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Examiners' report

# CHEMISTRY B (SALTERS)

H033

For first teaching in 2015

**H033/01 Summer 2024 series**

Version 1

# Contents

# Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates.

The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. A selection of candidate answers is also provided. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.

A full copy of the question paper and the mark scheme can be downloaded from OCR.

# Paper 1 series overview

This synoptic paper targets all three assessment objectives requiring candidates to:

- demonstrate and apply knowledge and understanding of scientific ideas, processes, techniques, and procedures in theoretical and practical contexts
- handle qualitative and quantitative data
- analyse, interpret, and evaluate scientific information to make judgements and reach conclusions
- show an ability to develop practical procedures.

To do well, candidates needed to demonstrate a broad knowledge and understanding of inorganic, organic and physical chemistry, and be able to carry out multi-step calculations.

Most candidates attempted all questions and there were no indications that candidates were short of time to complete the paper. Some candidates needed extra space to answer questions, particularly Question 22(a). Diagrams were generally of poor quality in Question 21(b)(i). Candidates demonstrated knowledge and understanding of organic and inorganic reactions but found difficulty with calculations that involved several steps.

| Candidates who did well on this paper generally: | Candidates who did less well on this paper generally: |
|---|---|
| • read the questions carefully and ensured all parts of the question were answered<br>• made structured answers to longer questions<br>• carried out accurate calculations that had clearly shown steps. | • showed a limited understanding of practical procedures<br>• had difficulty using correct terminology or were not precise enough with their answers<br>• were not able to use and manipulate supplied data in the correct mathematical expression. |

# Section A overview

Most candidates were given reasonable marks for this section. Candidates who were more successful generally used the blank space to the right of the listed question responses to make calculations, write equations or make notes to help them answer the question. There were some instances of questions not being answered; we recommend that candidates should always select an answer, even if they are unsure.

## Question 2

**2** $SiO_2$ has a covalent network structure.

What is correct for $SiO_2$?

**A** It consists of $SiO_2$ molecules joined by strong intermolecular bonds.

**B** It does not conduct electricity when molten.

**C** It has a low melting point.

**D** It is readily soluble in water.

Your answer ☐ **[1]**

Many candidates incorrectly selected answer A.

## Question 4

**4** Magnesium oxide reacts with dilute hydrochloric acid.

What is correct for this reaction?

**A** A gas is given off.

**B** A green solution of a salt is formed.

**C** It is a neutralisation.

**D** Magnesium hydrochloride is formed.

Your answer ☐ **[1]**

Candidates who wrote an equation for the reaction alongside the question were more likely to select the correct answer of C.

## Question 6

**6** What are possible products from cracking an alkane molecule?

**A** one alkane molecule and two alkene molecules

**B** two alkane molecules

**C** two alkane molecules and one alkene molecule

**D** two alkene molecules

Your answer [ ] **[1]**

Candidates who correctly chose answer A had usually drawn the structures of the possible products alongside the question.

## Question 8

**8** An impure organic liquid is being purified after preparation.

The liquid is insoluble in water.

Why is a separating funnel used?

**A** To complete the distillation.

**B** To remove the sodium sulfate used for drying.

**C** To separate the impure liquid from aqueous washings.

**D** To separate the pure product from water.

Your answer [ ] **[1]**

If candidates did not correctly identify answer C, they often chose answer D, which relates to the preparation, rather than purification, of the product.

## Question 9

**9** What is correct for all the halogens (Group 17)?

**A** Their atoms have electronic configurations ending $p^5$.

**B** They are gases.

**C** They are readily soluble in water.

**D** They have the highest first ionisation enthalpy in their period.

Your answer [ ] **[1]**

Candidates often incorrectly identified the common electronic configuration and also misidentified all the halogens as gases.

## Question 10

**10** What occurs when aqueous chlorine reacts with aqueous iodide ions?

**A** $2Cl^- \rightarrow Cl_2 + 2e^-$

**B** Electrons are transferred from chlorine atoms.

**C** $I^-$ is oxidised.

**D** The brown colour fades.

Your answer [ ] **[1]**

Successful candidates usually wrote out the equation that described the reaction alongside the question.

