AQA A-Level Chemistry

Group 7 mark scheme · goes with “Group 7” · whiteboardchemistry.com/revision/aqa-a-level-chemistry/exam-questions

Mark schemes

Group 7 · 12 questions

Q1 · June 2024 · Paper 3 · Q20 · [1 mark]

Answer: **A**

The boiling point of HX increases.

Q2 · June 2024 · Paper 3 · Q21 · [1 mark]

Answer: **C**

They form a cobalt(II) complex with a tetrahedral shape.

Q3 · June 2024 · AS Paper 1 · Q1 · [7 marks]

(a) Iodide ion / I^-

Not iodine / I / I_2

$Br_2 + 2I^- \rightarrow I_2 + 2Br^-$

Allow:

$Br_2 + 3I^- \rightarrow I_3^- + 2Br^-$

Ignore state symbols;

Accept multiples

[2 marks]

(b) Bromine not a strong enough oxidising agent to displace chlorine (so no visible change will be observed)

Br_2 unable to oxidise Cl^- (so no visible change will be observed)

Br_2 is a weaker oxidising agent than Cl_2 / Br_2 is only a stronger oxidising agent than I_2

Bromine not a strong enough oxidising agent to displace bromine (so no visible change will be observed)

Br_2 is unable to oxidise Br^- (so no visible change will be observed)

Allow Br_2 has the same oxidising ability as itself

Do not allow references to halides having oxidising ability do not allow bromine reacting with halogens

[2 marks]

(c) Add dilute ammonia

Allow ecf from (a)

The precipitate containing chloride ions will dissolve/react to form a colourless solution

The precipitate containing bromide ions will show no visible change

Allow does not dissolve

OR

Add dilute ammonia followed by concentrated ammonia

The precipitate containing chloride ions will dissolve/react to form a colourless solution using dilute ammonia

The precipitate containing bromide ions will not dissolve in dilute ammonia but will dissolve in concentrated ammonia.

Ignore references to precipitates containing iodide ions unless due to ecf from (a)

[3 marks]

Q4 · June 2024 · AS Paper 1 · Q13 · [1 mark]

Answer: **C**

Hydrogen

Q5 · June 2024 · AS Paper 1 · Q19 · [1 mark]

Answer: **C**

NaCl

Q6 · June 2023 · AS Paper 1 · Q19 · [1 mark]

Answer: **B**

Solution Q

Q7 · June 2023 · AS Paper 1 · Q20 · [1 mark]

Answer: **B**

$BaBr_2$

Q8 · June 2023 · AS Paper 1 · Q21 · [1 mark]

Answer: **D**

Pale yellow precipitate

Q9 · June 2025 · AS Paper 1 · Q17 · [1 mark]

Answer: **B**

silver chloride and silver bromide

Q10 · June 2025 · AS Paper 1 · Q2 · [14 marks]

02.1

(down the group)

M1: (molecules are) larger / (molecules contain) more electrons / (molecules) have a larger surface area

M2: stronger van der Waals' forces between molecules / stronger temporary induced dipole / stronger dispersion forces between molecules / stronger London forces between molecules

If the trend is stated and is incorrect then cannot

score the next mark gained.

[2 marks]

02.2

Kill bacteria / to prevent water-borne diseases / to prevent people getting cholera / to sterilise water

Small enough concentration (to avoid harming humans)

Accept any named bacterial (water-borne)

infection.

[2 marks]

02.3

$2Cl_2 + 2H_2O \rightarrow 4HCl + O_2$

allow $4H^+ + 4Cl^-$

allow multiples

ignore state symbols

[1 mark]

02.4

$2NaOH + Cl_2 \rightarrow NaClO + NaCl + H_2O$

allow multiples

ignore state symbols

[1 mark]

02.5

M1: $3NaClO \rightarrow 2NaCl + NaClO_3$

M2: Oxidation state = (+)5

allow multiples

allow 1 $NaClO_3$

[2 marks]

02.6

$ClO_3^- + 6H^+ + 6e^- \rightarrow Cl^- + 3H_2O$

allow multiples

ignore state symbols

[1 mark]

02.7

I^- or iodide

$H_2SO_4 + 8H^+ + 8I^- \rightarrow H_2S + 4H_2O + 4I_2$

allow astatide

allow multiples

allow 8 HI

allow $10H^+ + SO_4^{2-} + 8I^- \rightarrow H_2S + 4H_2O + 4I_2$

[2 marks]

02.8

(Sodium) fluoride or (sodium) chloride

$NaCl + H_2SO_4 \rightarrow HCl + NaHSO_4$

OR

$NaF + H_2SO_4 \rightarrow HF + NaHSO_4$

Base / proton acceptor

allow equations to form SO_4^{2-} ions

$2NaCl + H_2SO_4 \rightarrow 2HCl + Na_2SO_4$

OR

$2NaF + H_2SO_4 \rightarrow 2HF + Na_2SO_4$

allow ionic equations

[3 marks]

Q11 · June 2025 · AS Paper 1 · Q6 · [7 marks]

06.1

This question is marked using levels of response.

