unrelated



meso achiral (no enantiomer!)



IUPAC name of this compound?
(Include stereochemistry)

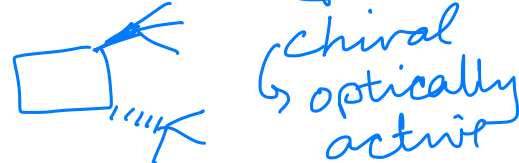
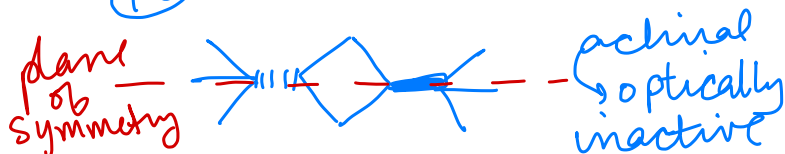


(2*S*,3*S*)-2,3-dichloro-3-methylpentane

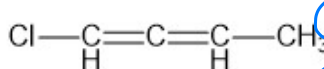
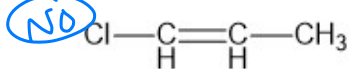
4 Determine whether or not each compound below is **optically active**. Explain.

NO *trans*-1,3-diisopropylcyclobutane

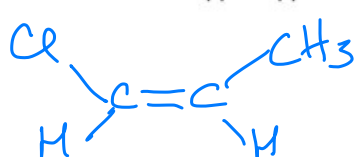
trans-1,2-diisopropylcyclobutane



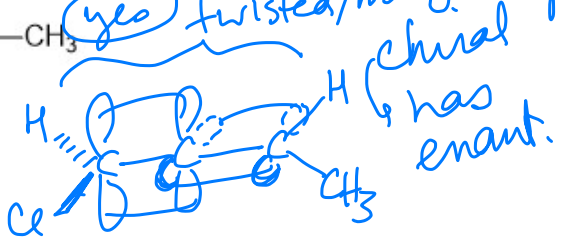
5 Determine whether or not each compound below has an enantiomer. Explain.



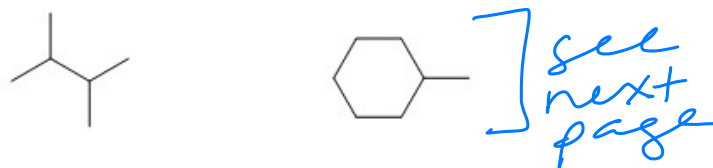
achiral (planar) → no enant.



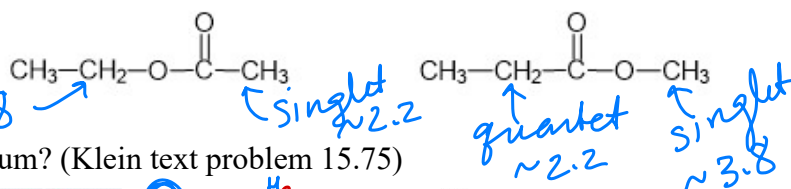
* recall 3D sketch (Klein sec 5.9)



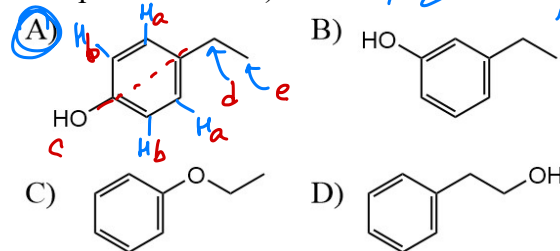
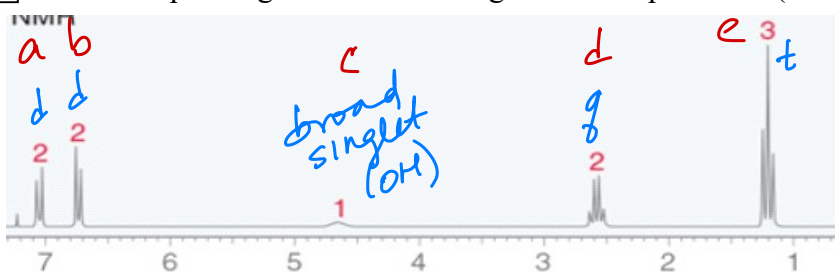
For each compound, draw all the constitutional isomers with the given carbon chain, plus one chlorine atom. Name each compound and mark all chiral centers with an asterisk (*). (Work on a separate page)



