GCSE Chemistry



Required Practical Answer Book

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| **Name:** | **Class:** | **Teacher:** |

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**Required Practical 1: Making Salts**

**Preparation of a pure, dry sample of a soluble salt from an insoluble oxide or carbonate, using a Bunsen**

**burner to heat dilute acid and a water bath or electric heater to evaporate the solution.**

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| Question 1 | (a)     s**1**l*Answers****must****be in the correct order.***1**(b)     A gas was lost from the flask**1**(c)     **Level 3 (5–6 marks):**A coherent method is described with relevant detail, and in correct sequence which demonstrates a broad understanding of the relevant scientific techniques and procedures. The steps in the method are logically ordered. The method would lead to the production of valid results.**Level 2 (3–4 marks):**The bulk of the method is described with mostly relevant detail, which demonstrates a reasonable understanding of the relevant scientific techniques and procedures. The method may not be in a completely logical sequence and may be missing some detail.**Level 1 (1–2 marks):**Simple statements are made which demonstrate some understanding of some of the relevant scientific techniques and procedures. The response may lack a logical structure and would not lead to the production of valid results.**0 marks:**No relevant content.**Indicative content**•        sulfuric acid in beaker (or similar)•        add copper carbonate one spatula at a time•        until copper carbonate is in excess or until no more effervescence occurs \*•        filter using filter paper and funnel•        filter excess copper carbonate•        pour solution into evaporating basin / dish•        heat using Bunsen burner•        leave to crystallise / leave for water to evaporate / boil off water•        decant solution•        pat dry (using filter paper)•        wear safety spectacles / goggles\*Students. may choose to use a named indicator until it turns a neutral colour, record the number of spatulas of copper carbonate added then repeat without the indicator.**6**(d)     Total mass of reactants = 221.5**1**159.5221.5*allow ecf from step 1***1**72.0 (%)**1***allow 72.0 with no working shown for****3****marks*(e)     any **one** from:•        Important for sustainable development•        Economic reasons•        Waste products may be pollutants / greenhouse gases**1** |

**Required Practical 2: Temperature Changes**

**Investigate the variables that affect temperature changes in reacting solutions such as, e.g. acid plus metals, acid plus carbonates, neutralisations, displacement of metals.**

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| Question 1 | (a)     any **two** from:•        concentration / volume of dilute hydrochloric acid•        mass of metal powder•        surface area of metal powder•        stirring (of any) / rate of stirring*allow reacted for the same length of time***2**(b)     4.2 °C*allow Magnesium Test 2***1**and any **one** from:•        lower mass of magnesium added•        surface area of magnesium too low•        magnesium coated in magnesium oxide (so took a while to start reacting)•        not stirred•        not stirred as quickly as the other metals•        not reacted for as long a time as the other metals*allow reason for break in circuit***1**(c)     17.4(°C)**1**(d)     bubbles of gas**1**more (bubbles) seen with calcium than other metals*allow any correct comparison between two metals***1**(e)     any value between 7.9 °C and 12.3 °C**1** |
| Question 2 | (a)     (i)      5.75 **or** 5.8*correct answer with or without working gains****2****marks**correct working showing addition of any four results and division by 4 gains****1****mark****OR****6(.04) for****1****mark***2**(ii)     use a polystyrene cup **or** lid*accept insulate the beaker***1**to prevent energy/heat gain*accept to prevent energy/heat transfer**do****not****accept energy/heat loss***OR**use a digital thermometer*allow use a data logger*easier to read (to 0.1°C)**1**(b)     (as mass increases) the final temperature increases**1**then stays constant**1**correct reference to a value above 8 g up to and including 10 g as mass when the trend changes**1** |

**Required Practical 3: Rates of Reaction**

**Investigate how changes in concentration affect the rates of reactions by both measuring the volume of a gas produced and monitoring a change in colour or turbidity.**

