AQA GCSE Chemistry

Organic chemistry · Higher tier

Questions only

The newest questions on the Higher papers, about an hour. All 10 are in the exam generator.

Questions	Total marks	Time allowed
5	**57**	**1 h**

Name _____ Class or teacher _____ Date _____

Instructions

- Answer all questions in the spaces provided.
- Use black ink. Show your working for every calculation.
- You may use a scientific calculator and the periodic table insert.
- Print the separate mark scheme when you are ready to mark your answers.

For marking

Q	Source	Marks	Score
1	2023 P2H Q2 / P2F Q9	11	
2	2024 P2H Q8	13	
3	2025 P2H Q2 / P2F Q9	9	
4	2025 P2H Q5	12	
5	2025 P2H Q7	12	

Total _____ / 57 **Percentage** _____ %

Questions from AQA GCSE past papers, 2023–2025, reproduced for revision. Practise these topics online, with instant marking:

`whiteboardchemistry.com/revision/gcse-chemistry/exam-questions?topics=c7-organic-chemistry&demand=standard,high&len=0`

Questions

Organic chemistry · Higher tier · 5 questions · 57 marks · time allowed 1 h

Q1 · June 2023 · Paper 2 Foundation · Q9 · Paper 2 Higher · Q2 · [11 marks]

This question also needs Chemical analysis.

This question is about alcohols and carboxylic acids.

Alcohols are used as fuels.

A student burned 1.00 g of six alcohols and determined the energy released from each.

Table 8 shows the results.

Table 8

Alcohol	Formula of one molecule of the alcohol	Energy released in kJ/g
Ethanol	C_2H_5OH	29.6
Propanol	C_3H_7OH	33.6
Butanol	C_4H_9OH	36.1
Pentanol	$C_5H_{11}OH$	37.7
Hexanol	$C_6H_{13}OH$	38.9
Heptanol	$C_7H_{15}OH$	39.8

09.1 Calculate the mass of ethanol that must be burned to release the same amount of energy as burning 1.00 g of heptanol.

