17 Rate of Reactions

Set A **Answer key**

A From the lesson

7 MARKS

1 **B** The marble chips have all reacted. [1]

The acid is in excess, so the marble chips are the limiting reactant. When they are used up, no more gas forms.

2 **C** using a larger volume of the same acid [1]

More acid of the same concentration has the same number of particles per unit volume, so the frequency of effective collisions is unchanged.

3 **(a)** The volume of gas given off and the mass of the reaction mixture. [1]

(b) A collision with energy greater than or equal to the activation energy, which leads to a reaction. [1]

(c) A substance that increases the rate of a reaction without being chemically changed at the end of the reaction. [1]

(d) Particles have more kinetic energy and collide more often, and more of them have energy greater than or equal to the activation energy. [1]

So the frequency of effective collisions increases. [1]

B Practice

6 MARKS

4 **C** $2Na(s) + 2H_2O(l) \rightarrow 2NaOH(aq) + H_2(g)$ [1]

Pressure affects the rate only when a reactant is a gas. In C, the reactants are a solid and a liquid.

5 **C** slower, and a larger volume [1]

Lumps of catalyst have a smaller surface area, so the rate is slower. Twice the mass of potassium chlorate gives twice the volume of oxygen.

6

When warmed, the particles gain energy and move faster, and more particles have energy greater than or equal to the activation energy. [1]

This leads to a higher frequency of effective collisions between the reacting molecules. [1]

7

A catalyst provides an alternative pathway with a lower activation energy for the reaction. [1]

This leads to a higher frequency of effective collisions between the particles, so the rate of reaction is higher. [1]