## Question 11

**11** Aluminium reacts with chlorine to form $AlCl_3$.

What is the maximum mass (in g) of $AlCl_3$ ($M_r$ = 133.5) that could be made by reacting 5.4 g of aluminium with 10.7 g of chlorine?

**A** 13.4

**B** 16.1

**C** 27.0

**D** 40.0

Your answer ☐ **[1]**

This question was not answered well. Candidates found it difficult to identify chlorine as the limiting reactant.

## Question 12

**12** A reaction has a $K_c << 1 \times 10^{-10}$

What is correct for this reaction?

**A** Concentration of products = concentration of reactants.

**B** It forms an equilibrium with more products than reactants.

**C** It goes to completion.

**D** It hardly happens at all.

Your answer ☐ **[1]**

B was a common incorrect response.

## Question 13

**13** The table shows the tropospheric abundance and greenhouse factors for carbon dioxide and methane. The greenhouse factor measures the relative contribution to the greenhouse effect of one gram of each gas.

| | **tropospheric abundance by mass** | **greenhouse factor** |
|---|---|---|
| $CO_2$ | 0.040% | 1 |
| $CH_4$ | 1.8 ppm | 28 |

What is the approximate value of the fraction shown?

$$\frac{\text{contribution to the greenhouse effect of the methane in the troposphere}}{\text{contribution to the greenhouse effect of the carbon dioxide in the troposphere}}$$

**A** 1/80

**B** 1/8

**C** 45/1

**D** 80/1

Your answer ☐ **[1]**

This question was not answered well. Most candidates found the multi-step calculation of conversion of units followed by multiplying by the greenhouse factor, and then evaluating the ratio, too difficult.

## Question 14

**14** Iodobutane reacts with silver nitrate solution.

What is correct about this reaction?

**A** It gives a white precipitate.

**B** It is faster than the reaction of chlorobutane with silver nitrate solution.

**C** It is slower than the reaction of bromobutane with silver nitrate solution.

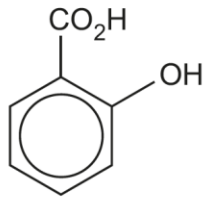
**D** The rate is determined by the polarity of the C–I bond.

Your answer ☐ **[1]**

Candidates did not answer this question well, with a wide range of answers seen.

## Question 15

**15** What is a property of the compound shown?




**A** It can be oxidised to a carbonyl compound.

**B** It gives a purple colour with neutral $FeCl_3$.

**C** It is neutral in solution.

**D** It reacts with alkalis but not carbonates.

Your answer ☐ **[1]**

The test for a phenol was known by candidates who did well on this paper.

## Question 16

**16** An impure solid is purified by recrystallisation.

What is correct?

**A** Insoluble impurities are removed by filtration at the end of the process.

**B** Soluble impurities remain in solution at the end of the process.

**C** The final mass of solid is greater than the mass before recrystallisation.

**D** The solid must be soluble in the chosen solvent at low temperatures.

Your answer ☐ **[1]**

Very few candidates gave the correct response (B).

## Question 18

**18** A hydrocarbon molecule has 9 σ bonds and 2 π bonds.

What is the hydrocarbon?

**A** $CH_2CHCHCHCH_3$

**B** $CH_2CHCH_2CH_3$

**C** $CH_2CHCHCH_2$

**D** $CH_2CHCH_3$

Your answer ☐ **[1]**

Candidates should be encouraged to draw out the structures of the molecules, either in the space next to the question or on the extra pages.

## Question 19

**19** The reaction shown is sometimes used during the manufacture of bromine from sea water.

$Br_2(aq) + SO_2(g) + \ldots\ldots\ldots\ldots \rightarrow 2HBr(aq) + H_2SO_4(aq)$

What is correct about this reaction?

**A** '$H_2O(l)$' should be written on the dotted line.

**B** The colour darkens during the reaction.

**C** The pH falls during the reaction.

**D** The sulfur is oxidised from +2 to +6.

Your answer ☐ **[1]**

Many candidates incorrectly selected A, perhaps not realising that the information missing from the equation is 2 moles of $H_2O$.