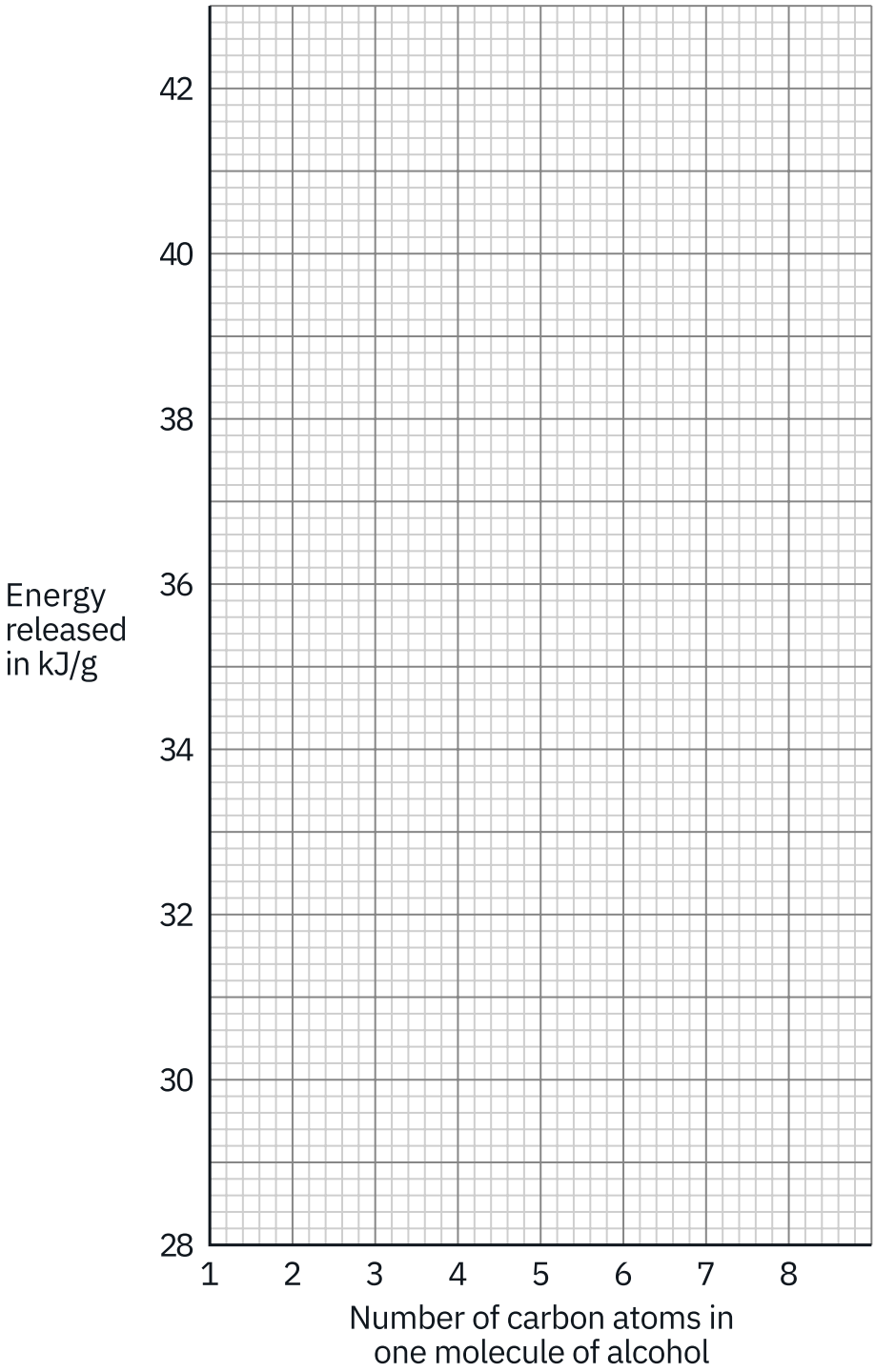
Mass = _____ g

[2 marks]

09.2 The energy released in kJ/g varies with the number of carbon atoms in one molecule of each alcohol.

Plot the data from Table 8 on Figure 8.

Figure 8



[2 marks]

Draw your answer on the figure above.

09.3 Estimate the energy released in kJ when 1.00 g of octanol ($C_8H_{17}OH$) is burned.

Use Figure 8.

Energy released = _____ kJ

[1 mark]

09.4 Carbon dioxide is produced when alcohols are burned.

Carbon dioxide is identified by bubbling the gas through limewater.

Complete the sentence.

Choose the answer from the box.

calcium chloride calcium hydroxide calcium nitrate calcium sulfate

Limewater is an aqueous solution of _____ .

[1 mark]

09.5 Give the result of the test when carbon dioxide is bubbled through limewater.

[1 mark]

09.6 Ethanoic acid can be produced from ethanol.

What is reacted with ethanol to produce ethanoic acid?

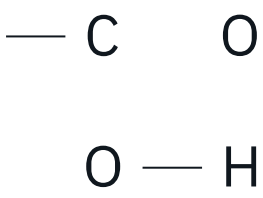
Tick (✓) **one** box.

A halogen	☐
An alkali metal	☐
An oxidising agent	☐
Water	☐

[1 mark]

09.7 Ethanoic acid contains the functional group –COOH

Complete the displayed structural formula of this functional group.



[1 mark]

09.8 Ethanoic acid reacts with different compounds.

Draw **one** line from each compound to a product of the reaction of the compound with ethanoic acid.

Compound	Product of the reaction with ethanoic acid
Ethanol	Carbon dioxide
Sodium carbonate	Ethene
	Ethyl ethanoate
	Hydrogen
	Poly(ethene)

[2 marks]

Draw your answer on the figure above.

Q2 · June 2024 · Paper 2 Higher · Q8 · [13 marks]

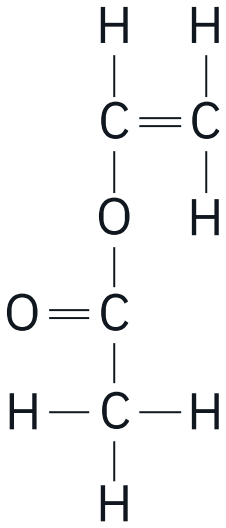
This question also needs Atomic structure and the periodic table, Bonding, structure, and the properties of matter, Quantitative chemistry and Using resources.

This question is about monomers and polymers.

Compound A has an alkene functional group and an ester functional group.

Figure 8 represents a molecule of compound A.

