



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)**  
**General Certificate of Education**  
**2025**

Centre Number

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Candidate Number

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# Chemistry

Assessment Unit AS 3

*assessing*

Module 3: Basic

Practical Chemistry

**Practical Booklet A**

**[SCH31]**

\*SCH31\*

**FRIDAY 2 MAY, MORNING**

## TIME

1 hour 15 minutes.

## INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

**You must answer the questions in the spaces provided.**

**Do not write outside the boxed area on each page or on blank pages.**

Complete in black ink and use a dark HB pencil for drawings and graphs.

**Do not write with a gel pen.**

Answer **all three** questions.

## INFORMATION FOR CANDIDATES

The total mark for this paper is 25.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You may use a scientific calculator.

A Data Leaflet, which includes a Periodic Table of the Elements, is included in this question paper.

Follow all health and safety instructions.

Safety glasses should be worn at all times.

You may not have access to notes, textbooks and other material to assist you.

The apparatus and materials required to complete the task(s) are provided.

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\*08SCH3101\*

1 You are required to carry out a titration of hydrochloric acid against sodium carbonate solution.

You are provided with:

- $0.1 \text{ mol dm}^{-3}$  sodium carbonate solution
- hydrochloric acid
- methyl orange

(a) Carry out the following procedure:

1. Rinse and fill the burette with  $0.1 \text{ mol dm}^{-3}$  sodium carbonate solution.
2. Pipette  $25.0 \text{ cm}^3$  portions of hydrochloric acid into three conical flasks.
3. Add 3 drops of methyl orange to each conical flask.
4. Carry out one rough and two accurate titrations.
5. Draw a suitable table in the space below and record your burette readings and titres to 1 decimal place.

[6]



(b) Use your results to calculate the mean titre.

Answer \_\_\_\_\_ [2]

(c) State the colour change observed at the end point of the titration.

From \_\_\_\_\_ to \_\_\_\_\_ [2]

[Turn over

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\*08SCH3103\*

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\*08SCH3104\*



2 You are provided with two boiling tubes, one containing a piece of magnesium and the other a granule of calcium.

(a) To the boiling tube containing the piece of magnesium, add deionised water until the boiling tube is half filled. Repeat this process for the boiling tube containing the granule of calcium. Record your observations in the table below.

Keep the contents of the boiling tubes for part (b).

Metal	Observations
magnesium	
calcium	

[5]

(b) Place a piece of universal indicator paper on a white tile and, using a glass rod, place a drop of the solution formed from the **calcium experiment in (a)** on the universal indicator paper. Record the colour observed and the corresponding pH.

Colour \_\_\_\_\_

pH \_\_\_\_\_

[2]

[Turn over



- 3 You are provided with two organic liquids, labelled **X** and **Y**. Carry out the following tests on the liquids. Record your observations in the table below.

**For the following tests, the volumes are approximate and may be measured using graduated disposable pipettes.**

Test	Observations
1. Place 10 drops of <b>X</b> in a test tube and add 1 cm <sup>3</sup> of deionised water. Stopper and shake gently.	[1]
2. Place 10 drops of <b>Y</b> on a watch glass on a heatproof mat and ignite <b>Y</b> using a burning splint.	[2]
3. (a) Place 10 drops of <b>X</b> in a test tube and add 2 cm <sup>3</sup> of acidified potassium dichromate(VI) solution. Place the test tube in a hot water bath.  (b) Place 10 drops of <b>Y</b> in a test tube and add 2 cm <sup>3</sup> of acidified potassium dichromate(VI) solution. Place the test tube in a hot water bath.	(a)  (b)  [3]



Test	Observations
4. (a) Place 2 cm <sup>3</sup> of <b>X</b> in a test tube and add 1 iodine crystal using tweezers. Stopper and shake.	(a)
(b) Place 2 cm <sup>3</sup> of <b>Y</b> in a test tube and add 1 iodine crystal using tweezers. Stopper and shake.	(b)

[2]

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**THIS IS THE END OF THE QUESTION PAPER**

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<b>For Examiner's use only</b>	
<b>Question Number</b>	<b>Marks</b>
1	
2	
3	

<b>Total Marks</b>	
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**Examiner Number**

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## General Information

1 tonne =  $10^6$  g

1 metre =  $10^9$  nm

One mole of any gas at 293 K and a pressure of 1 atmosphere ( $10^5$  Pa) occupies a volume of 24 dm<sup>3</sup>