## Question 20

**20** An aqueous solution of calcium nitrate is electrolysed.

What is the product at the anode?

**A** calcium

**B** hydrogen

**C** nitrogen

**D** oxygen

Your answer [ ] **[1]**

Few candidates answered this question correctly and they often chose answer B.

# Section B overview

The range of questions in this section allowed candidates to demonstrate their breadth of knowledge and understanding across the specification. Candidates seemed to have sufficient time to attempt all questions, and most did so.

## Question 21 (a)

**21** Sodium bicarbonate, $NaHCO_3$, is used in baking cakes.
It decomposes when heated, giving carbon dioxide that causes the cakes to 'rise'.

$2NaHCO_3(s) \rightarrow Na_2CO_3(s) + CO_2(g) + H_2O(g)$ **Equation 21.1**

**(a)** Give the systematic name of $NaHCO_3$.

..... **[1]**

Candidates did not answer this question well. A common incorrect response was sodium hydrocarbonate. Some candidates incorrectly used Roman numerals to identify the oxidation states of either sodium or carbon.

## Question 21 (b) (i)

**(b)** A pair of students want to check **Equation 21.1**.

They heat a sample of sodium bicarbonate, collect the carbon dioxide produced and measure its volume.

**(i)** Draw a labelled diagram of an apparatus they could use.

**[2]**

The quality of diagrams and their labelling was frequently inadequate. Most candidates correctly identified a gas syringe or an inverted measuring cylinder/burette under water to collect the gas. Candidates should be reminded that it is not necessary to show the clamps securing the apparatus.

**Common mistakes included:**

- the connection into the test tube did not show the tube passing through the bung
- a gap between the bung and the test tube
- tubing shown as a single line
- labels omitted on either the sodium bicarbonate or 'heat'.

## Question 21 (b) (ii)

**(ii)** Calculate the volume of gas (in $cm^3$, measured at RTP) that they would expect to collect if they heated 0.10 g of sodium bicarbonate.

volume = ..... $cm^3$ **[2]**

Many candidates correctly calculated the number of moles of $NaHCO_3$ but did not then divide by 2 to get the number of moles of $CO_2$. Some candidates did not convert $dm^3$ to $cm^3$.

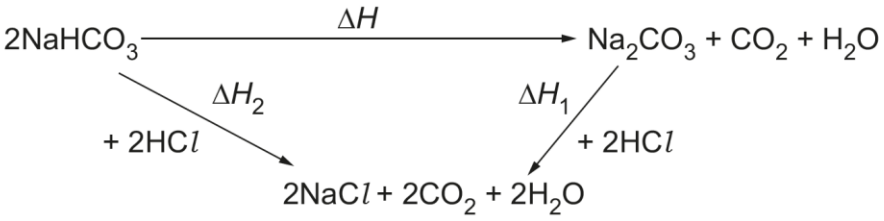
## Question 21 (c) (i)

**(c)** The students wish to measure the $\Delta H$ for the reaction in **Equation 21.1**.

They react $NaHCO_3$ and $Na_2CO_3$ separately with hydrochloric acid in glass beakers. They measure the temperature changes in each experiment.

They then use the Hess cycle in **Fig 21.1** to measure $\Delta H$.

**Fig. 21.1**




The students' results for measuring $\Delta H_1$ are:

| | |
|---|---|
| **Mass of $Na_2CO_3$ / g** | 2.0 |
| **Volume of 2.0 mol dm$^{-3}$ HCl (excess) / cm$^3$** | 25.0 |
| **Initial temperature of solution / °C** | 19.3 |
| **Final temperature of solution / °C** | 25.1 |

**(i)** Calculate the value of $\Delta H_1$ (in kJ mol$^{-1}$).
(Assume there are 27.0 g of solution with the same specific heat capacity as water.)

