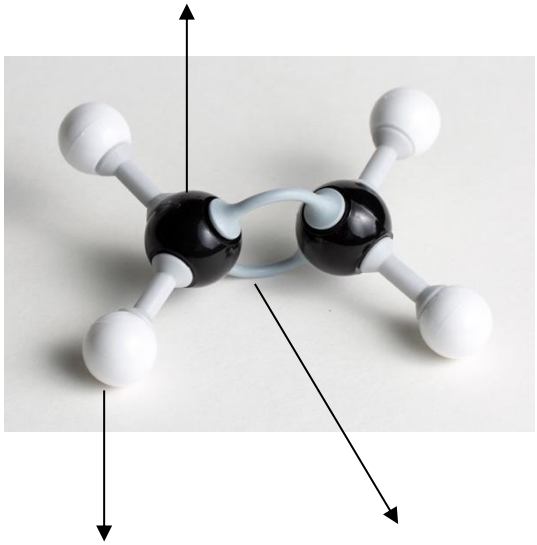
Alkenes: knowledge check

1.1 The images show two different ways of representing an ethene molecule. Use the terms provided to complete the labelling of the two diagrams. Some terms may be used more than once.

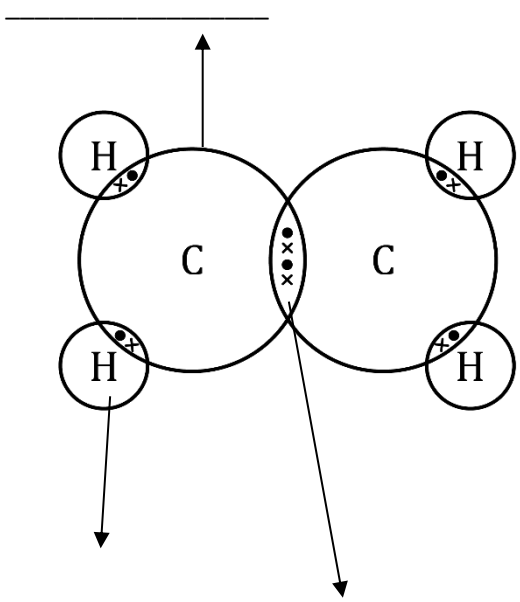
double covalent bond **carbon atom** **hydrogen atom**

ball and stick **dot and cross**

_____ model



_____ diagram



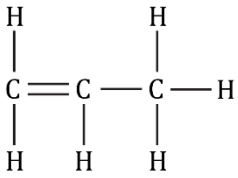
1.2 Each of the terms listed matches to one of the statements in the table.

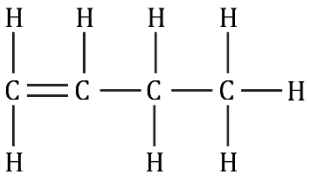
C=C **C_2H_4** **-ene** **butene** **three** **C_nH_{2n}**

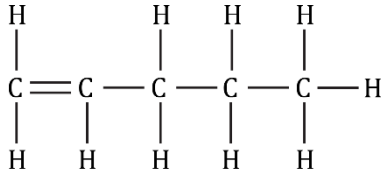
Add the correct term into the box provided for each statement. The first has been completed for you.

Suffix used for the names of alkenes	**-ene**
General formula for the alkenes homologous series	
Functional group of alkenes	
Number of carbon atoms in a molecule of propene	
Name of the alkene containing four carbon atoms	
Molecular formula of ethene	

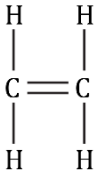
1.3 Complete the table using the molecular formulas and displayed formulas provided.







$\mathbf{C_4H_8}$ $\mathbf{C_3H_6}$ $\mathbf{C_5H_{10}}$

Name	Molecular formula	Displayed formula
ethene	$\mathbf{C_2H_4}$	
propene		
butene		
pentene		

1.4 Use the words provided to complete the gaps in the sentences.

ethane **incomplete** **ethene** **C–C**

addition **more** **combustion**

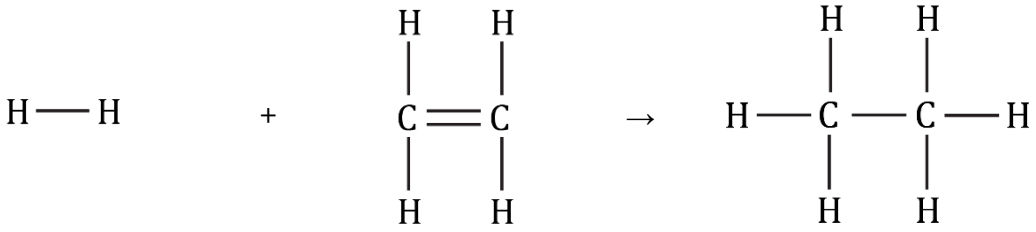
Like alkanes, alkenes react with oxygen in _____ reactions.

Unlike alkanes, alkenes tend to combust with smoky flames due to _____ combustion.

The double C=C bond in alkenes makes them _____ reactive than alkanes.

Atoms can be added across the C=C bond, so that the C=C bond becomes a _____ bond. These are called _____ reactions.

For example, hydrogen gas reacts with ethene to produce _____, as shown in the equation:



hydrogen _____ ethane

Alkenes: test myself

Answer questions 2.1 to 2.7 by circling the correct answer in each question.

