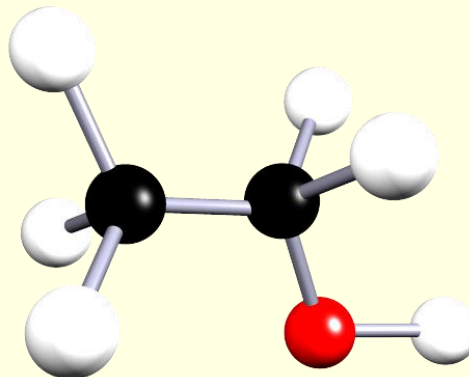
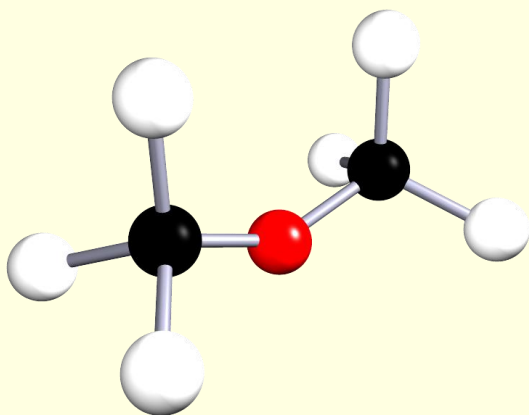


Position and functional group isomers

Answer all the questions below as fully as you can then check your answers

1. Give a definition for each of the following terms:
 - i. position isomer.
 - ii. functional group isomer.
2. The alcohols propan-1-ol and propan-2-ol are position isomers. Draw the displayed formula of these two alcohols and explain why they are position isomers.
 - a. What can you say about the chemical and physical properties of these two alcohols? Will they be similar or different? Explain your answer.
3. The ester methyl propanoate ($C_4H_8O_2$) and the carboxylic acid butanoic acid are functional group isomers of each other. Draw the structural formula of these isomers.
4. Alkynes contain one triple covalent bond between the carbon atoms. Butyne has the formula C_4H_6 . Draw the displayed formula for the two position isomers of butyne.

5. The two molecules shown below are ethanol and methoxymethane (dimethyl ether). Explain how these two molecules are related.



Answers

1. Give a definition for each of the following terms:

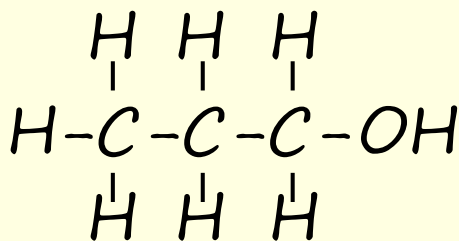
i. position isomer.

Positional isomers have the same carbon skeleton and the same functional groups but differ from each other in the location of the functional group in the carbon chain

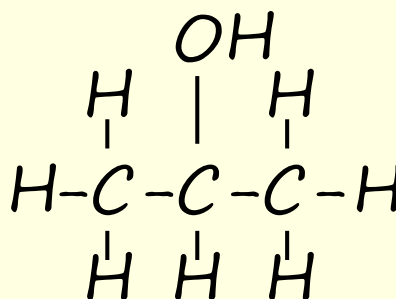
ii. functional group isomer.

Functional group isomers are molecules that have the same molecular formula but have different functional groups

2. The alcohols propan-1-ol and propan-2-ol are position isomers. Draw the displayed formula of these two alcohols and explain why they are position isomers.



Propan-1-ol



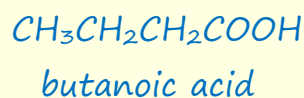
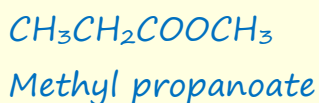
propan-2-ol

These two alcohols are position isomers because they both have the same molecular formula but the functional group, the hydroxyl group, is simply in different locations on the carbon skeleton for each alcohol.

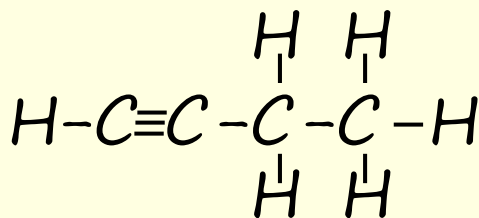
- a. What can you say about the chemical and physical properties of these two alcohols? Will they be similar or different? Explain your answer.

The chemical properties will depend on the functional group present and since both these alcohols have the same hydroxyl functional group their chemical properties will be very similar. However their physical properties, such as melting and boiling points and density are likely to be different due to differences in the intermolecular bonding as a result of the functional group being in different locations on the molecules.

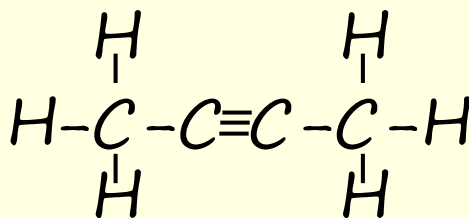
3. The ester methyl propanoate ($C_4H_8O_2$) and the carboxylic acid butanoic acid are functional group isomers of each other. Draw the structural formula of these isomers.



4. Alkynes contain one triple covalent bond between the carbon atoms. Butyne has the formula C_4H_6 . Draw the displayed formula for the two position isomers of butyne.

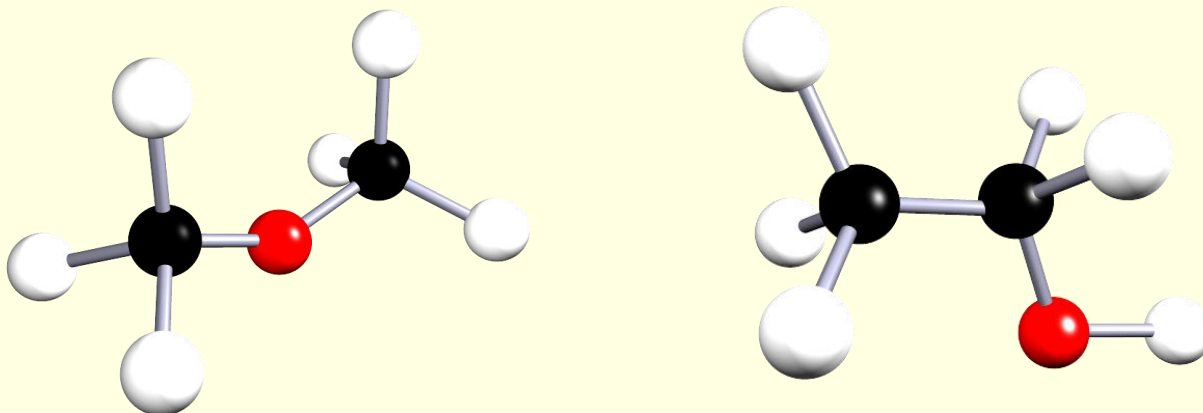


But-1-yne



But-2-yne

5. The two molecules shown below are ethanol and methoxymethane (dimethyl ether). Explain how these two molecules are related.



Both these molecules have the same molecular formula, C_2H_6O but they have different functional groups. They are functional group isomers.