$\Delta H_1$ = ..... kJ mol$^{-1}$ **[3]**

This question was not answered well. Most candidates correctly calculated the number of moles of sodium carbonate. Some candidates then correctly calculated the heat given out, using the mass of the solution as 27 g, as given in the question. Many incorrectly used either 25 g or 2 g as the mass. When recording their final answer, some candidates had not recognised that because this was an exothermic reaction they needed to show this with a negative sign before their value of ΔH.

## Question 21 (c) (ii)

**(ii)** The greatest measurement uncertainty is 0.05 g in the mass.

What percentage is 0.05 of 2.0?

answer = ..... % **[1]**

This question was answered well by candidates across the attainment range.

## Question 21 (c) (iii)

**(iii)** As well as measurement uncertainties, there are also errors caused by experimental limitations. One such error is 'heat loss' during the measurement of $\Delta H_1$.

The students could reduce heat loss by changing one piece of apparatus.

Describe this change and explain how it will reduce heat loss.

.....

.....

..... **[2]**

Few candidates answered this question correctly, with many answering in terms of improvements to the existing apparatus rather than changing the apparatus. More care needed to be taken when reading the question.

## Question 21 (c) (iv)

**(iv)** The students do another experiment and calculate that $\Delta H_2 = +22\,kJ\,mol^{-1}$.

Calculate $\Delta H$ in $kJ\,mol^{-1}$, using your answer from **(i)** and the cycle in **Fig. 21.1**.

$\Delta H$ = ..... $kJ\,mol^{-1}$ **[2]**

Although many candidates had not calculated the correct answer to Question 21 (c) (i), they could be given both marks for an 'error carried forward' when they showed the correct equation and evaluation. Most of the marks for this question were given this way.

## Question 22 (a)

**22** Knowledge of the structure of atoms developed gradually over time.
By the year 1914 the arrangement of the electrons was still being worked out.
A scientist called Neils Bohr studied atomic spectra and devised the idea of electrons being in energy levels.

**(a)** Atomic spectra can be either absorption spectra or emission spectra.

Describe the appearance of an atomic **absorption** spectrum and explain how it is formed.
Give **one** similarity between the atomic absorption and emission spectra of the same element.

.....

.....

.....

.....

.....

..... **[5]**

This question discriminated well. Most candidates correctly described the appearance of the absorption spectrum and a similarity between absorption and emission spectra. Many candidates described electrons absorbing specific frequencies (or used a reference to $\Delta E = h\nu$) and being excited to higher energy levels and that this caused the lines in the spectrum. Some candidates then described how the electrons then dropped down levels and emitted light; this is a description of an emission spectrum, and in these cases the mark for 'electrons are excited' was not given.

## Exemplar 1

an atomic absorption spectrum is a colourful background with black lines indicating a specific wave length that has been absorbed by the gaseous sample as the electrons in their defined electron shells have moved up due to the energy being ~~be~~ exciting them these lines will be in the same position as the coloured lines on an emition spectrs [5]

This is a well-structured response that was given all 5 marks. The candidate's response could be improved with use of 'frequency' instead of 'wavelength' when describing the radiation absorbed and the similarity between the spectra.

## Question 22 (b)

**(b)** Later work led to the ideas of electron orbitals.

Give the shape of an s-orbital.

..... **[1]**

This question was answered well, although some candidates described the shape as a circle rather than a sphere or spherical.

## Question 22 (c) (i)

**(c)** Electron configurations help to explain the similarities and trends in the Periodic Table.

**(i)** Complete the electron configuration of a calcium atom.

$1s^2$ ..... **[1]**

This question was answered well, with nearly all candidates correctly using lower case for the s and p shells and superscript for the number of electrons.

## Question 22 (c) (ii)

**(ii)** Magnesium has similar reactions to calcium.

Explain why, in terms of electron configurations.

.....

..... **[1]**

Many candidates did not recognise that the important electron configuration similarity is having the same number of electrons in the outer shell. Answers referring to magnesium and calcium being in the same group or having full s orbitals were not given the mark.

## Question 22 (c) (iii)

**(iii)** An element **A** has the following properties:

- It is a silvery metal with a melting point of 29 °C.
- Its atoms contain d electrons.
- It forms an oxide of formula $\mathbf{A}_2O_3$ with $M_r$ less than 200.

