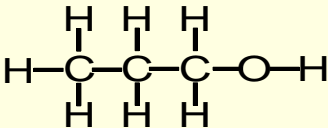


# Reactions of alcohols

Answers all the questions below then check your answers

1. The table below shows the formula and structure for the first 4 alcohols. Complete the table.

alcohol	Molecular formula	Displayed formula
methanol	$\text{CH}_3\text{OH}$	
ethanol		
		
butanol		

2. What functional group do all alcohols contain?
- a. Draw the functional group found in alcohols.

3. Describe how the solubility of alcohols change as you increase the chain length of the alcohol molecule.

4. Alcohols are all excellent fuels, they can be burned in lamps and burners. Complete the word and symbolic equations for the combustion of ethanol and butanol.

i. ethanol + oxygen  $\longrightarrow$

ii.  $C_2H_5OH + O_2 \longrightarrow$

iii. butanol + oxygen  $\longrightarrow$

iv.  $C_4H_9OH + O_2 \longrightarrow$

5. Alcohols react with reactive metals such as sodium and magnesium to form salts and hydrogen gas.

a. How is the reaction of sodium with water similar to that with alcohols and how is it different?

6. Complete the equations below:

a. sodium + ethanol  $\longrightarrow$

ii  $Na + C_2H_5OH \longrightarrow$

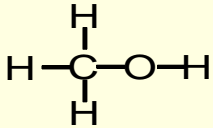
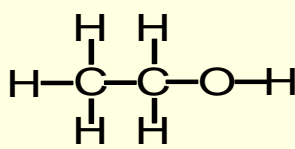
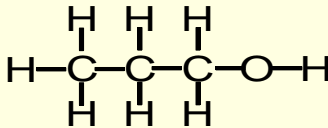
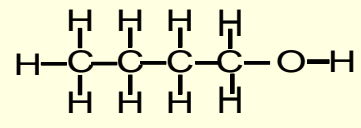
b. sodium + propanol  $\longrightarrow$

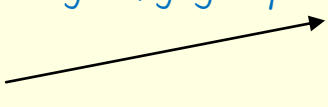
ii  $Na + C_3H_7OH \longrightarrow$



## Answers

1. The table below shows the formula and structure for the first 4 alcohols. Complete the table.

alcohol	Molecular formula	Displayed formula
methanol	$CH_3OH$	
ethanol	$C_2H_5OH$	
propanol	$C_3H_7OH$	
butanol	$C_4H_9OH$	

2. What functional group do all alcohols contain? *Hydroxyl group -C-OH*
- a. Draw the functional group found in alcohols. 
3. Describe how the solubility of alcohols change as you increase the chain length of the alcohol molecule.

*The longer the chain length the less soluble the alcohol will be in water.*

4. Alcohols are all excellent fuels, they can be burned in lamps and burners.  
Complete the word and symbolic equations for the combustion of ethanol and butanol.

i. ethanol + oxygen  $\longrightarrow$  carbon dioxide + water

ii  $C_2H_5OH + 3O_2 \longrightarrow 2CO_2 + 3H_2O$

iii butanol + oxygen  $\longrightarrow$  carbon dioxide + water

IV.  $C_4H_9OH + 6O_2 \longrightarrow 4CO_2 + 5H_2O$

5. Alcohols react with reactive metals such as sodium and magnesium to form salts and hydrogen gas.

a. How is the reaction of sodium with water similar to that with alcohols and how is it different? Produces a salt and hydrogen gas. The reaction with alcohols is much slower than with water.

6. Complete the equations below:

a. sodium + ethanol  $\longrightarrow$  sodium ethoxide + hydrogen

ii  $2Na + 2C_2H_5OH \longrightarrow 2C_2H_5ONa + H_2$

b. sodium + propanol  $\longrightarrow$  sodium propoxide + hydrogen

ii  $2Na + 2C_3H_7OH \longrightarrow 2C_3H_7ONa + H_2$