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GCSE Chemistry

Paper 1 · Required Practicals - Cheat Sheet

AQA Chemistry (8462) | Paper 1 | 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.

RP1 Making a Soluble Salt

AIM	Prepare a pure, dry sample of a soluble salt from an insoluble base and an acid.
METHOD	**1.** Warm a fixed volume of acid (e.g. dilute H_2SO_4) gently in a beaker. **2.** Add insoluble base (e.g. CuO) a spatula at a time, stirring, until excess solid remains and no more reacts. **3.** Filter off the excess base to leave a clear salt solution (filtrate). **4.** Heat the filtrate to the point of crystallisation, then leave to cool so crystals form. **5.** Pat the crystals dry between filter paper to give a pure dry sample.
VARIABLES	IV: amount of base added · DV: whether reaction is complete (excess solid stays) · Control: same acid volume and concentration
RESULT	Excess insoluble base guarantees all the acid reacts; evaporating then cooling gives pure hydrated salt crystals (e.g. $CuSO_4$).
EXAM TIPS	› Adding base in excess ensures no leftover acid contaminates the salt. › Stop heating at the crystallisation point – do not evaporate to dryness or you lose the crystal shape. › Filtering removes the unreacted excess base, the key purification step.

RP2 Titration

AIM	Find the volume of acid needed to neutralise a known volume of alkali (or the unknown concentration).
METHOD	**1.** Pipette 25 cm^3 of alkali into a conical flask and add a few drops of indicator (e.g. methyl orange). **2.** Fill a burette with the acid and record the starting volume to the nearest 0.05 cm^3. **3.** Run acid in, swirling, until the indicator just changes colour at the end point. **4.** Record the final burette reading and work out the titre. **5.** Repeat until concordant titres (within 0.10 cm^3) are obtained and take a mean.
VARIABLES	IV: volume/concentration of acid added · DV: titre (volume of acid at end point) · Control: same volume and concentration of alkali, same indicator
RESULT	Concordant titres give a reliable mean; from moles = concentration × volume the unknown concentration in mol/dm^3 can be calculated.
EXAM TIPS	› Read the burette at eye level from the bottom of the meniscus to avoid parallax error. › Add acid dropwise near the end point so you do not overshoot the colour change. › Ignore the rough titration and only average concordant results. › Swirl constantly and wear eye protection – acids and alkalis are irritants.

RP3 Electrolysis

AIM	Investigate what is formed at each electrode when aqueous solutions are electrolysed using inert electrodes.
METHOD	**1.** Half-fill a small beaker with the salt solution (e.g. copper(II) sulfate or sodium chloride). **2.** Place two inert carbon (graphite) electrodes in the solution, not touching each other. **3.** Connect the electrodes to a d.c. power supply through an ammeter and switch on. **4.** Observe each electrode and test any gas given off (glowing splint for O_2, lit splint for H_2, litmus for Cl_2). **5.** Record the product at the cathode (−) and the anode (+).
VARIABLES	IV: the ionic solution electrolysed · DV: products at cathode and anode · Control: same voltage, electrode type and electrolysis time
RESULT	Cathode gives the metal if it is less reactive than hydrogen, otherwise H_2; anode gives a halogen if a halide is present, otherwise O_2.
EXAM TIPS	› Use inert graphite electrodes so they do not react and skew the products. › Chlorine is toxic − carry out halide electrolysis in a fume cupboard or well-ventilated room. › Reactive metals (e.g. Na, K) stay in solution because hydrogen is discharged at the cathode instead.

RP4 Temperature Change (Calorimetry)

AIM	Investigate the temperature change of reacting solutions to find whether a reaction is exothermic or endothermic.
METHOD	**1.** Measure a fixed volume of one reactant into an insulated polystyrene cup with a lid. **2.** Record the starting temperature of the solution with a thermometer. **3.** Add the second reactant (e.g. a metal, or a measured volume of acid/alkali), stir, and note the highest or lowest temperature reached. **4.** Calculate the temperature change ΔT = final − start. **5.** Repeat for different variables (e.g. different metals or acid concentrations) and compare.
VARIABLES	IV: e.g. concentration of acid or type of metal/reactant · DV: temperature change ΔT · Control: same volume of solution, same insulated cup and starting temperature
RESULT	A rise in temperature shows an exothermic reaction, a fall shows endothermic; the energy released relates to $q = mc\Delta T$, so larger ΔT means more energy transferred.
EXAM TIPS	› Use a polystyrene cup with a lid to reduce heat loss to the surroundings. › Take the maximum (or minimum) temperature − this gives the true overall change. › Keep the volume of solution constant so any temperature change is a fair comparison. › Stir before reading so the heat is spread evenly through the mixture.