

## C2 Rates of Reaction Quiz Answers

1. What do you see when magnesium is added to an acid?

Fizzing and the magnesium disappears

2. Describe an experiment to show how concentration affects rate?

Add Mg to acid and start stopwatch. Count the number of bubbles in a given time frame. Repeat with different acid concentration. Keep size of Mg, time and volume of acid same.

3. Why do catalysts work for a long time before they need to be replaced?

They are not used up in a reaction.

4. What happens to a catalyst at the end of a reaction?

Regenerated.

5. Explain the shape of a 'volume-time' rates graph.

Steepest at start as concentration of reactants highest. Becomes less steep as concentration of reactants lowers as they form products. Flattens as concentration of reactants reaches zero and reaction is finished.

6. When water is sprayed onto a fire caused by the reaction between magnesium and acid, why does the reaction slow down?

Temperature is lowered so particles slow down and there are fewer successful collisions. Acid gets diluted so concentration decreases and there are fewer collisions.

7. Chewing antacid tablets is better than swallowing them whole. Why?

Chewing increases the surface area so the tablets dissolve faster.

8. Define rate of reaction

Change of concentration of reactant (or product) over time

9. What is the collision theory?

The rate of reaction depends on the frequency of successful collisions between particles. For the collision to be successful the particles must exceed the activation energy.

10. Define activation energy

Minimum amount of energy needed to start a reaction.

11. How do you find the rate of a precipitation reaction?

Time how long it takes for the precipitate to obscure a black cross once the chemicals have been mixed.

12. How do you find the rate of a reaction that produces a gas?

Use a gas syringe and time how long it takes to collect a specified volume of gas.

13. Why should bread be placed in the fridge?

The temperature is lowered so the rate of decomposition slows down.

14. How and why does increasing temperature increase rate?

Particles gain kinetic energy so the collision frequency increases. Particles gain thermal energy and more particles have the activation energy to react on collision.

15. Why does increasing the concentration increase the rate?

There are more particles available so more collisions are likely.

16. What is a catalyst?

A substance that increases the rate of reaction with itself being used up.

17. How does a catalyst work?

It provides an alternative reaction pathway with a lower activation energy.

18. How does a biological washing powder work?

It contains enzymes which are biological catalysts. The cleaning process can occur at lower temperatures and save energy.

19. Draw a graph that shows a reaction at two different temperatures.

Both lines level out at the same volume and the graph for the higher temperature is steeper.

20. What can you tell me about the energy distribution of particles in a hot and a cold sample?

In a cold sample most particles have little energy and few have the required activation energy. In a hot sample more particles have the activation energy and fewer particles have little energy.

21. Which reaction is fastest?

**A)** 1g limestone powder, 100cm<sup>3</sup> of 1mol dm<sup>-3</sup> acid and 30°C

**B)** 1g limestone solid, 100cm<sup>3</sup> of 1mol dm<sup>-3</sup> acid and 40°C

**C)** 1g limestone powder, 100cm<sup>3</sup> acid of 1mol dm<sup>-3</sup> and 40°C.

Answer C

22. Which property of a catalyst will never change?

Mass

23. Why is a catalyst often spread over a honeycomb surface?

To increase the surface area.

24. An experiment between magnesium and acid is carried out in the lab. The experiment is repeated with half the amount of magnesium. How is the time/volume graph different?

The graph levels out at half the volume of gas produced.

25. Although gold is rare and expensive, it is used as a catalyst in industry. Why?

You only need small amounts and the catalyst is not used up in the reaction.

26. Marble chips react with acid. At the end of the reaction there are still some chips left over. Why?

Either the chips were in excess or not sufficient acid was used.

27. Why does increasing the surface area increase the rate?

More particles are available for collisions.