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GCSE Chemistry

Paper 2 · Required Practicals - Cheat Sheet

AQA Chemistry (8462) | Paper 2 | 4 Practicals

Quick-revision reference for the Required Practicals in AQA GCSE Chemistry. For each practical: the **aim**, the **method**, the **variables**, the expected **result**, and the **exam tips** examiners reward. Learn the method and the why, not just the what.

RP5 Rates of Reaction (Cloudiness)

AIM	Investigate how the concentration of a solution affects the rate of reaction using the loss of clarity of a precipitate.
METHOD	**1.** Draw a black cross on paper and stand a conical flask of sodium thiosulfate on top of it. **2.** Add dilute hydrochloric acid and immediately start a stopwatch. **3.** Look down through the flask and stop timing when the cloudy sulfur precipitate hides the cross. **4.** Repeat with different concentrations of thiosulfate, keeping the total volume and temperature the same.
VARIABLES	IV: concentration of sodium thiosulfate · DV: time for cross to disappear (rate = 1 ÷ time) · Control: volume, temperature, depth of liquid, same observer
RESULT	Higher concentration means a shorter time, so a faster rate; rate is proportional to 1 ÷ time. A graph of rate against concentration gives an upward trend.
EXAM TIPS	› Sulfur dioxide gas is produced, which is toxic and an irritant, so work in a ventilated room. › Always have the same person judge when the cross vanishes to keep the end point fair. › Repeat each concentration and take a mean to improve reliability.

RP5 Rates of Reaction (Gas Volume)

AIM	Investigate how a chosen variable, such as surface area, affects the rate of reaction by measuring the volume of gas given off.
METHOD	**1.** Add marble chips (calcium carbonate) to dilute hydrochloric acid in a conical flask fitted with a bung and delivery tube. **2.** Collect the carbon dioxide produced in a gas syringe or an inverted measuring cylinder over water. **3.** Record the volume of gas every 10 seconds until the reaction stops. **4.** Repeat using chips of a different size (large lumps versus small lumps or powder), keeping mass and acid the same.
VARIABLES	IV: surface area of the marble chips · DV: volume of gas collected per unit time (rate) · Control: mass of carbonate, concentration and volume of acid, temperature
RESULT	Smaller pieces have a larger surface area, giving a steeper curve and faster initial rate; all runs reach the same final gas volume when the limiting reactant is used up.
EXAM TIPS	› The steepest part of the graph is at the start when reactant concentration is highest. › A flat (horizontal) line shows the reaction has finished. › Fit the bung quickly after adding the acid so no gas escapes before measuring begins.

RP6 Chromatography

AIM	Use paper chromatography to separate a mixture of soluble dyes and calculate the R_f value of each spot.
METHOD	**1.** Draw a pencil baseline near the bottom of the chromatography paper and add a small spot of each ink on it. **2.** Place the paper in a beaker so the solvent level sits below the baseline, then cover it. **3.** Let the solvent rise up the paper, carrying the dyes, then remove it before the solvent reaches the top. **4.** Mark the solvent front in pencil, leave the paper to dry, and measure the distances moved.
VARIABLES	IV: the different dyes or inks tested · DV: distance each spot travels (used for R_f) · Control: same solvent, same paper, same starting line
RESULT	Each dye moves a characteristic distance, giving R_f = distance moved by spot ÷ distance moved by solvent. R_f is always between 0 and 1, and more soluble dyes travel further.
EXAM TIPS	› Always draw the baseline in pencil, because ink would dissolve and run up the paper. › Keep the spots above the solvent so the dye is not washed straight into the beaker. › Measure to the centre of each spot when finding its distance for a fair R_f.

RP8 Identifying Ions and Water Analysis

AIM	Use chemical and flame tests to identify the cations and anions present in unknown salts and samples of water.
METHOD	**1.** For metal cations, dip a clean wire loop in the sample and hold it in a blue Bunsen flame to see the flame colour. **2.** Add sodium hydroxide solution to a portion to test for metal hydroxide precipitates and their colours. **3.** Test for carbonates by adding dilute acid and bubbling any gas through limewater. **4.** Test for halides with nitric acid then silver nitrate, and for sulfates with hydrochloric acid then barium chloride.
VARIABLES	IV: the ion being tested for · DV: observation (flame colour, precipitate colour, gas produced) · Control: clean apparatus, same volumes, fresh wire loop each time
RESULT	Each ion gives a characteristic result: for example lithium burns red, sodium yellow, potassium lilac; carbonates fizz and turn limewater milky; halides give coloured silver halide precipitates; sulfates give a white barium sulfate precipitate.
EXAM TIPS	› Clean the flame test wire in acid between samples so a leftover ion does not mask the next colour. › Use nitric acid before silver nitrate, and hydrochloric acid before barium chloride, to remove ions that would give a false positive. › Flame and chemical tests struggle when a mixture of ions is present, as one strong colour can hide another.