Identify **A**, giving at least **three** reasons based on its properties.

**A** is .....

Reasons: .....

.....

.....

.....

.....

.....

..... **[4]**

This question discriminated well. Candidates who were most successful used all the information provided in the question. Some candidates appeared to know that gallium was a metal with a low melting point which may have distracted them from fully justifying their choice. Candidates often recognised that the element formed a 3+ ion and that the Ar of the element needed to be below 76 to meet the requirement of the maximum Mr of the oxide. Candidates did not seem to know that the melting points of the transition metals are high, so they often selected elements from the d block, including zinc, which does not form a 3+ ion. Candidates did not always calculate the Mr of their chosen oxide and many confused Ar and Mr. When candidates provided evidence for the element containing d electrons, some stated the electron configuration of their element, but many used a 4d notation where it should have been 3d.

## Exemplar 2

**(iii)** An element **A** has the following properties:

- It is a silvery metal with a melting point of 29 °C.
- Its atoms contain d electrons.
- It forms an oxide of formula $A_2O_3$ with $M_r$ less than 200.

$O_3 = 48$

$A_2 < 152$

$M_r$ A < 76

Identify **A**, giving at least **three** reasons based on its properties.

A is ~~Arsenic~~ Gallium

Reasons: - It must be post after Calcium (Atomic No. order) to contain d electrons

- Gallium melts (usually) not shortly after coming into contact with skin as it has a melting point close to room temperature

- It is a non transition metal as it is silvery (likely)

- must have a $M_r$ < 76 as $O_3 = 48$, $200 - 48 = 152$

$A_2 < 152 \div 2$ A < 76, so before Selenium [4]

- Gallium ion charge is 3+

$O_{3}$ ion charge is 2-

$2 \times 3+ \; + \; 3 \times 2- = 0$ Net Charge so Gallium fits

This response clearly explains why gallium was chosen and was given the maximum of 4 marks. The candidate shows by calculation why the $A_r$ of the element must be below 76 and similarly why it will have a 3+ charge. Knowledge of electron configurations places the element after calcium in order for it to contain d electrons. In common with responses from most other candidates it is not recognised that transition elements should be eliminated as a possible choice because they have high melting points, but the candidate correctly identified 3 of the 4 marking points.

## Question 23 (a) (i)

**23** Ethanoic acid, $CH_3COOH$, is widely used for making other substances, such as polymers.

Most ethanoic acid is now made from methanol by the Cativa process.

The Cativa process has three stages, shown below.

**Stage 1:** $CH_3OH + HI \rightarrow CH_3I + H_2O$

**Stage 2:** $CH_3I + CO \rightarrow CH_3COI$

**Stage 3:** $CH_3COI + H_2O \rightarrow CH_3COOH + HI$

**(a)**
**(i)** Draw the **skeletal** formula of ethanoic acid.

**[1]**

Although many candidates did not draw the correct skeletal formula, there were very few errors when displaying the OH group.

## Question 23 (a) (ii)

**(ii)** Name $CH_3I$, the product of **Stage 1**.

..... **[1]**

This question was generally answered well.

## Question 23 (b)

**(b)** What is the atom economy of the Cativa process for producing ethanoic acid?

atom economy = ..... % **[1]**

Very few correct responses were seen. It was not understood that the products of some stages were used as a reactant in a following stage. For example, $CH_3I$ produced in stage 1 is re-used in stage 2. The overall equation is therefore $CH_3OH + CO \rightarrow CH_3COOH$ giving 100% atom economy.

## Question 23 (c)

**(c)** Calculate the minimum mass of CO needed to make 15 g of ethanoic acid by the Cativa process.

Give your answer to an **appropriate** number of significant figures.

mass = ..... g **[3]**

Many candidates made a correct calculation, but only gave their answer to one significant figure.

**Assessment for learning**

Candidates should be reminded that where they are asked to give answers to an "appropriate" number of significant figures, this is the smallest number of significant figures present in the data used for a calculation.