Level 3 (5-6 marks):

All stages are covered and the explanation of each stage is generally correct and virtually complete (ie at least two from stages 1, 2 and at least three from stage 3).

Answer communicates the whole explanation, including equations, coherently and shows a logical progression through all three stages.

Level 2 (3-4 marks):

All stages are covered but the explanation of each stage may be incomplete or may contain inaccuracies.

OR

Two stages covered and the explanations are generally correct and virtually complete (ie two from stages 1 and/or 2 or three from stage 3).

Answer is coherent and shows some progression through all three stages. Some steps in each stage may be incomplete.

Level 1 (1-2 marks):

Two stages are covered but the explanation of each stage may be incomplete or may contain inaccuracies.

OR

Only one stage is covered but the explanation is generally correct and virtually complete (i.e. two from stages 1 and/or 2 or three from stage 3).

Answer shows some progression between two stages.

Level 0 (0 marks)

Insufficient correct chemistry to gain a mark.

Stage 1: Solution A

1a: (white ppt in) Test 1, so Ba^{2+} (Sr^{2+})

1b: (white ppt in) Test 2, so Cl^-

1c: barium chloride / $BaCl_2$ (strontium chloride

/ $SrCl_2$)

Stage 2: Solution B

2a: (effervescence in) Test 1 and/or Test 2, so

CO_3^{2-} / HCO_3^-

2b: (red litmus turns blue in) Test 3, so NH_4^+

2c: ammonium carbonate / $(NH_4)_2CO_3$ or ammonium hydrogencarbonate / NH_4HCO_3

Stage 3: Equations

3a: $Ba^{2+} + SO_4^{2-} \rightarrow BaSO_4$

($Sr^{2+} + SO_4^{2-} \rightarrow SrSO_4$)

3b: $Ag^+ + Cl^- \rightarrow AgCl$

3c: $CO_3^{2-} + 2H^+ \rightarrow CO_2 + H_2O$ /

$HCO_3^- + H^+ \rightarrow CO_2 + H_2O$

3d: $NH_4^+ + OH^- \rightarrow NH_3 + H_2O$

[6 marks]

06.2

(Add) universal indicator and it turns blue / purple

or

(Add) red litmus and it turns blue

Add a named soluble magnesium salt and (slight) white precipitate formed

[1 mark]

Q12 · June 2025 · Paper 1 · Q5 · [10 marks]

05.1

M1 Chlorine smaller / fewer electrons / fewer shells / smaller M_r

M2 The van der Waals/vdw forces between chlorine molecules are weaker/fewer (so less energy needed to separate the molecules)

"It" is chlorine

Allow converse answers for bromine.

[2 marks]

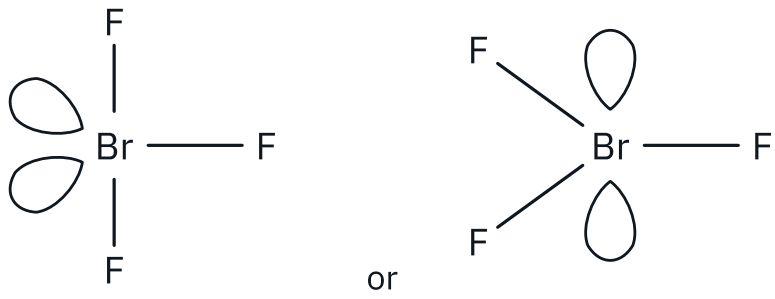
05.2

Br (+)3, F –1

both needed for the mark

[1 mark]

05.3



M2 Lone pairs/bond pairs/electron pairs repel (each other to be) as far apart as possible.

OR

Lone pairs/bond pairs/electron pairs are arranged (to be) as far apart as possible to minimise repulsion.

Allow any shape with 3 bond pairs and 2 lone pairs of electrons

[2 marks]

05.4

M1: Acid-base equation: $H_2SO_4 + NaBr \rightarrow NaHSO_4 + HBr$

OR

$H_2SO_4 + 2NaBr \rightarrow Na_2SO_4 + 2HBr$

M2: Observation for acid-base reaction: white/misty/steamy fumes

M3: Redox equation: $H_2SO_4 + 2H^+ + 2Br^- \rightarrow SO_2 + Br_2 + 2H_2O$

OR

$SO_4^{2-} + 4H^+ + 2Br^- \rightarrow SO_2 + Br_2 + 2H_2O$

OR

$H_2SO_4 + 2HBr \rightarrow SO_2 + Br_2 + 2H_2O$

M4: Observation for redox reaction: orange/brown fumes/gas

Mark M1 to M4 independently

M4 Allow choking gas

[4 marks]

05.5

$2Cu^{2+} + 4I^{-} \rightarrow 2CuI + I_2$

[1 mark]

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