AQA GCSE Chemistry

Using resources · Higher tier

Questions only

The newest questions on the Higher papers, about an hour. All 16 are in the exam generator.

Questions	Total marks	Time allowed
5	**52**	**55 min**

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	2024 P2H Q1 / P2F Q8	10	
2	2024 P2H Q2 / P2F Q9	8	
3	2025 P2H Q3 / P2F Q10	9	
4	2025 P2H Q1 / P2F Q8	11	
5	2025 P2H Q9	14	

Total _____ / 52 **Percentage** _____ %

Questions from AQA GCSE past papers, 2024–2025, reproduced for revision. Practise these topics online, with instant marking:
`whiteboardchemistry.com/revision/gcse-chemistry/exam-questions?topics=c10-using-resources&demand=standard,high&len=0`

Questions

Using resources · Higher tier · 5 questions · 52 marks · time allowed 55 min

Q1 · June 2024 · Paper 2 Foundation · Q8 · Paper 2 Higher · Q1 · [10 marks]

This question also needs Chemical analysis.

A student investigated an aqueous solution of a salt.

The student identified that the salt solution contained only sodium ions and chloride ions.

08.1 Describe a test to identify sodium ions.

Give the result of the test.

[2 marks]

Test for sodium ions

Result

08.2 Describe a test to identify chloride ions.

Give the result of the test.

[2 marks]

Test for chloride ions

Result

08.3 The student determined the concentration of sodium chloride in the salt solution.

This is the method used.

1. Weigh an empty evaporating dish.

2. Add 25.0 cm^3 of the salt solution into the evaporating dish.

3. Heat the evaporating dish and contents.

4. Weigh the evaporating dish and contents.

5. Repeat steps 3 to 4 until there is no further change in mass.

6. Repeat steps 1 to 5 three more times.

Why did the student heat the evaporating dish and contents until the mass did not change?

[1 mark]

08.4 How did the student calculate the mass of solid sodium chloride remaining after steps 1 to 5?

Tick (✓) **one** box.

Mass of 25 cm^3 of salt solution + mass of empty evaporating dish	☐
Mass of 25 cm^3 of salt solution – mass of empty evaporating dish	☐
Mass of evaporating dish and dry contents + mass of empty evaporating dish	☐
Mass of evaporating dish and dry contents – mass of empty evaporating dish	☐

[1 mark]

08.5 The student calculated the concentration of sodium chloride in the salt solution.

Table 5 shows the results.

Table 5

Concentration of sodium chloride in g/dm^3			
Trial 1	**Trial 2**	**Trial 3**	**Trial 4**
35.2	34.6	36.4	33.8

The percentage by mass of sodium ions in sodium chloride is 39.3%.

Calculate the mean concentration of sodium ions in the salt solution.

Mean concentration = _____ g/dm^3

[4 marks]

Q2 · June 2024 · Paper 2 Foundation · Q9 · Paper 2 Higher · Q2 · [8 marks]

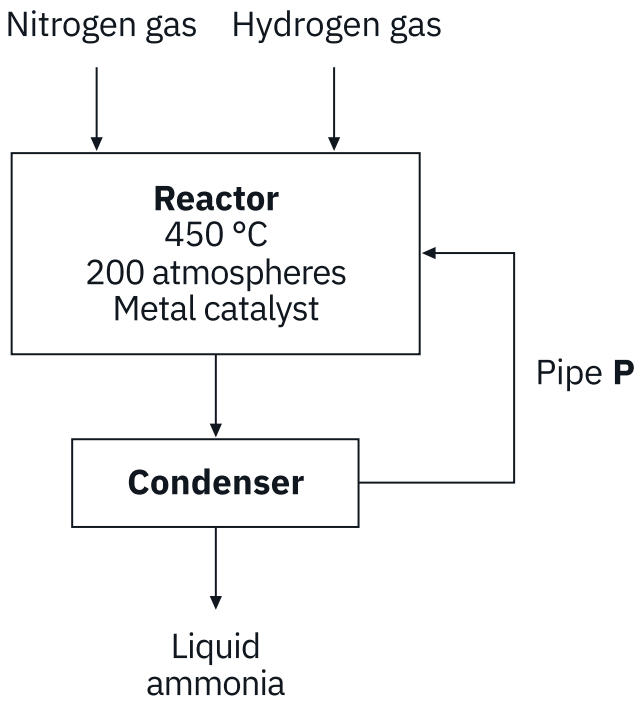
This question also needs Chemical analysis and The rate and extent of chemical change.

This question is about ammonia and nitric acid.

In the Haber process ammonia is produced from nitrogen and hydrogen.

Figure 10 represents the Haber process.

Figure 10



09.1 Pipe P links the condenser to the reactor.

Why is the condenser linked to the reactor?

Use Figure 10.

