

**0 8**

This question is about iron.

Iron reacts with dilute hydrochloric acid to produce iron chloride solution and one other product.

**0 8 . 1**

Name the other product.

**[1 mark]**

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**0 8 . 2**

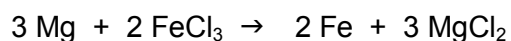
Suggest how any unreacted iron can be separated from the mixture.

**[1 mark]**

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Magnesium reacts with iron chloride solution.

**0 8 . 3**

0.120 g of magnesium reacts with excess iron chloride solution.

Relative atomic masses ( $A_r$ ): Mg = 24    Fe = 56

Calculate the mass of iron produced, in mg

**[5 marks]**

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Mass of iron = \_\_\_\_\_ mg

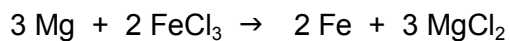
**Question 8 continues on the next page**

**Turn over ►**



0 8 . 4

Explain which species is reduced in the reaction between magnesium and iron chloride.



Your answer should include the half equation for the reduction.

[3 marks]

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**END OF QUESTIONS**

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Question	Answers	Extra information	Mark	AO / Spec. Ref.
08.1	hydrogen <b>or</b> H <sub>2</sub>	allow hydrogen gas ignore H without the 2 subscript	1	AO1 5.4.2.1
08.2	filtration / filter	allow magnet <b>or</b> decant ignore heating	1	AO1 5.1.1.2
08.3	<p>(Mg) <math>\frac{0.12}{24}</math> or 0.005 (moles)</p> <p>(Fe) <math>\frac{2}{3} \times 0.005 = 0.00333</math>(moles)</p> <p>(mass Fe) = 0.00333 × 56</p> <p>= 0.1866 (g)</p> <p>= 187 (mg)</p> <p><b>OR</b></p> <p>(Mg) = <math>\frac{0.12}{(3 \times 24 =) 72}</math> (1)</p> <p>= 0.00166 <b>or</b> <math>\frac{1}{600}</math> (moles) (1)</p> <p>(mass of Fe) = 0.00166</p> <p><b>or</b> <math>\frac{1}{600} \times 112</math> (2 × 56) (1)</p> <p>= 0.1866 (g) (1)</p> <p>187 (mg) (1)</p>	<p>an answer of 185–190 (mg) scores <b>5</b> marks</p> <p>an answer of 0.185–0.19 scores <b>4</b> marks</p> <p>mark is for ÷ by 24</p> <p>mark is for <math>\times \frac{2}{3}</math></p> <p>mark is for <math>\times 56</math></p> <p>an answer of 280 (mg) scores <b>4</b> marks</p> <p>an answer of 0.280 scores <b>3</b> marks (no ratio from equation)</p> <p>184 scores <b>0</b> [(3×24) + (2×56)]</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	AO2 5.3.2.2

Question	Answers	Extra information	Mark	AO / Spec. Ref.
<b>08.3 cont.</b>	<b>OR</b> $72 \text{ g Mg} \rightarrow 112 \text{ g Fe (1)}$ $1 \text{ g Mg} \rightarrow \frac{112}{72} \text{ or } 1.56 \text{ g Fe (1)}$ $0.12 \text{ g Mg} \rightarrow \frac{112}{72} \times 0.12 \text{ (1)}$ $= 0.1866 \text{ (g) (1)}$ $= 187 \text{ (mg) (1)}$			
<b>08.4</b>	$\text{Fe}^{3+}$ (because) reduction is gain of <u>electrons</u> $\text{Fe}^{3+} + 3\text{e}^{(-)} \rightarrow \text{Fe}$	allow change in oxidation state / (+)3 to 0	1 1 1	AO2 AO1 AO2 5.4.1.2 5.4.1.4
<b>Total</b>			<b>10</b>	