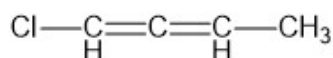
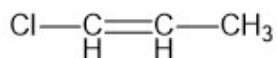


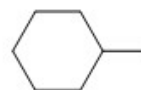
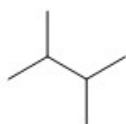
4 Determine whether or not each compound below is optically active. Explain.



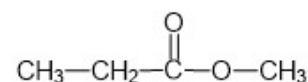
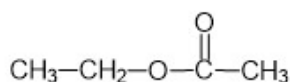
5 Determine whether or not each compound below has an enantiomer. Explain.



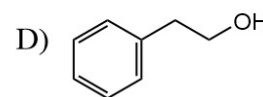
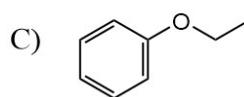
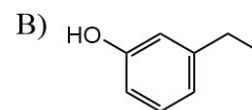
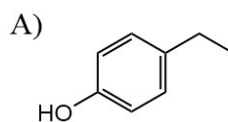
For each compound, draw all the constitutional isomers with the given carbon chain, plus one chlorine atom. Name each compound and mark all chiral centers with an asterisk (*). (Work on a separate page)



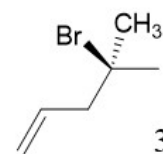
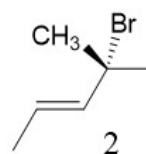
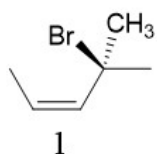
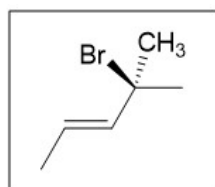
6 Which would be better to distinguish the following compounds, ¹H or ¹³C NMR (or are they equally suitable)? Explain, and describe the difference(s) to look for.



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