2.1 Which compound is an alkene?

propane **butane** **pentene** **ethane**

2.2 What is the molecular formula of the alkene that contains six carbon atoms?

C_6H_{10} C_6H_{12} C_6H_{14} C_6H_{16}

2.3 Which of the following conditions are required for an addition reaction between ethene and hydrogen?

A nickel catalyst at 150°C

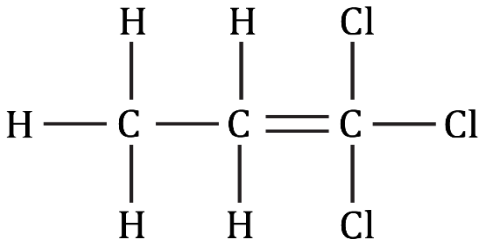
B nickel catalyst at room temperature

C ethane catalyst at room temperature

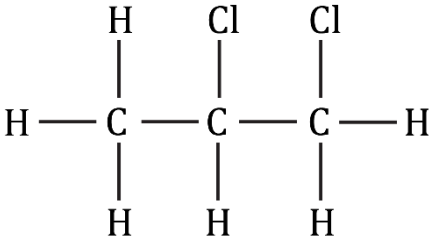
D ethane catalyst at 150°C

2.4 Chlorine gas reacts with propene in an addition reaction. Which of the images shows the correct displayed formula of the product formed in this reaction?

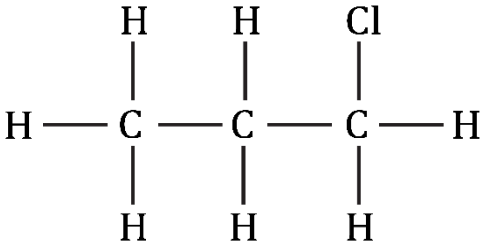
A



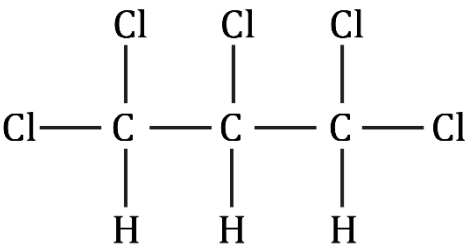
B



C



D

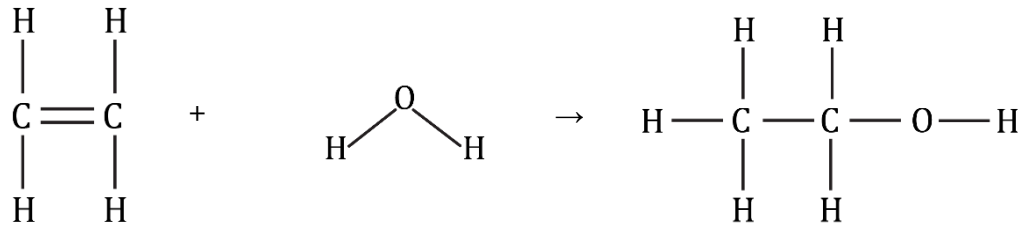


2.5 What is the name of the product formed in **question 2.4**?

1,1-dichloropentane **1,2-dichloropentane**

1,2-dichloropentene **2,2-dichloropentane**

2.6 The equation represents ethene reacting with water.



(a) What type of reaction is represented by this equation?

combustion **addition** **substitution** **reduction**

(b) What is the name of the product formed in this reaction?

ethanol **ethane** **ethanal** **ethanoic acid**

2.7 What conditions are required when ethene reacts with water?

A 25°C, high pressure and a nickel catalyst

B 300°C, 1 atm and an acid catalyst

C 300°C, high pressure and an acid catalyst

D 100°C, 1 atm and a nickel catalyst

2.8 Use some of the numbers and formulas provided to complete the balanced symbol equation representing the incomplete combustion of propene, C_3H_6. The numbers may be used once, more than once or not at all.

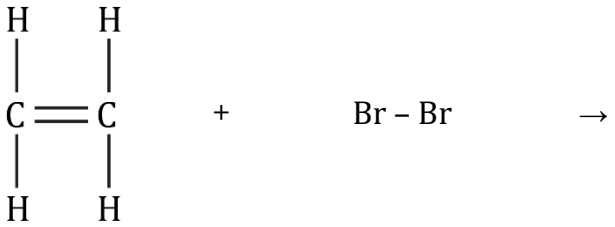
3 **CO_2** **4** **H_2O** **OH** **C**

$$C_3H_6 + \_\_\_\_\_\ O_2 \rightarrow \_\_\_\_\_\ CO + \_\_\_\_\_$$

Alkenes: feeling confident?

3.1 When ethene gas is bubbled into bromine water, an addition reaction happens and the bromine water turns colourless.

(a) Add the displayed formula of the product formed to complete the equation:



(b) Name the product formed in this reaction.

_____

3.2 Describe and explain what happens when alkanes, such as ethane, are added to bromine water. The first sentence has been started to help you.

Alkanes _____ decolourise bromine water because _____

_____

_____

_____

Alkenes: what do I understand?

Think about your answers and confidence level for each mini-topic. Decide whether you understand it well, are unsure or need more help. Tick the appropriate column.

Mini-topic	I understand this well	I think I understand this	I need more help
I can describe alkenes as a homologous series.			
I can identify the general formula and functional group of alkenes.			
I can write molecular formulae and draw displayed formulae of alkenes.			
I can describe and write equations to represent the combustion reactions of alkenes.			
I can describe the addition reactions of alkenes with hydrogen, water and halogens.			
I can state the conditions needed for the addition reactions of alkenes.			
Feeling confident? topics	**I understand this well**	**I think I understand this**	**I need more help**
I can write an equation to represent the decolourisation of bromine water.			
I can explain why alkanes do not decolourise bromine water.			