AQA GCSE Chemistry | 8462

SPECIFICATION POINT 4.8.2.4

Test for chlorine

Mark schemes and examiner comments

Tier	**Higher**
Question groups	**3**
Available paper years	**2010–2025**

Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

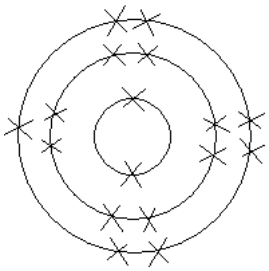
Name: _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

4.8.2.4 Test for chlorine

Answer 01 · Mark scheme January 2010 | CHY2H | Original Q1 | Legacy

Question 1

question	answers	extra information	mark
1(a)		accept dots / crosses / e must be drawn on diagram electrons do not need to be paired ignore brackets or + or −charges ignore 2,8,7	1
1(b)	(one) electron lost / given away / transferred from sodium / transferred to chlorine owtte	recognition that electrons are involved must be linked to electrons accept loses electron(s) for **2** marks NB loses 2 or more electrons gains **1** mark reference to sharing / covalent max **1** mark ignore charges on ions formed	1 1
1(c)(i)	any **one** from: • ions / atoms / they are / it is negatively charged / anions • opposite (charges) attract	 accept they are negative accept they are attracted or it is oppositely charged ignore opposite forces attract	1
1(c)(ii)	hydrogen	accept H_2 ignore H or H^+	1

Question 1 continues on next page

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CHY2H

Question 1 continued

question	answers	extra information	mark
1(d)(i)	poisons released into environment (owtte)	accept any sensible idea of harm / harmful / poisons / poisonous / pollution / damaging do **not** accept answers such as global warming / ozone layer etc. ignore safety unless qualified	1
1(d)(ii)	any **one** sensible idea eg • loss of work / unemployment **or** company goes out of business • any adverse effect on local economy (owtte) • any adverse effect on paper production / cost of paper / cost of water (treatment) • chlorine (compounds) have been used (for many years) without causing harm owtte • only a tiny amount of chlorine is released so it would not cause harm	eg shops / house prices etc. allow less expensive to use chlorine or converse ignore uses of chlorine to treat drinking water unless qualified	1
1(d)(iii)	ideas related to bias	accept more reliable or valid or fair ignore more accurate / fair test	1
Total			**8**

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Answer 01 · Mark scheme

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CHY2H

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Answer 02 · Mark scheme

June 2022 | 8462/2H | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1		allow a description of each process		AO1 4.10.1.3
	screening **or** grit removal	allow filtering to remove (large) solids	1	
	sedimentation (to produce sewage sludge and effluent)		1	
	anaerobic digestion of (solid sewage) sludge		1	
	aerobic biological treatment of (liquid) effluent	allow aerobic digestion of effluent	1	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	Na^+ : 0.003 mol/dm^3 Cl^- : 0.003 mol/dm^3		1	AO3 4.10.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	the ions pass through the filter	allow the ions are not trapped / removed by the filter	1	AO3 4.1.1.2 4.10.1.2
	(because) the ions are in solution	allow (because) the ions are smaller than the filter pores	1	

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Answer 02 · Mark scheme

June 2022 | 8462/2H | Original Q5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4	(the ground water) contains microbes which are harmful (to health) (so) the water is sterilised **or** (so) the microbes are destroyed		1 1	AO3 AO1 4.10.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	(the water is) unadulterated **or** (the water is) in its natural state	allow nothing is added (to the water) allow (the water) contains no microbes	1	AO2 4.8.1.1 4.10.1.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	(use) damp litmus paper (the paper) is bleached **or** (the paper) turns white	MP2 is dependent upon MP1 ignore paper turns red	1 1	AO1 4.8.2.4

Total Question 5		12

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Answer 03 · Mark scheme

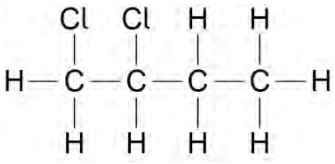
June 2025 | 8462/2H | Original Q5

Question 5

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.1	– 6 (°C)	allow a value in the range (+)4 to –16 (°C)	1	AO2 4.7.1.3