Avogadro Constant =  $6.02 \times 10^{23}$  mol<sup>-1</sup>

Planck Constant =  $6.63 \times 10^{-34}$  Js

Specific Heat Capacity of water =  $4.2 \text{ J g}^{-1} \text{ K}^{-1}$

Speed of Light =  $3 \times 10^8 \text{ ms}^{-1}$



## Characteristic absorptions in IR spectroscopy

Wavenumber/cm <sup>-1</sup>	Bond	Compound
550–850	C–X (X = Cl, Br, I)	Haloalkanes
750–1100	C–C	Alkanes, alkyl groups
1000–1300	C–O	Alcohols, esters, carboxylic acids
1450–1650	C=C	Arenes
1600–1700	C=C	Alkenes
1650–1800	C=O	Carboxylic acids, esters, aldehydes, ketones, amides, acyl chlorides
2200–2300	C≡N	Nitriles
2500–3200	O–H	Carboxylic acids
2750–2850	C–H	Aldehydes
2850–3000	C–H	Alkanes, alkyl groups, alkenes, arenes
3200–3600	O–H	Alcohols
3300–3500	N–H	Amines, amides

## Proton Chemical Shifts in Nuclear Magnetic Resonance Spectroscopy (relative to TMS)

Chemical Shift	Structure	
0.5–2.0	–CH	Saturated alkanes
0.5–5.5	–OH	Alcohols
1.0–3.0	–NH	Amines
2.0–3.0	–CO–CH	Ketones
	–N–CH	Amines
	C <sub>6</sub> H <sub>5</sub> –CH	Arene (aliphatic on ring)
2.0–4.0	X–CH	X = Cl or Br (3.0–4.0) X = I (2.0–3.0)
4.5–6.0	–C=CH	Alkenes
5.5–8.5	RCONH	Amides
6.0–8.0	–C <sub>6</sub> H <sub>5</sub>	Arenes (on ring)
9.0–10.0	–CHO	Aldehydes
10.0–12.0	–COOH	Carboxylic acids

These chemical shifts are concentration and temperature dependent and may be outside the ranges indicated above.

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COUNCIL FOR THE CURRICULUM, EXAMINATIONS AND ASSESSMENT

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# Data Leaflet

## Including the Periodic Table of the Elements

For the use of candidates taking  
Advanced Subsidiary and  
Advanced Level Examinations

**Copies must be free from notes or additions of any kind. No other type of data booklet or information sheet is authorised for use in the examinations**

# gce a/as examinations

# chemistry





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General Certificate of Education  
2025**

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## **Chemistry**

Assessment Unit AS 3

Basic Practical Chemistry

Practical Booklet A

**[SCH31]**

**FRIDAY 2 MAY, MORNING**

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# **APPARATUS AND MATERIALS LIST**

**To be accessed by Head of Department only**

## Advice for centres

- All chemicals used should be at least laboratory reagent specification and labelled with appropriate safety symbols, e.g. flammable.
- For centres running multiple sessions – candidates for the later session should be supplied with clean, dry glassware. If it is not feasible then glassware from the first session should be thoroughly washed, rinsed with deionised water and allowed to drain.
- Ensure all chemicals are in date, otherwise expected observations may not be seen.
- It is the responsibility of the centre to be cognisant of all health and safety issues and to carry out a thorough risk assessment **including checking hazard labelling advice**. Up to date information can be obtained at [www.cleapss.org.uk](http://www.cleapss.org.uk).
- Provision of chemicals, their safe storage, use and subsequent disposal, are the responsibility of the centre.
- Each candidate must wear safety goggles or alternative eye protection for the duration of the practical examination.

## Practical Examination

Each candidate must be supplied with safety goggles or glasses.

### Question 1

- 1 × 50 cm<sup>3</sup> burette of at least class B quality
- 1 × funnel for filling the burette
- 1 × burette clamp and retort stand
- 1 × 250 cm<sup>3</sup> beaker (for waste solution)
- 1 × 25 cm<sup>3</sup> pipette of at least class B quality
- 1 × safety pipette filler
- 3 × conical flasks of 250 cm<sup>3</sup> capacity
- 1 × white tile
- 1 × wash bottle containing deionised water
- methyl orange indicator solution with dropper and labelled **methyl orange** and with the hazard symbol for **health hazard (exclamation mark label)** (Check hazard labelling from supplier).
- 150 cm<sup>3</sup> of 0.1 mol dm<sup>-3</sup> sodium carbonate solution labelled **0.1 mol dm<sup>-3</sup> sodium carbonate solution**
- 150 cm<sup>3</sup> of 0.2 mol dm<sup>-3</sup> hydrochloric acid labelled **hydrochloric acid**.