[1 mark]

09.2 Which metal is used as a catalyst in this reaction?

[1 mark]

09.3 Nitric acid is produced by reacting ammonia with oxygen.

The word equation for the production of nitric acid is:

ammonia + oxygen → water + nitric acid

Platinum is a catalyst in this reaction.

Describe the test for oxygen gas.

Give the result if oxygen gas is present.

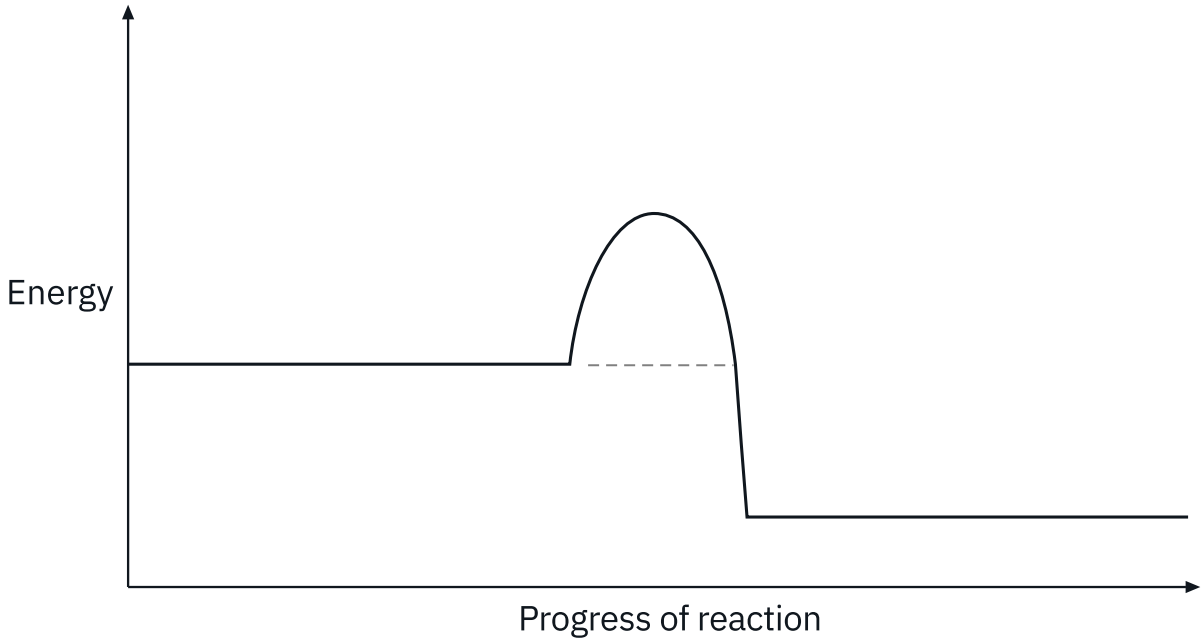
[2 marks]

Test

Result

09.4 Figure 11 represents the reaction profile of the catalysed reaction between ammonia and oxygen.

Figure 11



Complete the reaction profile for the catalysed reaction in Figure 11.

You should:

- label the activation energy
- label the reactants and products, using the names of the reactants and products.

[2 marks]

09.5 How would Figure 11 be different if **no** catalyst was used?

Tick (✓) **one** box.

The final energy level would be higher.	☐
The final energy level would be lower.	☐
The line would reach a higher peak.	☐
The line would reach a lower peak.	☐

[1 mark]

09.6 Ammonia and nitric acid react to produce the salt, ammonium nitrate.

Ammonium ions and nitrate ions both contain nitrogen.

Suggest **one** use of ammonium nitrate.

[1 mark]

Q3 · June 2025 · Paper 2 Foundation · Q10 · Paper 2 Higher · Q3 · [9 marks]

This question also needs Chemical analysis.

Doors can be made from aluminium or wood.

10.1 Table 5 gives information about aluminium and wood.

Table 5

	Aluminium	**Wood**
Raw material	Metal ore from rock	Trees
Relative cost of 1 kilogram of material	87	1
Relative strength	1.3	1.0
Protection	No protection needed to prevent corrosion	Painted to prevent rotting
Disposal	Melted to form new products	Shredded into wood chips for fuel

Evaluate the use of aluminium and of wood for making doors.

[6 marks]

10.2 Aluminium has an oxide coating that protects the metal from corrosion.

Explain how the oxide coating protects aluminium from corrosion.

[2 marks]

10.3 Doors made from wood need painting to prevent rotting.

Paints are **formulations** made by mixing a solid pigment and a liquid.

Which statement describes the composition of a paint?

Tick (✓) **one** box.