## Question 23 (d) (i)

**(d)** **Stage 1** is a nucleophilic substitution.

**(i)** What is a **nucleophile**?

.....

..... **[1]**

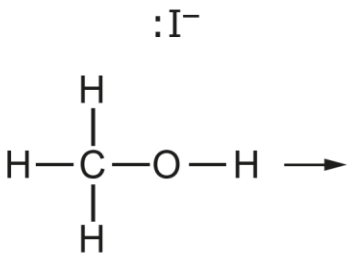
This question was not answered well. Some candidates recognised that nucleophiles were attracted to areas of positive charge and others noted that electron donation was involved, but few described an electron pair being donated to form a covalent bond.

## Question 23 (d) (ii)

**(ii)** In **Stage 1**, $I^-$ ions from the HI displace $OH^-$ ions from methanol, $CH_3OH$.

Complete the mechanism for this process.

Use curly arrows and show the products.




**[2]**

Candidates who achieved well in this question were precise with the placement of the curly arrows. Those candidates who were given 1 mark had usually shown the correct products.

## Question 23 (e) (i)

**(e)** The Cativa process uses an iridium catalyst in **Stage 2**.
An alternative process, called the Monsanto process, uses a rhodium catalyst. The Monsanto process makes more propanoic acid as a by-product than the Cativa process.

**(i)** In which **block** of the Periodic Table are rhodium (Rh) and iridium (Ir) both found?

..... **[1]**

Common incorrect answers included 'transition metals' or 'D' instead of 'd'.

## Question 23 (e) (ii)

**(ii)** Explain why the Cativa process is 'greener' than the Monsanto process.

.....

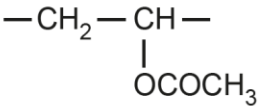
..... **[1]**

Many responses were incorrectly based on 'waste products' or atom economy.

## Question 23 (f)

**(f)** Ethanoic acid can be converted to 'vinyl acetate'.

Vinyl acetate is the monomer for PVAc, a polymer used in wood glue.



**repeating unit of PVAc**

Draw the **skeletal** formula of the monomer vinyl acetate.

**[2]**

Candidates did not answer this question well. Although 1 mark was available for drawing the correct monomer, this was seldom given. This suggests the difficulty was working out the structure of the monomer and not the conversion to a skeletal formula.

## Question 24 (a) (i)

**24** Some students investigate the rate of the reaction of sodium thiosulfate with acid.

$S_2O_3^{2-}(aq) + 2H^+(aq) \rightarrow H_2O(l) + SO_2(g) + S(s)$ **Equation 24.1**

The students make a pencil mark on a piece of paper. They measure the time it takes for the precipitate of sulfur to block out their view of the mark.

The rate of reaction is given by: Rate $\propto$ 1/time

Mixtures of sodium thiosulfate solution and water are made up as shown in the table.
$5\,cm^3$ of $2.0\,mol\,dm^{-3}$ HC*l* is added to each one.
The time for the mark to be blocked out is noted.

The students get the following results at room temperature.

| Volume of sodium thiosulfate / $cm^3$ | Volume of water / $cm^3$ | Time / s | Rate (1/time) / $s^{-1}$ |
|---|---|---|---|
| 10 | 40 | 100 | 0.010 |
| 20 | 30 | 44 | 0.023 |
| 30 | 20 | 35 | ..... |
| 40 | 10 | 26 | 0.038 |
| 50 | 0 | 20 | 0.050 |

