2h - Chemical tests

Edexcel IGCSE Chemistry Revision Notes

How to use these notes

These notes cover everything you need to know for this part of the specification. They have been written in question-answer format to make them easier for you to study from.

In order to study successfully, I recommend you do the following for each question and answer:

- Read it carefully and make sure you **understand** it.
- **Memorise** the answer.
- **Practice** applying your understanding to past exam questions.

A good way to memorise information is to use **retrieval practice**. This is when you practise retrieving information from your memory. You could do this by making a flashcard for each question with the question on one side and the answer on the other. Or you could use a flashcard app. Alternatively, use a sheet of paper to cover up the answer so you can only see the question. Try to answer the question and then check how you did.

You should practise retrieving each answer from your memory until you can do it perfectly. Even once you can retrieve the answer perfectly, your ability to retrieve it will probably fade as time passes without practising. Therefore you will need to keep going back to the questions that you have previously mastered and practising them again. However, each time you re-learn the answer, the memory will be stronger and will last longer than the time before.

2.44

What is the test for hydrogen (H_2)?
Hold a lit splint at the open end of a test tube of the gas. If the gas is hydrogen, a squeaky pop sound will be heard as the gas burns rapidly.

What is the test for oxygen (O_2)?
Place a glowing splint (a splint that has been lit and then blown out) into a test tube of the gas. If the gas is oxygen, the splint will relight.

What is the test for carbon dioxide (CO_2)?
Bubble the gas through limewater. If the gas is carbon dioxide, the limewater will turn cloudy.

What is the test for ammonia gas (NH_3)?
Put damp red litmus paper in the gas. If ammonia is present, the litmus paper will turn blue.

What is the test for chlorine gas (Cl_2)?
Put damp blue litmus paper in the gas. If the gas is chlorine, the litmus paper will be bleached (turned white).

2.45

How do you carry out a flame test?
Clean a platinum wire by dipping it in dilute hydrochloric acid and then holding it in a flame. Then, dip the wire in the substance you want to test. Then hold the wire in the blue part of the flame. Observe any change in the colour of the flame.

2.46

What is observed when a flame test is carried out on a lithium compound (a compound containing Li^+ ions)?
A red flame

What is observed when a flame test is carried out on a sodium compound (a compound containing Na^+ ions)?
A yellow flame.

What is observed when a flame test is carried out on a potassium compound (a compound containing K^+ ions)?
A lilac flame.

What is observed when a flame test is carried out on a calcium compound (a compound containing Ca^{2+} ions)?
An orange-red flame.

What is observed when a flame test is carried out on a copper compound (a compound containing Cu^{2+} ions)?
A blue-green flame.

2.47

What is the test for ammonium ions (NH_4^+)?
Add sodium hydroxide solution. If a gas is given off, use damp red litmus paper to test whether the gas is ammonia (ammonia turns damp red litmus paper blue). If the gas is ammonia, then the original substance contained ammonium ions.

What is a precipitate?
A precipitate is an insoluble solid that is formed in a reaction between two dissolved solids.

Which substance can be used to identify many metal ions?
Sodium hydroxide solution - $NaOH_{(aq)}$

How can you test for copper (II) ions (Cu^{2+}), other than a flame test?
Add sodium hydroxide solution. If copper (II) ions (Cu^{2+}) are present, a blue precipitate will form.

How can you test for iron (II) ions?
Add sodium hydroxide solution. If iron (II) ions are present, a green precipitate will form.

How can you test for iron (III) ions?
Add sodium hydroxide solution. If iron (III) ions are present, a brown precipitate will form.

2.48

What is the test for halide ions (Cl^-, Br^- and I^-)?
Add silver nitrate and dilute nitric acid. If halide ions are present a precipitate is formed. If the halide is chloride, the precipitate will be silver chloride, which is white. If the halide is bromide, the precipitate will be silver bromide, which is cream. If the halide is iodide, the precipitate will be silver iodide, which is yellow.

What is the test for sulfate ions (SO_4^{2-})?
Add barium chloride and dilute hydrochloric acid. If sulfate ions are present a white precipitate will form.

What is the test for carbonate ions (CO_3^{2-})?
Add dilute hydrochloric acid. If a gas is given off, bubble it through limewater. If the limewater turns cloudy, that means the gas is carbon dioxide, which shows that the original substance contained carbonate ions, since carbonate ions react with dilute acid to form carbon dioxide.

2.49

What is a chemical test for water (H_2O)?
Add some of the substance being tested to anhydrous copper (II) sulfate, which is white. If the substance contains water, the copper (II) sulfate will turn blue.

2.50

What physical test can be used to test whether a sample of water is pure?
To test whether a sample of water is pure, determine its melting and boiling points. If the melting point is 0°C and the boiling point is 100°C then the water is pure. Otherwise, the water is not pure.