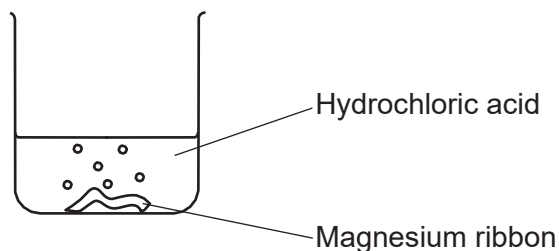


**GCSE Chemistry A (Gateway Science)**  
**J248/02 C4-C6 and C7 Foundation (Foundation Tier)**

**Question Set 28**

1 A student investigates the reaction between magnesium and dilute hydrochloric acid, HCl.

The student adds magnesium ribbon to hydrochloric acid in a beaker, as shown in the diagram.



Magnesium chloride,  $MgCl_2$ , and hydrogen gas are made.

(a) Write the **balanced symbol** equation for this reaction.

[2]

(b)\* The student measures the time it takes for all the magnesium to react. This is the reaction time.

The student does five experiments.

This is the student's prediction:

**“The smaller the volume of acid and the smaller the mass of magnesium, the shorter the reaction time.”**

Look at the student's results.

Experiment	Mass of magnesium used (g)	Volume of acid used (cm <sup>3</sup> )	Concentration of acid (mol/dm <sup>3</sup> )	Reaction time (s)
1	0.05	25	1.0	30
2	0.05	50	1.0	30
3	0.05	50	2.0	15
4	0.10	25	1.0	30
5	0.10	50	2.0	15

Describe and explain whether the student's results support his prediction.

Include ideas about the reacting particle model in your answer.

[6]

(c) The student repeats experiment 1. This time he uses acid at a **lower** temperature.

Explain, using the reacting particle model, **what happens to the rate of reaction** and **predict the reaction time** for this reaction.

[3]

(d) During chemical reactions, reactants are used up and the rate of reaction **decreases**.

Explain, in terms of particles, why the rate of reaction decreases.

[2]

**Total Marks for Question Set 28: 13**

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