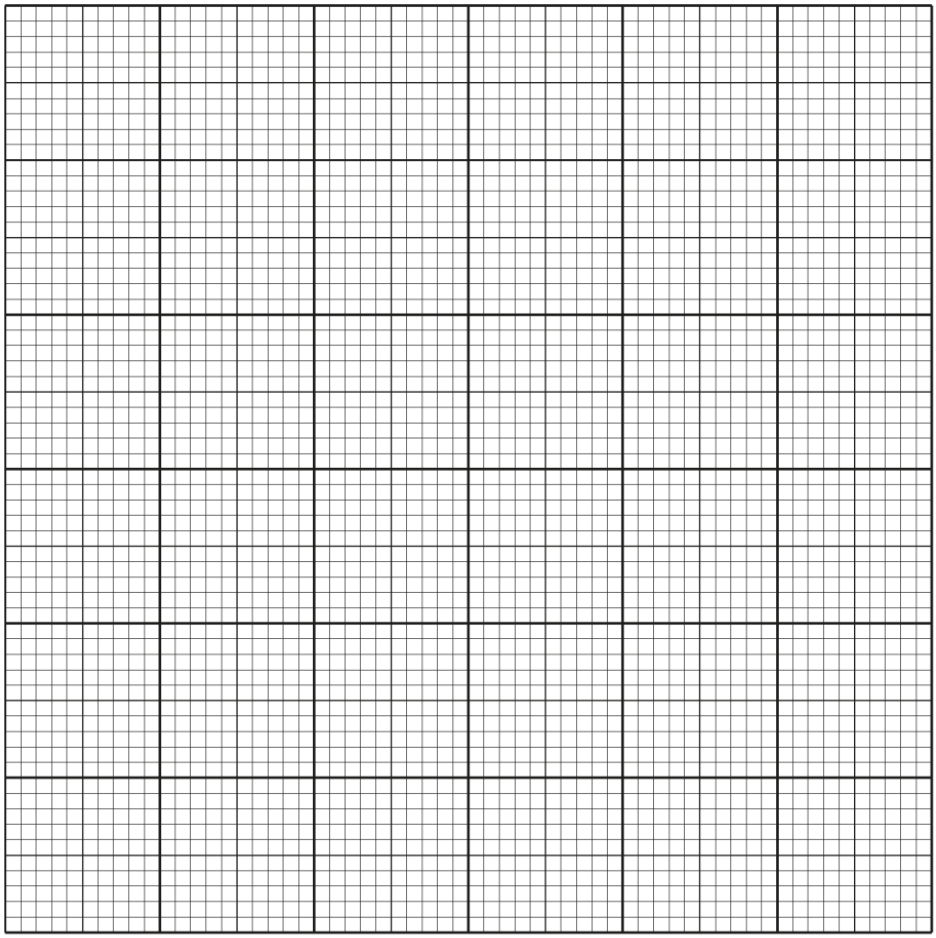
**(a)**
**(i)** Fill in the missing value in the table. **[1]**

Most candidates answered this question well. Some did not realise that a simple calculation was needed and instead plotted the graph without using this value. Then, having drawn a line of best fit, they used this to read off the value which did not give the correct response. Candidates should be reminded that questions should be answered in the same order as the exam paper lists them.

## Question 24 (a) (ii)

**(ii)** On the graph paper below, plot a graph of rate against volume of sodium thiosulfate, including the origin. Label the axes.

Draw a line of best fit.



**[3]**

The majority of candidates chose scales so that the plotted points used at least half the graph grid in both the x and y directions and included clearly labelled axes (with units). Some had the dependant variable (rate) on the x-axis and some did not include the origin as instructed in the question or did not draw the line of best fit going exactly through the origin. Points were accurately plotted by all candidates.

## Question 24 (a) (iii)

**(iii)** Explain why 'volume of sodium thiosulfate' is proportional to 'concentration of sodium thiosulfate'.

.....

..... **[1]**

This question was not answered well. Most candidates referred to a higher volume of sodium thiosulfate resulting in a higher concentration but had not realised this is correct only when the total volume is kept constant.

## Question 24 (a) (iv)

**(iv)** The graph shows the relationship between rate and thiosulfate concentration for the reaction in **Equation 24.1**.

Describe this relationship and explain it in terms of molecular collisions.

.....

.....

.....

