

## Chemguide – questions

### OPTICAL ISOMERISM

1. Read the following bit of text, and then answer the questions after it. You should expect to find it difficult to read. I have deliberately included as many of the unfamiliar words as possible!

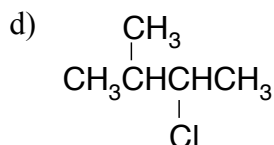
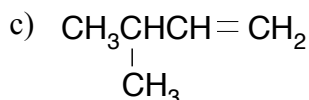
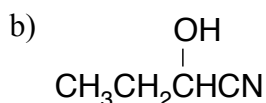
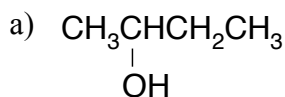
2-aminopropanoic acid (alanine) has two enantiomers (optical isomers) because it has a chiral molecule containing an asymmetric carbon atom. One enantiomer is a non-superimposable mirror image of the other.

The two enantiomers rotate the plane of polarisation of plane polarised light in opposite directions, but 2-aminopropanoic acid can also be found as a racemic mixture which has no effect on the plane of polarisation.

2-aminopropanoic acid has the structure:

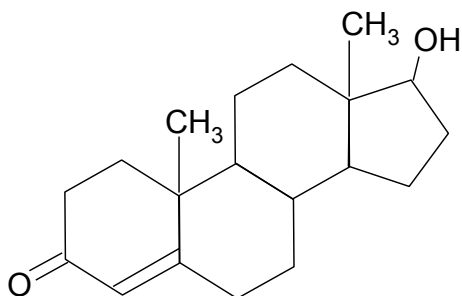
$$\begin{array}{c} \text{CH}_3\text{CHCOOH} \\ | \\ \text{NH}_2 \end{array}$$

- a) Draw the structures of the two enantiomers. Use your diagram to explain what is meant by the term *non-superimposable mirror image*.
- b) Explain what is meant by a *chiral molecule* and say how you would recognise an *asymmetric carbon atom*.
- c) Why doesn't a racemic mixture have any effect on the plane of polarisation of plane polarised light?
2. Some, but not all, of the following molecules have optical isomers. For those that do, draw the structures for the two isomers.



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3. Draw the structure of the smallest alkane (with a general molecular formula of  $C_nH_{2n+2}$ ) which has optical isomers.
4. The structure of the hormone testosterone is:



Sketch this molecule and then draw a circle around all the asymmetric carbon atoms that you can find.