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| Question 1 | (a)     36 cm3**1**(b)     all points correct*± ½ small square***2***allow****1****mark if 6 or 7 of the points are correct*2 best fit lines drawn*must not deviate towards anomalous point***2***allow****1****mark if 1 line correct*(c)     The bung was not pushed in firmly enough.**1**The measuring cylinder was not completely over the delivery tube.**1**(d)     as mass of lithium carbonate increases volume of gas produced increases**1**linear / (directly) proportional**1**(e)     A gas / carbon dioxide is produced.*allow because the air in the tube expands***1**(f)     any **one** from:•        Potassium carbonate does not decompose to produce carbon dioxide / a gas.•        Potassium carbonate does not decompose at the temperature of the Bunsenburner **or** the Bunsen burner is not hot enough to decompose potassium carbonate.•        When potassium carbonate decomposes a gas is not formed.**1** |
| Question 2 | (a)     because sulfur / S (forms)(a)     sulfur dioxide*accept SO2***1**(b)     (i)      curved line of best fit between the 4 non-anomalous points**1**(ii)     temperature was lower (than 40 °C)*accept student missed the moment when the cross disappeared**accept smaller volume of acid or acid more dilute***1**(iii)     0.005 **or** 1/200*correct answer with or without working gains****2****marks**if answer incorrect, allow****1****mark for 0.32 / 64***2**(iv)     The particles move faster.**1**The particles collide with more energy.**1**(v)     activation**1** |

**Required Practical 4: Chromatography**

**Investigate how paper chromatography can be used to separate and tell the difference between coloured substances.**

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| Question 1 | (a)     The start line was drawn in ink**1**The water level was above the spots**1**(b)     3**1**(c)     **A****1**(d)     *(distance moved by dye A)* 38 (mm)*allow values in range 36-40***1***(distance from start line to solvent front)*102 (mm)*allow values in range 101-103***1**https://app.doublestruck.eu/content/AG_CHM/HTML/M/MSP182F04_files/img01.png *allow ecf from Table 1***1**0.37254 …*allow values in range 0.35 − 0.39***1**0.37**1***accept 0.37 with no working shown for****5****marks* |
| Question 2 | (a)    additive**1**(b)     colour 3 is a mixture of colours 1 and 2any **two** from:*accept E-number or additive instead of colour**ignore comments about height / level***1**•        colour 1 is made up of only one colour / dye•        colour 2 is made up of only one colour / dye•        colour 3 is made up of two colours / dyes **or** more colours (than colours 1 and 2)**2** |

**Required Practical 5: Water Purification**

**Analysis and purification of water samples from different sources. To include pH measurement, removal of dissolved solids and distillation.**

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| Question 1 | (a) *(as part of glassware attached to bung)*salt solution in (conical) flask*allow suitable alternative equipment, eg boiling tube***1***(at end of delivery tube)*pure water in test tube which must not be sealed*allow suitable alternative equipment, eg, beaker, condenser***1**heat source (to heat container holding salt solution)**1***if no other mark obtained allow for****1****mark suitable equipment drawn as part of glassware attached to bung****and****at end of delivery tube*(b)     determine boiling point**1**should be at a fixed temperature 100°C*allow should be 100°C**allow if impure will boil at a temperature over 100°C***1**(c)     high energy requirement**1** |
| Question 2 | (a)     any **one** from:•        heat•        stir**1**(b)     filter*accept use a centrifuge**accept leave longer (to settle)***1**(c)     any **one** from:•        wear safety spectacles•        wear an apron**1**(d)     evaporation at **A****1**condensation at **B****1**(e)     100**1** |

**Required Practical 6: Electrolysis**

**Investigate what happens when aqueous solutions are electrolysed using inert electrodes.**

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| Question 1 | (a)     (i)      economical**1**(ii)     phytomining**1**(iii)    carbon dioxide**1**(b)     (i)      copper / Cu**1**iron sulfate / FeSO4**1**(ii)     copper / ions have a positive charge*it = copper ions**allow copper ions have a different charge**accept copper / ions are free to move**accept to gain electrons**accept copper / ions are attracted to the negative electrode****or****opposite charges attract***1**(c)     any **two** from:*ignore not biodegradable or does not decay*•        copper ores are limited / running out*allow copper is running out*•        copper can be recycled•        copper can be reused•        copper is expensive•        landfill sites are filling up•        copper compounds are toxic*allow copper is toxic***2** |
| Question 2 | (a)     substance brokendown / separates / splits into elementsby electric current / electricityions free to move e.g. when molten / in solution*allow 1 mark for “a substance that conducts electricity”***max 2**(b)     (i)      copper / Cu**1**(ii)     oxygen /O2*allow CO2***1**(c)     tube over electrodefull of CuSO4(aq) / water*allow sulphuric acid / sensible electrolyte****not****any other liquid / using a syringe***2**(d)     Cu2+ ions removed / less Cu2+***not****copper sulphate removed**allow 1 mark for “copper removed / less copper”***2** |