A fixed mass of pigment and a fixed mass of liquid	☐
A fixed mass of pigment and a variable mass of liquid	☐
A variable mass of pigment and a fixed mass of liquid	☐
A variable mass of pigment and a variable mass of liquid	☐

[1 mark]

Q4 · June 2025 · Paper 2 Foundation · Q8 · Paper 2 Higher · Q1 · [11 marks]

This question also needs Quantitative chemistry.

A student investigated the mass of dissolved solids in sea water.

This is the method used.

1. Weigh an empty evaporating basin.

2. Measure 10.0 cm^3 of sea water sample A into the evaporating basin using a burette.

3. Heat the evaporating basin until all the water seems to have evaporated.

4. Weigh the evaporating basin and contents.

5. Calculate the mass of dissolved solids in the sample.

6. Repeat steps 1 to 5 with sea water samples B, C and D.

08.1 Why did the student use a burette rather than a measuring cylinder to measure 10.0 cm^3 of each sample?

[1 mark]

08.2 What was the dependent variable in this investigation?

[1 mark]

08.3 Describe how the student could make sure **all** of the water had evaporated in step 3.

[2 marks]

08.4 How did the student calculate the mass of dissolved solids in each sea water sample?

[1 mark]

08.5 Table 3 shows the results.

Table 3

Sea water sample	A	B	C	D
Mass of dissolved solids in grams	0.35	0.37	0.33	0.34

Calculate the mean concentration of dissolved solids in 10.0 cm^3 samples of sea water A, B, C and D.

Use Table 3 and the equation:

mean concentration of dissolved solids (g/dm^3) = (mean mass of dissolved solids (g))/(volume of sample (dm^3))

Give your answer in g/dm^3.

Mean concentration = _____ g/dm^3

[5 marks]

08.6 Suggest why sea water samples A, B, C and D contain different masses of dissolved solids.

[1 mark]

Q5 · June 2025 · Paper 2 Higher · Q9 · [14 marks]

This question also needs Chemistry of the atmosphere and The rate and extent of chemical change.

This question is about ammonia.

Ammonia is produced from nitrogen and hydrogen in the Haber process.

Hydrogen is produced from methane and steam.

The equation for one of the reactions in the production of hydrogen is:

$CH_4(g) + H_2O(g) \rightleftharpoons CO(g) + 3H_2(g)$

The forward reaction absorbs energy from the surroundings.

09.1 Explain why a high temperature is used in this reaction.

[3 marks]

09.2 Explain why as low a pressure as possible is used in this reaction.

[2 marks]

09.3 A nickel catalyst is used in this reaction.

What is the effect of the nickel catalyst on the position of equilibrium?

Tick (✓) **one** box.

Equilibrium position shifts to the left.	☐
No effect on equilibrium position.	☐
Equilibrium position shifts to the right.	☐

[1 mark]

09.4 The nitrogen needed in the Haber process is obtained from air.

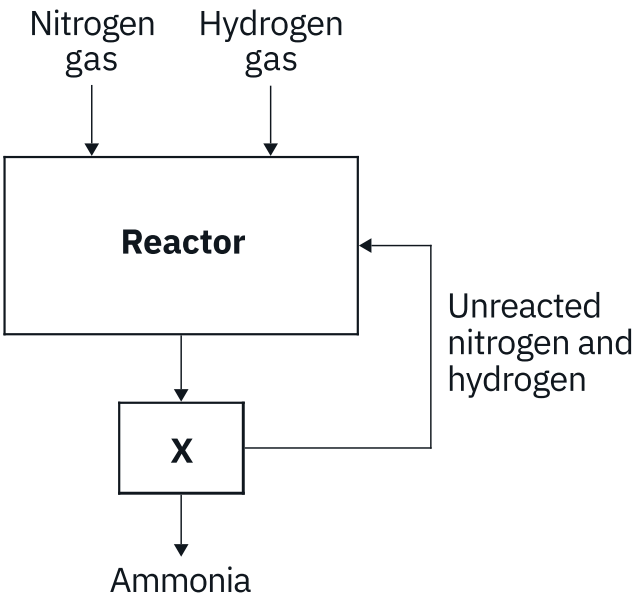
Calculate the approximate volume of air required to obtain 50 dm^3 of nitrogen.

Volume ~ _____ dm^3

[2 marks]

09.5 Figure 9 shows how ammonia is produced from nitrogen and hydrogen.

Figure 9



Explain how the mixture of ammonia, nitrogen and hydrogen is separated at X.

[3 marks]

09.6 Ammonia is used to produce fertilisers.

Nitrogen is released into the air when bacteria break down fertilisers and dead plant matter.

One of the reactions during the production of hydrogen from methane (natural gas)

releases carbon dioxide into the air.

The use of nitrogen to produce ammonia is more sustainable than the use of hydrogen to produce ammonia.

Give **three** reasons why.

[3 marks]

1

2

3

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Mark scheme:
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