Figure 8



08.1 Draw a circle around the alkene functional group on Figure 8.

[1 mark]

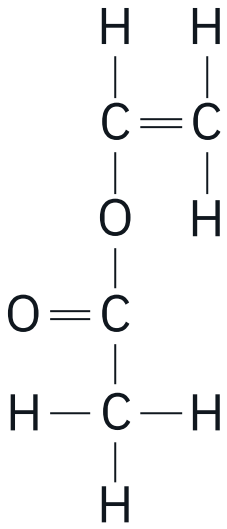
Draw your answer on the figure above.

08.2 Describe what will be seen when compound A is shaken with bromine water.

[2 marks]

08.3 Figure 9 is a repeat of Figure 8.

Figure 9



Draw a circle around the ester functional group on Figure 9.

[1 mark]

Draw your answer on the figure above.

08.4 Compound A has the formula $C_4H_6O_2$

Compound A is flammable.

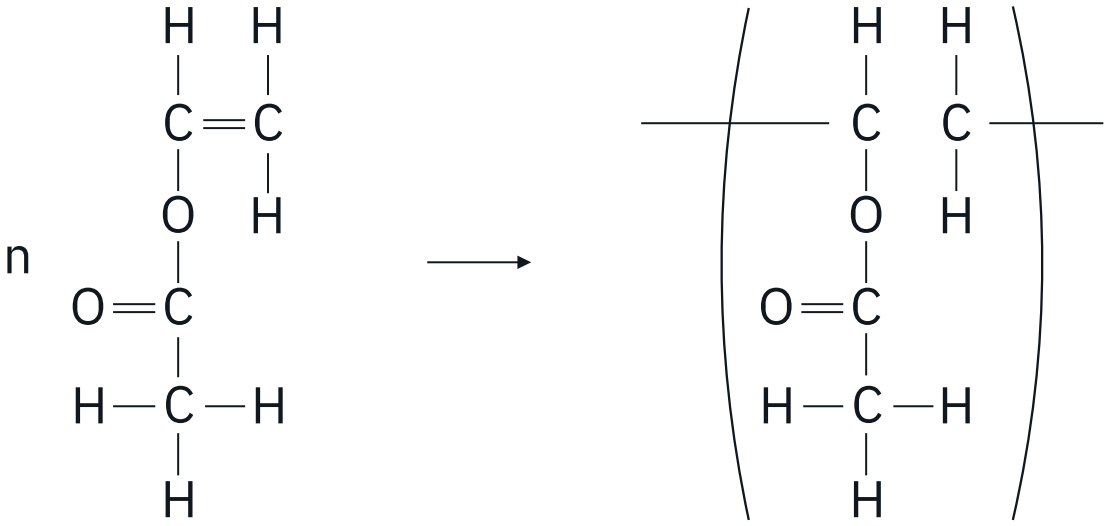
Write a balanced equation for the complete combustion of compound A.

_____ + _____ → _____ + _____

[3 marks]

08.5 Many molecules of compound A join together to form polymer B.

Complete the displayed formula equation which represents this reaction.



[2 marks]

08.6 What type of polymer is polymer B?

Tick (✓) **one** box.

Addition polymer	☐
Condensation polymer	☐
DNA	☐
Protein	☐

[1 mark]

08.7 Polymer B is a polymer which melts when heated.

What word is used to describe polymers which melt when heated?

[1 mark]

08.8 Explain why some polymers do **not** melt when heated.

[2 marks]