## Question 2

Each candidate must be supplied with:

- 1 × boiling tube rack
- 1 × wash bottle containing deionised water
- 1 × piece of universal indicator paper (Johnson UI paper pH 1–11) and pH colour chart
- 1 × white tile
- 1 × glass rod
- 1 × 3 cm length of magnesium ribbon in a boiling tube labelled **magnesium** and with the hazard symbol for **flammable**
- 1 × granule of calcium in a boiling tube labelled **calcium** and with the hazard symbol for **flammable** (this boiling tube should be stoppered or the calcium placed in it on the day of the practical examination)

### Question 3

Each candidate must be supplied with:

- 1 × test tube rack
- 5 × test tubes
- 6 × plastic graduated disposable pipettes (3 cm<sup>3</sup>)
- 1 × watch glass
- 1 × heat proof mat
- 1 × splint
- 1 × tweezers
- 1 × Bunsen burner (to light splint)
- 1 × 250 cm<sup>3</sup> beaker for water bath
- 3 × stoppers for test tubes
- 1 × wash bottle containing deionised water
- access to a kettle of hot water for water bath
- 10 cm<sup>3</sup> of ethanol (IDA) in a small, stoppered container labelled **X** and with the hazard symbols for **flammable**, **health hazard (exclamation mark symbol)** and **serious health hazard**
- 10 cm<sup>3</sup> of 2-methylpropan-2-ol in a small, stoppered container labelled **Y** and with the hazard symbols for **flammable** and **health hazard (exclamation mark label)**
- 5 cm<sup>3</sup> of 0.1 mol dm<sup>-3</sup> acidified potassium dichromate(VI) solution labelled **acidified potassium dichromate(VI) solution** and with the hazard symbols for **corrosive**, **health hazard (exclamation mark label)**, and **serious health hazard**
- 2 iodine crystals in a stoppered container labelled **iodine** and with the hazard symbols for **health hazard (exclamation mark label)** and **harmful to the environment**









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General Certificate of Education  
2025**

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## **Chemistry**

**Assessment Unit AS 3**

*Practical Assessment*

**Practical Booklet A**

**[SCH31]**

**FRIDAY 2 MAY, MORNING**

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# **Confidential Instructions to the Supervisor of the Practical Examination**

# INSTRUCTIONS TO THE SUPERVISOR OF THE PRACTICAL EXAMINATION

## General

1. The instructions contained in this document are for the use of the Supervisor **and are strictly confidential**. Under no circumstances may information concerning apparatus or materials be given before the examination to a candidate or other unauthorised person.
2. In a centre with a large number of candidates it may be necessary for two or more examination sessions to be organised. **It is the responsibility of the schools to ensure that there should be no contact between candidates taking each session.**
3. A suitable laboratory must be reserved for the examination and kept locked throughout the period of preparation. Unauthorised persons not involved in the preparation for the examination must not be allowed to enter. Candidates must not be admitted until the specified time for commencement of the examination.
4. The Supervisor must ensure that the solutions provided for the candidates are of the nature and concentrations specified in the Apparatus and Materials List.
5. **The Supervisor is to be granted access to the Teacher's Copy of Practical Booklet A on Tuesday 29 April 2025.** The Supervisor is asked to check, at the earliest opportunity, that the experiments and tests in the question paper may be completed satisfactorily using the apparatus, materials and solutions that have been assembled. **This question paper must then be returned to safe custody** at the earliest possible moment after the Supervisor has ensured that all is in order. **No access to the question paper should be allowed before 29 April 2025.**
6. Centres may need to carry out multiple sessions to accommodate all their candidates sitting Practical Booklet A in a laboratory. Supervision must take place from 30 minutes after the scheduled starting time of the examination, as set out in the timetable, until the time when the candidate(s) begin(s) their examination(s). This is in order to ensure that there is no contact with other candidates. The centre must appoint a member of staff from the centre to supervise the candidate(s) at all times while they are on the premises.
7. All apparatus should be checked before the examination, and there should be an adequate supply of spare apparatus in case of breakages. The Apparatus and Materials List should be regarded as a minimum and there is no objection to candidates being supplied with more than the minimum amount of apparatus and materials.
8. **Candidates may not use text books and laboratory notes for reference during the examination, and must be informed of this beforehand.**

