2.16 Rates of Reaction: 10-minute Pack

AQA 8464 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Both concentration and surface area affect the rate of a reaction between a solid and a solution.

(a) Increasing the concentration of a solution increases the rate of reaction. Explain why, in terms of particles. **(2)**

(b) Breaking a solid reactant into smaller pieces also increases the rate of reaction. Explain why, in terms of particles. **(2)**

(Total for Question 1 is 4 marks)

2 Give one experimental source of systematic error when measuring gas volume in a reaction and suggest a practical way to reduce it.

(Total for Question 2 is 1 mark)

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3 A student measures the volume of gas produced from marble and acid over time. Their table of results for one run is:

Time / s: 0, 10, 20, 30, 40
Volume / cm3: 0, 16, 28, 34, 37

Using the data, calculate the initial rate of reaction in cm3/s by using the gradient from 0 to 10 s. Show working and give a unit.

(Total for Question 3 is 4 marks)

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Mark scheme · 2.16 Rates of Reaction: 10-minute Pack

Question 1

(a) there are more particles of the reactant in the same volume, so the solution is more crowded (oe) **B1**

(a) this leads to more frequent collisions between reacting particles per unit time (oe), so the rate of reaction increases **B1**

(a) Answer: A higher concentration means more particles in the same volume, so collisions between reacting particles are more frequent, increasing the rate.

(b) breaking the solid into smaller pieces increases its surface area (exposed to the other reactant) for the same total mass/volume (oe) **B1**

(b) this leads to more frequent collisions between reacting particles per unit time (oe), so the rate of reaction increases **B1**

(b) Answer: Smaller pieces have a greater surface area, so more particles are exposed and collisions happen more frequently, increasing the rate.

Question 2

example: gas loss due to leaks in apparatus; reduce by sealing joints with rubber tubing or using a gas syringe with no leaks, oe **B1**

Answer: Leakage from apparatus; fix by sealing joints or using a properly fitted gas syringe to prevent gas loss.

Question 3

uses gradient = change in volume / change in time with numbers: (16 - 0) / (10 - 0) **M1**

1.6 cm^3/s cao **A1**

states unit cm3/s with the numerical answer **B1**

accepts sensible rounding to 2 significant figures if shown **B1**

Answer: 1.6 cm^3/s

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