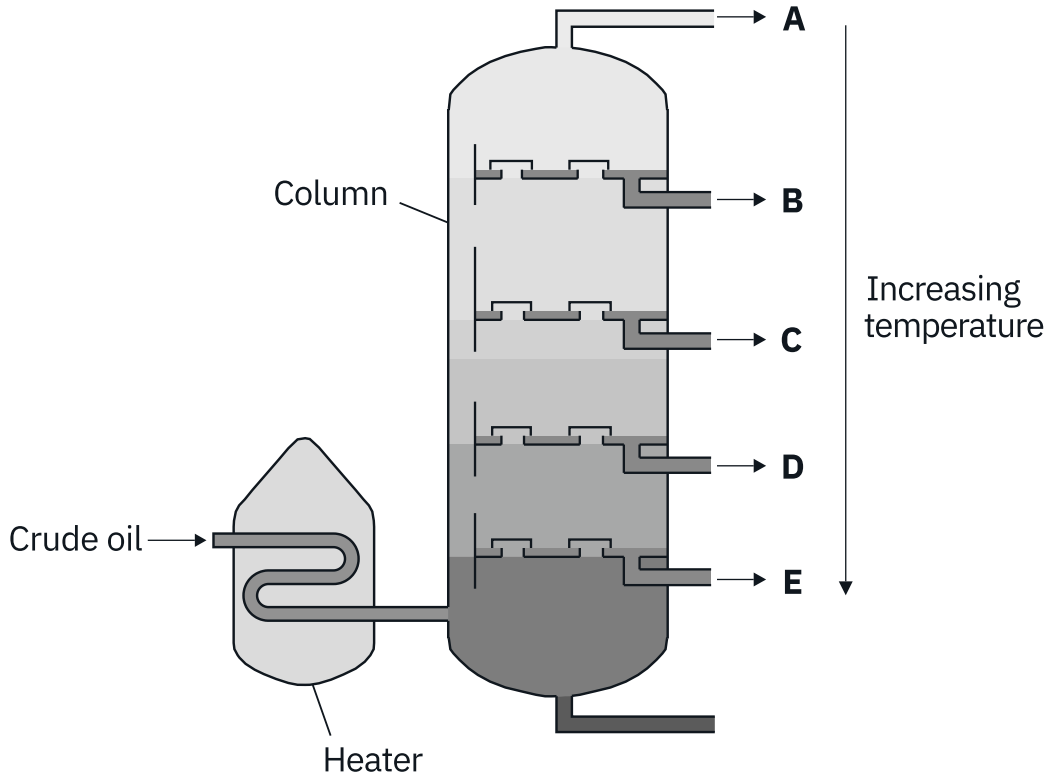
Q3 · June 2025 · Paper 2 Foundation · Q9 · Paper 2 Higher · Q2 · [9 marks]

This question also needs Atomic structure and the periodic table, Bonding, structure, and the properties of matter and Quantitative chemistry.

This question is about hydrocarbon fuels.

Figure 7 represents the process used to separate hydrocarbon fuels from crude oil.

Figure 7



09.1 Name the process represented by Figure 7.

[1 mark]

09.2 Changes of state take place during the process in Figure 7.

Name the change of state taking place in:

- the heater
- the column.

[2 marks]

Heater

Column

09.3 Different fuels are obtained from crude oil at the points on Figure 7 labelled A to E.

Table 4 shows the boiling point ranges of different fuels obtained from the process in Figure 7.

Table 4

Fuel	Boiling point range in °C
Diesel oil	260 – 320
Heavy fuel oil	320 – 400
Kerosene	180 – 260
Petrol	40 – 110
Petroleum gases	Below 30

Which fuel is obtained at B in the column?

Use Figure 7 and Table 4.

[1 mark]

09.4 Fuels with higher boiling point ranges contain larger molecules.

What is the order of increasing flammability of the fuels?

Use Table 4.

Tick (✓) **one** box.

Heavy fuel oil → diesel oil → kerosene	☐
Heavy fuel oil → kerosene → diesel oil	☐
Kerosene → diesel oil → heavy fuel oil	☐
Kerosene → heavy fuel oil → diesel oil	☐

[1 mark]

09.5 Liquified petroleum gases are a mixture of several different hydrocarbons.

Figure 8 shows a model of one of these hydrocarbons.

Figure 8



Write the molecular formula of the hydrocarbon represented by the model in Figure 8.

[1 mark]

09.6 Name the hydrocarbon represented by the model in Figure 8.

[1 mark]

09.7 Petroleum gases also contain a hydrocarbon with the formula C_3H_8

Balance the equation for the complete combustion of C_3H_8

$C_3H_8 + 5O_2 \rightarrow$ _____ CO_2 + _____ H_2O

[2 marks]

Q4 · June 2025 · Paper 2 Higher · Q5 · [12 marks]

This question also needs Chemical analysis and Quantitative chemistry.

This question is about unsaturated hydrocarbons.

05.1 Table 6 shows the boiling points of some unsaturated hydrocarbons.

Table 6

Formula of unsaturated hydrocarbon	Boiling point in °C
C_2H_4	– 104
C_3H_6	– 47
C_4H_8	X
C_5H_{10}	30
C_6H_{12}	63

Estimate the boiling point X in Table 6.

°C

[1 mark]

05.2 C_2H_4 reacts with water vapour (steam).

Name the compound produced when C_2H_4 reacts with water vapour.

[1 mark]

05.3 C_4H_8 reacts with chlorine (Cl_2).

Describe the test for chlorine.

Give the result of the test.