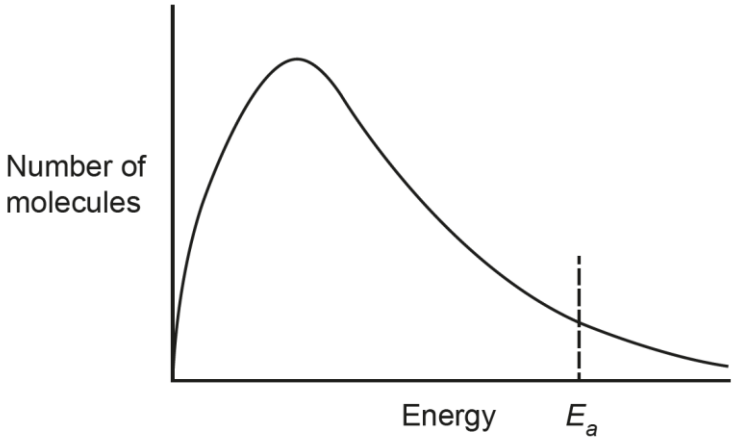
..... **[2]**

Most candidates were given 1 mark for explaining that collision frequency increases with concentration. Few candidates said that rate is proportional to concentration for the second mark.

## Question 24 (b)

**(b)** The students repeat the experiment, varying the temperature. They find that the reaction gets faster as the temperature is increased.

Complete and label the diagram below to explain why reactions get faster as the temperature increases.




**[2]**

Many candidates correctly drew a curve with the peak below and to the right of the supplied curve. Candidates who appeared to understand the concept that more particles/particle collisions were above the activation energy at the higher temperature, had not always made it clear that this is shown as the area under the curve and were not therefore given the second mark.

## Question 24 (c) (i)

**(c)**

**(i)** Assign oxidation states to the sulfur atoms in the equation.

Write the oxidation states on the dotted lines below the atoms.

$$S_2O_3^{2-}(aq) + 2H^+(aq) \rightarrow H_2O(l) + SO_2(g) + S(s)$$

.... .... ....

**[2]**

Many candidates correctly answered +4 and 0 for the oxidation states in $SO_2$ and S respectively, however the oxidation state of sulphur in the $S_2O_3^{2-}$ ion was often incorrect. Candidates generally correctly placed the + sign before the oxidation number.

## Question 24 (c) (ii)

**(ii)** State what is being oxidised and what is being reduced in the reaction.

.....

..... **[1]**

This question was not answered well with candidates not recognising this as a disproportionation reaction, even when they had correctly identified the oxidation states of the sulphur in Question 24 (c) (i). A common response was that the hydrogen was oxidised or reduced.

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## Reviews of marking

If any of your students' results are not as expected, you may wish to consider one of our post-results services. For full information about the options available visit the OCR website.

## Access to Scripts

We've made it easier for Exams Officers to download copies of your candidates' completed papers or 'scripts'. Your centre can use these scripts to decide whether to request a review of marking and to support teaching and learning.

Our free, on-demand service, Access to Scripts is available via our single sign-on service, My Cambridge. Step-by-step instructions are on our website.

## Keep up-to-date

We send a monthly bulletin to tell you about important updates. You can also sign up for your subject specific updates. If you haven't already, sign up here.

## OCR Professional Development

Attend one of our popular professional development courses to hear directly from a senior assessor or drop in to a Q&A session. Most of our courses are delivered live via an online platform, so you can attend from any location.

Please find details for all our courses for your subject on **Teach Cambridge**. You'll also find links to our online courses on NEA marking and support.

## Signed up for ExamBuilder?

**ExamBuilder** is a free test-building platform, providing unlimited users exclusively for staff at OCR centres with an Interchange account.

Choose from a large bank of questions to build personalised tests and custom mark schemes, with the option to add custom cover pages to simulate real examinations. You can also edit and download complete past papers.

Find out more.

## Active Results

Review students' exam performance with our free online results analysis tool. It is available for all GCSEs, AS and A Levels and Cambridge Nationals (examined units only).

Find out more.

**You will need an Interchange account to access our digital products. If you do not have an Interchange account please contact your centre administrator (usually the Exams Officer) to request a username, or nominate an existing Interchange user in your department.**

**Need to get in touch?**

If you ever have any questions about OCR qualifications or services (including administration, logistics and teaching) please feel free to get in touch with our customer support centre.

Call us on
**01223 553998**

Alternatively, you can email us on
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