

Alcohols

- Ethanol and propanol are members of the same homologous series.
 - Name this homologous series. _____
 - Write the general formula for the homologues series in (a). _____
 - What is the name of the functional group for this homologous series? _____
 - Give one similarity and one difference between the structures of ethanol and propanol.

Similarity: _____

Difference: _____
 - Ethanol has a boiling point of 78°C while propanol has a boiling point of 98°C . Explain why the boiling point increases when the number of carbon atoms per molecule increases.

 - When the vapour of propanol is passed over hot porcelain chips, propene is produced.
 - What is the name of the reaction that has occurred? _____
 - Write the chemical equation for the reaction that has occurred.

- Ethanol is most often used as a motor fuel, mainly as a biofuel additive for gasoline. In some countries, it is produced from glucose in sugar cane.
 - Name the process used to produce ethanol from sugar. _____
 - For the ethanol to be usable as a fuel, the majority of the water produced from the process in (a) must be removed. Name the method that can be used to separate water from ethanol.

 - Carbon dioxide, which is a greenhouse gas, is emitted during the combustion of ethanol. However, unlike the combustion of gasoline, ethanol does not add to the amount of existing carbon dioxide in the air. Explain why this is true.

1.
 - (a) Alcohol
 - (b) $C_nH_{2n+1}OH$
 - (c) Hydroxyl group
 - (d) Similarity: Both have the hydroxyl (-OH) functional group
Difference: Propanol has 1 carbon more than ethanol
 - (e) Intermolecular forces increases with increasing molecular mass. Hence, more energy is required to overcome these forces, resulting in higher boiling points.
 - (f)
 - (i) Dehydration
 - (ii) $C_3H_7OH \rightarrow C_3H_6 + H_2O$
2.
 - (a) Fermentation
 - (b) Fractional distillation
 - (c) The carbon dioxide produced from the combustion of ethanol is taken in by the plants for photosynthesis. The carbon is used to make sugars. Hence, there is no increase in the amount of carbon dioxide in the air.