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**GCSE Combined Science**

**(and Chemistry)**

**Student Answer Booklet**

**Chemical Changes**

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**Level 1 ANSWERS**

**GCSE Chemistry – Chemical changes**

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**Exam Practice**

**Question 1:**

(a)     any **three** from:

•        concentration of (salt) solution

•        volume of (salt) solution

*ignore amount of solution*

•        **initial** temperature (of the solution)

*ignore room temperature*

•        surface area / form of metal

•        moles of metal

*allow mass / amount*

*ignore time*

*ignore size of tube*

**3**

(b)     20

**1**

32

**1**

12

*allow ecf*

**1**

(c)     (i)      four bars of correct height

*tolerance is + / - half square*

*3 correct for* ***1*** *mark*

**2**

bars labelled

**1**

(ii)     *one variable* is non-continuous / categoric

*accept qualitative or discrete*

*accept no values between the metals*

**1**

(iii)    magnesium

**1**

because biggest temperature change

*accept gives out most energy*

*ignore rate of reaction*

*dependent on first mark*

**1**

(iv)    does not react / silver cannot displace copper

**1**

because silver not more reactive (than copper) **or** silver below copper in reactivity series

*do* ***not*** *accept silver is less reactive than copper sulfate*

**1**

(v)     replace the copper sulfate

*could be implied*

**1**

with any compound of a named metal less reactive than copper

*allow students to score even if use an insoluble salt*

**1**

**[16]**

Examiner's report here

Notes here

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58 questions

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**Question 2:**

(a)     add excess copper carbonate (to dilute hydrochloric acid)

*accept alternatives to excess, such as ‘until no more reacts’*

**1**

filter (to remove excess copper carbonate)

**1**

heat filtrate using a water bath to evaporate some water **or** heat to point of crystallisation

**1**

leave to cool (so crystals form)

*until crystals form*

**1**

*must be in correct order to gain* ***4*** *marks*

**Question 3:**

(a)     (sulfuric acid is) completely / fully ionised

**1**

In aqueous solution **or** when dissolved in water

**1**

(b)     H+(aq) + OH−(aq) → H2O(l)

*allow multiples*

***1*** *mark for equation*

***1*** *mark for state symbols*

**2**

**Question 4:**

 because ions can move

*ignore ions attracted*

*do* ***not*** *accept molecules / atoms moving*

*do* ***not*** *accept incorrect reference to electrons moving*

**1**

(and ions move) to the electrodes

**or**

(and ions) carry charge

**1**

*accept converse for solid*

(ii)     magnesium (ions) attracted (to the electrode)

**1**

so magnesium ions gain electrons

*accept magnesium ions are reduced*

*ignore oxidised*

**1**

2 electrons

*accept a correct half equation for 2nd* ***and*** *3rd marking points*

**1**

(iii)     hydrogen

*allow H2*

**1**

(iv)     magnesium is more reactive than hydrogen

*accept converse*

*allow magnesium is high in the reactivity series* ***or*** *magnesium is very/too reactive.*

*do* ***not*** *accept magnesium ions are more reactive than hydrogen ions*

**1**

(v)     **2** Cl- → Cl2 + **2e-**

*must be completely correct*

**1**

**Question 5:**

(a)     (sulfuric acid is) completely / fully ionised

**1**

In aqueous solution **or** when dissolved in water

**1**

(b)     H+(aq) + OH−(aq) → H2O(l)

*allow multiples*

***1*** *mark for equation*

***1*** *mark for state symbols*

**2**

**Answers below for Chemistry Only booklet:**

(c)     adds indicator, eg phenolpthalein / methyl orange / litmus added to the sodium hydroxide (in the conical flask) *do* ***not*** *accept universal indicator*

**1**

(adds the acid from a) burette

**1**

with swirling **or** dropwise towards the end point **or** until the indicator just changes colour

**1**

until the indicator changes from pink to colourless (for phenolphthalein) or yellow to red  
(for methyl orange) or blue to red (for litmus)

**1**

(d)     titrations 3, 4 and 5

**or**

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**1**

27.12 cm3

*accept 27.12 with no working shown for* ***2*** *marks*

**1**

*allow 27.1166 with no working shown for* ***2*** *marks*

(e)     Moles H2SO4 = conc × vol = 0.00271

*allow ecf from 8.4*

**1**

Ratio H2SO4:NaOH is 1:2

**or**

Moles NaOH = Moles H2SO4 × 2 = 0.00542

**1**

Concentration NaOH = mol / vol = 0.00542 / 0.025 = 0.2168

**1**

0.217 (mol / dm3)

*accept 0.217 with no working for* ***4*** *marks*

**1**

*accept 0.2168 with no working for* ***3*** *marks*

(f)        https://app.doublestruck.eu/content/AG_CHM/HTML/M/MSP181H08_files/img02.png   ×   0.18 = no of moles

**or**

0.15 × 40 g

**1**

0.144 (g)

**1**

*accept 0.144g with no working for* ***2*** *marks*

**[16]**