

How acids, bases and salts behave

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

The answers use the sample data. Your own pH and time values will differ, but the order of the results and the explanation in terms of ionisation and H^+ concentration should match.

Level: Chemistry grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · **Curriculum:** GCSE C4, IGCSE 7

Question 1 Compare the pH

Hydrochloric acid (pH 1.0) has the lower pH, so it has more H^+ ions than ethanoic acid (pH 2.9).

Question 2 Hydrogen ion concentration

$0.0013 \div 0.100 \times 100 = 1.3\%$. Hydrochloric acid, in contrast, is almost 100% ionised.

Question 3 Rate of reaction

The rate depends on the concentration of H^+ ions. Hydrochloric acid has about **80 times more H^+ ions** ($0.10 \div 0.0013$), so collisions with magnesium are more frequent.

Question 4 Equal neutralisation

They contain the **same number of moles of acid** (0.00100 mol each). Ethanoic acid keeps ionising as H^+ is used up, so it neutralises as much alkali as the strong acid.

Question 5 Strong or concentrated

So that any difference is due to the **strength** (degree of ionisation) of the acid and not to the amount dissolved.

Question 6 Control variables

Volume of acid, temperature and size of the magnesium ribbon (also its surface area and purity).

Question 7 Sources of error

Judging when the ribbon has gone is subjective, and the ribbon may differ in thickness.

Repeat the test and use a mean, and cut the ribbon from the same strip.

Question 8 Extend the investigation

Collect the hydrogen in a gas syringe from **excess magnesium with equal volumes of each acid**. The final volumes will be the same because the moles of acid are the same.