



# Chem!stry

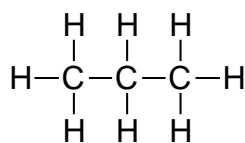
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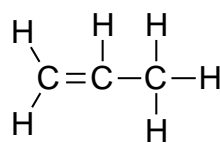
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## Secondary 4 Revision of Organic Chemistry

1.
  - a) Write the balanced chemical equation for the complete combustion of propane.  
.....
  - b) Write the balanced chemical equation for the incomplete combustion of ethane.  
.....
  - c) Write the balanced chemical equation for the complete combustion of ethanol.  
.....
  
2. In an oil refinery, long-chain hydrocarbons are often “cracked” to form other chemicals.
  - a) Explain why it is desirable for oil refineries to crack long-chain hydrocarbons.  
.....  
.....  
.....
  - b) Write a balanced chemical equation to show how a 20-carbon alkane can be cracked to form a 12-carbon alkane and 8-carbon alkene.  
.....
  
3. The structures of propane and propene are both given below.



Propane



Propene

Propane and propene with both react with chlorine gas under different conditions.

- a)
  - i) State the conditions under which propane reacts with chlorine gas.  
.....  
.....
  - ii) Write a balanced chemical equation for the reaction between 1 mol of propane and 1 mol of chlorine gas.  
.....

- iii)** Give the structural formula and name of a possible reaction product that could be formed when 1 mol of propane reacts with 1 mol of chlorine gas.

Structural Formula:

Name: .....

- b) i)** State the conditions under which propene reacts with chlorine gas.

.....  
.....

- ii)** Write a balanced chemical equation for the reaction between 1 mol of propene and 1 mol of chlorine gas.

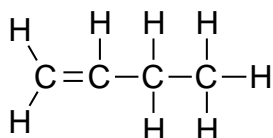
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- iii)** Give the structural formula and name of a possible reaction product that could be formed when 1 mol of propene reacts with 1 mol of chlorine gas.

Structural Formula:

Name: .....

4. The structure of butene is given below:



Butene will react with water, in the presence of an acid catalyst, to produce an alcohol. Give the structural formulae and names of the two different alcohols that could be produced when butene reacts with water in the presence of an acid catalyst.

Structure of Alcohol #1

Structure of Alcohol #2

Name: ..... Name: .....

5. Ethanol may be prepared by the fermentation of glucose,  $\text{C}_6\text{H}_{12}\text{O}_6$ .

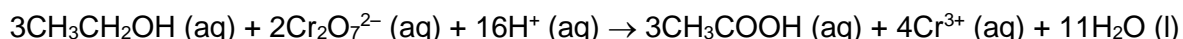
a) Write a balanced chemical equation for the fermentation of glucose into ethanol and carbon dioxide.

.....

b) State the conditions required for the fermentation of glucose.

.....  
.....

6. Ethanol can be oxidised to ethanoic acid by acidified potassium dichromate(VI):



a) State the colour change for this reaction.

.....

b) Calculate the average oxidation state (number) of carbon in ethanoic acid.

.....

c) Which carboxylic acid will be formed when propanol is oxidised?

.....

d) A student wanted to prepare a sample of methanoic acid. Which alcohol should they oxidise?

.....

7. Formation of esters.

- a) i) Give the full structural formula and name of the ester that is formed when propanoic acid reacts with ethanol.

Structural Formula of Ester:

Name: .....

- ii) Write a balanced chemical equation for the formation of this ester.

.....

- b) i) Give the full structural formula and name of the ester that is formed when methanoic acid reacts with propanol.

Structural Formula of Ester:

Name: .....

- ii) Write a balanced chemical equation for the formation of this ester.

.....

8. Give the names and structural formulae of the carboxylic acid and alcohol that are used to make the ester butyl propanoate.

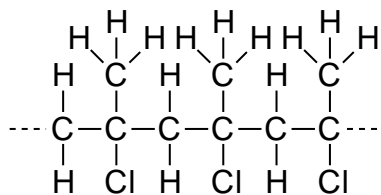
Structure of Carboxylic Acid

Structure of Alcohol

Name: .....

Name: .....

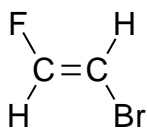
9. a) The diagram below shows part of an addition polymer:



Give the full structural formula of the monomer that is used to make this polymer.

Structural Formula of Monomer:

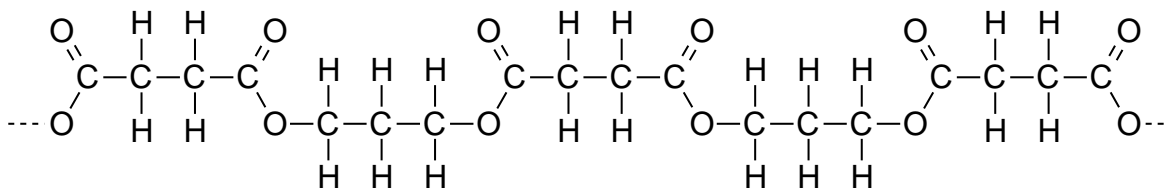
- b) The diagram below gives the full structural formula of an alkene.



Give the full structural formula of the addition polymer that would be formed from this alkene. Your answer should show three repeating units.

Structural Formula of Polymer:

10. The diagram below shows part of a condensation polymer:



a) Name the type of condensation polymer shown.

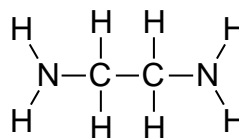
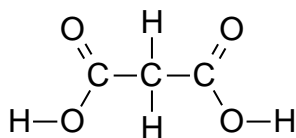
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b) Give the full structural formulae of the two monomers that are used to make this condensation polymer.

Structure of Monomer #1

Structure of Monomer #2

c) The diagram below gives the structural formulae of two monomers that can join together to form a condensation polymer.



i) Give the full structural formula of the condensation polymer that would be formed from these two monomers. Your answer should show a total of four monomer units.

Structural Formula of Polymer:

ii) Name the type of polymer that you have drawn.

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- Scan the QR code given below to view the answers to this assignment.



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