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.2	ethanol	allow C_2H_5OH	1	AO2 4.7.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.3	(test) damp litmus paper (result) litmus paper is bleached **or** litmus paper turns white	 ignore litmus paper turns red ignore litmus paper turns red	1 1	AO1 4.8.2.4

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.4			1	AO2 4.7.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.5	propene		1	AO1 4.7.2.1

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Answer 03 · Mark scheme

Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.6	(because of) incomplete combustion	ignore insufficient oxygen	1	AO1 4.7.2.2

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
05.7	(conversion 24 dm^3 =) 24 000 cm^3	allow conversion of volume anywhere in method	1	AO2 4.3.1.2 4.3.2.1 4.3.5
	(M_r = (3 × 12) + (6 × 1) =) 42		1	4.7.2.1
	(moles = $\frac{2.1}{42}$ =) 0.05	allow correct use of an incorrectly determined M_r	1	
	(volume =) 24 000 × 0.05	allow correct use of an incorrectly determined number of moles allow correct use of an incorrect / no conversion of volume	1	
	= 1200 (cm^3)		1	
	alternative approach			
	(conversion 24 dm^3 =) 24 000 cm^3 (1)	allow conversion of volume anywhere in method		
	(M_r = (3 × 12) + (6 × 1) =) 42 (1)			
	(ratio of mass = $\frac{42}{2.1}$ =) 20 (1)	allow correct use of an incorrectly determined M_r		
	(volume =) $\frac{24\,000}{20}$ (1)	allow correct use of an incorrect / no conversion of volume		
	= 1200 (cm^3) (1)			

Total Question 5	12

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Answer 02 · Examiner comments

June 2022 | 8462/2H | Original Q5

Question 5 (Standard, standard/high and high demand)

05.1 About a fifth of the students gained all the available marks. Many students answered the question in terms of treating water to make it potable, rather than treating sewage. Those who did answer in terms of treating sewage initially answered well though many answers broke down after mention of screening and sedimentation.

05.2 Half of the students were able to give the correct pair of concentrations in this multiple choice question.

05.3 The common error in this question was to concentrate on what Process 1 (filtering) did do, rather than the lack of effect on the ions. Of those who did correctly answer the question, more were awarded the first mark on the mark scheme. Around a quarter of the students gained both of the marks.

05.4 Students needed to state that the microbes were harmful and because of this some did not gain the first mark, although many were awarded the second. About 40% of the students scored both marks.

05.5 Less than a third of students answered this successfully with many responses stating the company meant the water was chemically pure, in spite of this being explicitly negated in the question.

05.6 Most students knew the test for chlorine gas; however a significant number did not refer to the need for the litmus paper to be damp and therefore did not gain the first mark. Over one-third of the students gained both marks.

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Answer 03 · Examiner comments June 2025 | 8462/2H | Original Q5

Question 5

05.1 Over four fifths of students correctly estimated the boiling point. Those that did not gain the mark were often giving values that were just outside of the range given in the mark scheme.

05.2 Fewer than half of the students correctly identified ethanol as the product of the reaction between ethene and steam. Many of those who did not gain this mark gave the product as alcohol, which was insufficient.

05.3 Over half of students gained both marks on this item. Where students gained one mark, about 20%, it was because 'damp' was omitted from the test and only litmus paper was given.

05.4 The product of the chlorination of butene was well known by over 90% of students.

05.5 Around three quarters of students correctly identified propene. The most common incorrect response was butene. Very few students did not identify an alkene.

05.6 Around two fifths of students knew that alkenes burn with a smoky flame due to incomplete combustion. Many of the incorrect answers seen referred to there being a double bond present, or that there was insufficient oxygen.

05.7 This multi-step calculation was well answered by over 40% of students who gained all five marks. The most common error was the omission of the volume conversion from dm^3 to cm^3. Some students divided by the volume, rather than multiplying. Equally, a number multiplied by the M_r to calculate the number of moles. In both instances, marks were awarded where clear working was shown for correct

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Answer 03 · Examiner comments June 2025 | 8462/2H | Original Q5

additional steps. when one mark alone was awarded, it was for the correct determination of the M_r.