[2 marks]

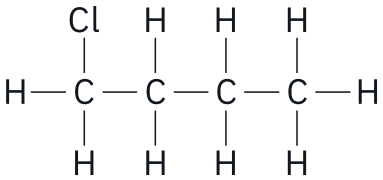
Test

Result

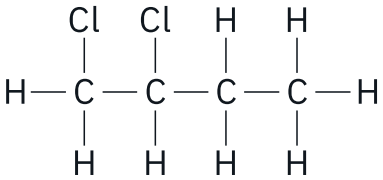
05.4 Which is the displayed formula of the organic compound produced when C_4H_8

reacts with chlorine?

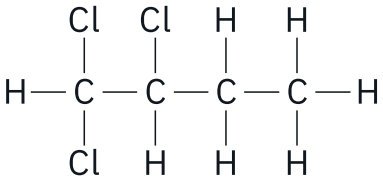
Tick (✓) **one** box.



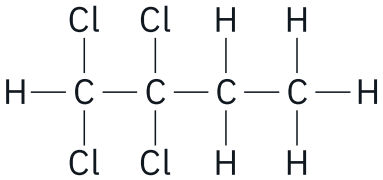
☐



☐



☐



☐

[1 mark]

05.5 Name the unsaturated hydrocarbon with the formula C_3H_6

[1 mark]

05.6 Why does C_3H_6 tend to burn in air with a smoky flame?

[1 mark]

05.7 C_3H_6 is a gas at room temperature and pressure.

Calculate the volume of 2.1 g of C_3H_6 at room temperature and pressure.

Give your answer in cm^3.

The volume of one mole of any gas at room temperature and pressure is 24 dm^3.

Relative atomic masses (A_r): H = 1 C = 12

Volume = _____ cm^3

[5 marks]

Q5 · June 2025 · Paper 2 Higher · Q7 · [12 marks]

This question also needs Using resources.

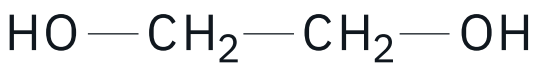
This question is about polymers.

A condensation polymer is produced from two different compounds, A and B.

Figure 4 represents a molecule of A and a molecule of B.

Figure 4

A



B



07.1 Name compound A and compound B.

[2 marks]

A

B

07.2 Compound A and compound B react to produce a condensation polymer.

Name the type of condensation polymer produced from compound A and compound B.

[1 mark]

07.3 Name the small molecule lost when molecules of compound A and of compound B react.

[1 mark]

07.4 Glycine is an amino acid.

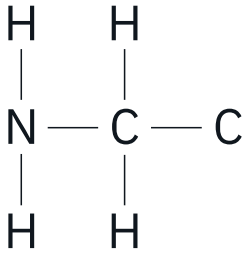
Glycine can produce condensation polymers.

Name the type of condensation polymer produced when glycine polymerises.

[1 mark]

07.5 Complete Figure 5 to show the displayed structural formula of glycine.

Figure 5



[1 mark]

Draw your answer on the figure above.

07.6 Which polymer is produced when different amino acids are combined in the same chain?

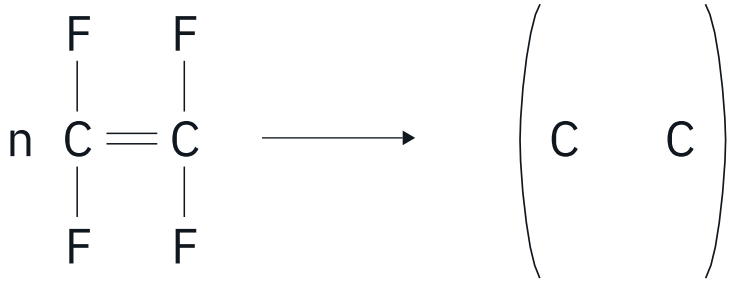
Tick (✓) **one** box.

Cellulose	☐
DNA	☐
Protein	☐
Starch	☐

[1 mark]

07.7 The polymer poly(tetrafluoroethene) is produced from the monomer tetrafluoroethene (C_2F_4).

Complete the equation for the production of poly(tetrafluoroethene) from tetrafluoroethene.



[3 marks]

07.8 Poly(tetrafluoroethene) is a thermosoftening polymer.

Some other polymers are thermosetting polymers.

Describe the structure of a thermosetting polymer.

[2 marks]

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