

How fast do reactions go?

Chemistry grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · Test

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

This test lasts 45 minutes and is worth 20 marks. Answer every question. In explanations, refer to particles, collisions and activation energy. Show every step of a calculation and give units, such as cm^3/s .

Level: Chemistry grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · **Curriculum:** HS-PS1-5

Time: 45 minutes · 8 questions · Total: 20 marks · Calculator allowed

Question 1 Concentration and collisions (3 marks)

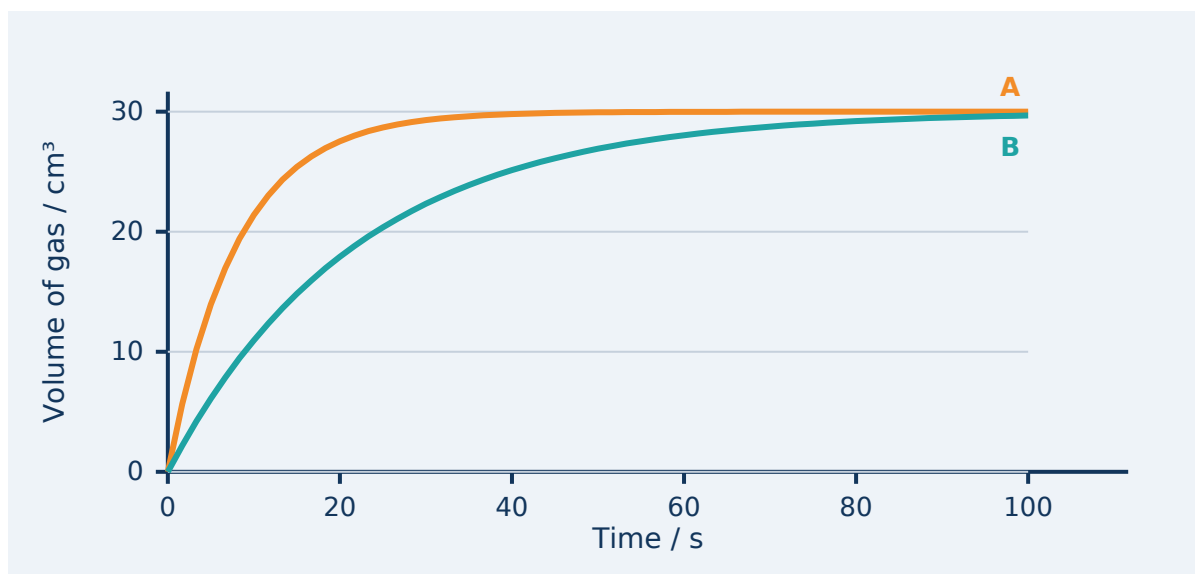
Zinc reacts faster with 2.0 mol/dm^3 hydrochloric acid than with 1.0 mol/dm^3 acid.

- Explain the difference in terms of particles. (2 marks)
- State the effect on the final volume of hydrogen if the same mass of zinc is used in excess acid. (1 mark)

Question 2 Two experiments (3 marks)

The figure shows gas collected in experiments A and B.

- State which experiment is faster. (1 mark)
- Explain why both reach 30 cm^3 . (1 mark)
- Suggest one change that would make B slower than A. (1 mark)



Gas volume for experiments A and B.

Question 3 Mean rate (2 marks)

A reaction produces 54 cm³ of gas in 45 s. Calculate the mean rate in cm³/s. (2 marks)

Question 4 Surface area (3 marks)

Emma cuts a cube of marble of side 4 cm into eight cubes of side 2 cm.

- Calculate the total surface area before and after cutting. (2 marks)
- State how the cutting changes the rate of reaction with acid. (1 mark)

Question 5 Temperature (3 marks)

Warming a reaction mixture increases the rate.

- Give two reasons in terms of particles. (2 marks)
- State which reason is more important. (1 mark)

Question 6 Catalysts (2 marks)

Explain what a catalyst does and why it is not used up. (2 marks)

Question 7 Doubling rule (2 marks)

A reaction takes 120 s at 25 °C. The rate doubles for every 10 °C rise. Calculate the time at 45 °C. (2 marks)

Question 8 Flour dust (2 marks)

A cloud of flour dust in a mill can explode, but a heap of flour only burns slowly. Explain why. (2 marks)