9. Clear instructions must be given by the Supervisor to all candidates at the beginning of the examination concerning appropriate safety procedures and precautions. Supervisors are also advised to remind candidates that all substances in the examination must be treated with caution. **Only those tests specified in the question paper should be attempted. Candidates must not attempt any additional confirmatory tests.** Anything spilled on the skin should be washed off immediately with plenty of water. The use of appropriate eye protection is essential.
10. Supervisors are reminded that they may not assist candidates during the examination. However if, in the opinion of the Supervisor, a candidate is about to do something which may endanger themselves or others, the Supervisor should intervene. A full written report must be sent to CCEA at once.
11. Upon request, a candidate may be given additional quantities of materials (answer paper, reagents and unknowns) without penalty. No notification needs to be sent to CCEA.
12. The examination room must be cleared of candidates immediately after the examination.
13. No materials will be supplied by CCEA.
14. All JCQ procedures for conducting examinations should be followed for this practical examination including displaying JCQ posters with examination information in the laboratory and removal of mobile phones. Posters should be available from your Examinations Officer.





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**ADVANCED SUBSIDIARY (AS)  
General Certificate of Education  
2025**

Centre Number

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Candidate Number

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# Chemistry

Assessment Unit AS 3

*assessing*

Module 3: Basic

Practical Chemistry

**Practical Booklet A**

**[SCH31]**

**FRIDAY 2 MAY, MORNING**



\*SCH31\*

## TEACHER'S COPY

For use with the

**Confidential Instructions to the Supervisor of the Practical Examination**

**Please Note:** This Teacher's Copy only shows the minimum information required to test the practical work in advance of the exam sitting. As information has been removed, the question numbering may not be consistent.



**1** You are required to carry out a titration of hydrochloric acid against sodium carbonate solution.

You are provided with:

- $0.1 \text{ mol dm}^{-3}$  sodium carbonate solution
- hydrochloric acid
- methyl orange

**(a)** Carry out the following procedure:

1. Rinse and fill the burette with  $0.1 \text{ mol dm}^{-3}$  sodium carbonate solution.
2. Pipette  $25.0 \text{ cm}^3$  portions of hydrochloric acid into three conical flasks.
3. Add 3 drops of methyl orange to each conical flask.



2 You are provided with two boiling tubes, one containing a piece of magnesium and the other a granule of calcium.

(a) To the boiling tube containing the piece of magnesium, add deionised water until the boiling tube is half filled. Repeat this process for the boiling tube containing the granule of calcium.

**Keep the contents of the boiling tubes for part (b).**

(b) Place a piece of universal indicator paper on a white tile and, using a glass rod, place a drop of the solution formed from the **calcium experiment in (a)** on the universal indicator paper.



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\*08SCH3104\*



- 3 You are provided with two organic liquids, labelled **X** and **Y**. Carry out the following tests on the liquids.

**For the following tests, the volumes are approximate and may be measured using graduated disposable pipettes.**

Test
1. Place 10 drops of <b>X</b> in a test tube and add 1 cm <sup>3</sup> of deionised water. Stopper and shake gently.
2. Place 10 drops of <b>Y</b> on a watch glass on a heatproof mat and ignite <b>Y</b> using a burning splint.
3. (a) Place 10 drops of <b>X</b> in a test tube and add 2 cm <sup>3</sup> of acidified potassium dichromate(VI) solution. Place the test tube in a hot water bath.  (b) Place 10 drops of <b>Y</b> in a test tube and add 2 cm <sup>3</sup> of acidified potassium dichromate(VI) solution. Place the test tube in a hot water bath.

[Turn over

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\*08SCH3105\*

### Test

4. (a) Place  $2\text{ cm}^3$  of **X** in a test tube and add 1 iodine crystal using tweezers. Stopper and shake.
- (b) Place  $2\text{ cm}^3$  of **Y** in a test tube and add 1 iodine crystal using tweezers. Stopper and shake.





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**THIS IS THE END OF THE QUESTION PAPER**

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\*08SCH3107\*

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Question Number	Marks
1	
2	
3	
<b>Total Marks</b>	

Examiner Number

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