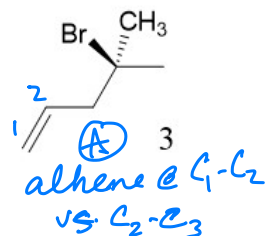
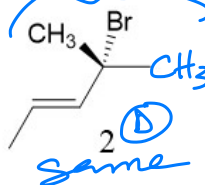
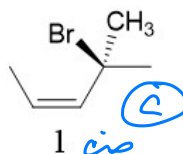
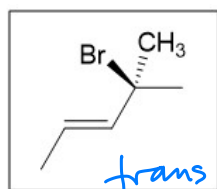
6 Which would be better to distinguish the following compounds, ¹H or ¹³C NMR (or are they equally suitable)? Explain, and describe the difference(s) to look for.



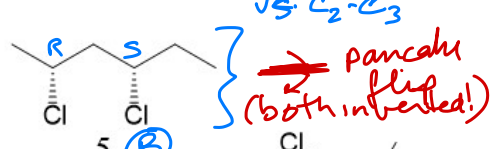
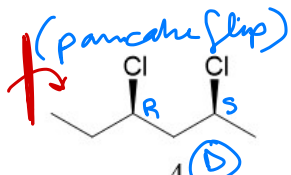
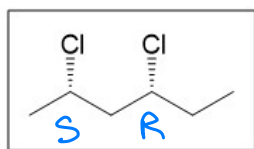
7 Which compound gives the following ¹H NMR spectrum? (Klein text problem 15.75)



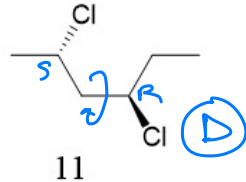
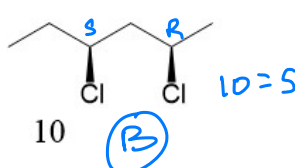
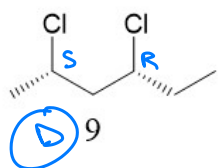
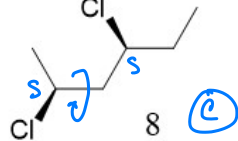
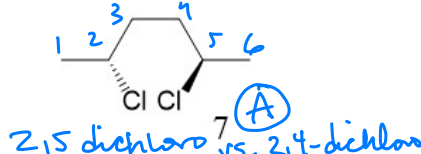
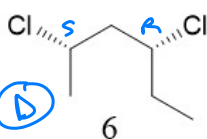
What is the relationship of the following pairs of compounds? (Compare the structure in each box to the other drawings.)



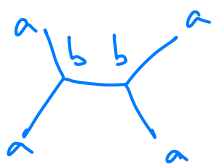
- A) constitutional isomers
- B) enantiomers
- C) diastereomers
- D) the same compound
- E) unrelated



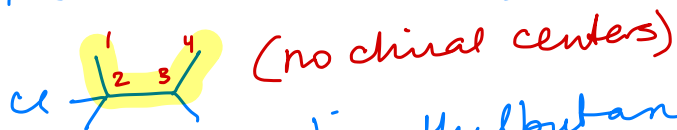
only a bond rotation: tipped both Cl atoms forward, pushes both alkyl groups back



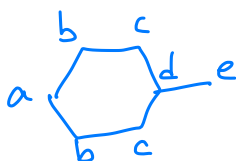
only 2 unique positions (attach Cl @ a or b)



1-chloro-2,3-dimethylbutane

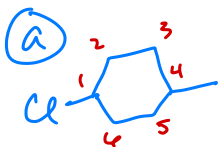


2-chloro-2,3-dimethylbutane

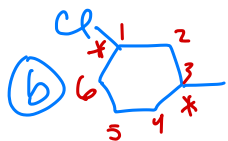


five unique positions

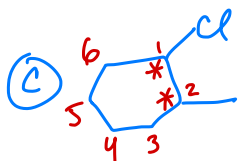
↳ 5 constitutional isomers



1-chloro-4-methylcyclohexane
(no chiral centers)



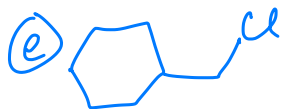
1-chloro-3-methylcyclohexane
(2 chiral centers)



1-chloro-2-methylcyclohexane
(2 chiral centers)



1-chloro-1-methylcyclohexane
(no chiral centers)



(chloromethyl)cyclohexane
(no chiral centers)

* note: carbon in ring with attached Cl is #1 because chloro comes before methyl alphabetically