



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2025

Centre Number

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Candidate Number

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Chemistry

StemUp Model Solution

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.

14553



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

You are provided with:

- 0.1 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 mol dm^{-3} sodium carbonate solution.
2. Pipette 25.0 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.

	<i>Rough</i>	<i>1st accurate</i>	<i>2nd accurate</i>
<i>Final reading / cm^3</i>	<i>24.6</i>	<i>24.4</i>	<i>24.8</i>
<i>Initial reading / cm^3</i>	<i>0.0</i>	<i>0.3</i>	<i>0.6</i>
<i>Titre / cm^3</i>	<i>24.6</i>	<i>24.1</i>	<i>24.2</i>

[6]



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

$$\begin{aligned}\text{Mean titre} &= (24.1 + 24.2) \div 2 \\ &= 24.15 \text{ cm}^3\end{aligned}$$

Answer 24.15 cm³ [2]

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

From red to yellow [2]

[Turn over]

14553



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14553



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	<i>Very few bubbles of gas, very slow; almost no reaction seen.</i>
calcium	<i>Bubbles / effervescence (fizzing) of gas; the calcium rises and falls in the water; heat released, tube feels warm; a milky white suspension/solution forms.</i>

[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 dark blue

pH 11

[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 X in a test tube and add 1 cm ³ of deionised water. Stopper and shake gently.	<i>One layer forms; X is miscible with water, giving a colourless solution.</i> [1]
2. Place 10 drops of Y on a watch glass on a heatproof mat and ignite Y using a burning splint.	<i>Y burns with a clean (not sooty) yellow-blue flame; no residue is left, Y disappears.</i> [2]
3. (a) Place 10 drops of X in a test tube and add 2 cm ³ of acidified potassium dichromate(VI) solution. Place the test tube in a hot water bath. (b) Place 10 drops of Y in a test tube and add 2 cm ³ of acidified potassium dichromate(VI) solution. Place the test tube in a hot water bath.	(a) <i>Solution changes from orange to green.</i> (b) <i>Solution remains orange.</i> [3]



Test	Observations
4. (a) Place 2 cm ³ of X in a test tube and add 1 iodine crystal using tweezers. Stopper and shake.	(a) <i>Iodine dissolves to give an orange/brown solution.</i>
(b) Place 2 cm ³ of Y in a test tube and add 1 iodine crystal using tweezers. Stopper and shake.	(b) <i>Iodine dissolves to give a yellow solution.</i>

[2]

THIS IS THE END OF THE QUESTION PAPER



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For Examiner's use only	
Question Number	Marks
1	
2	
3	

Total Marks	
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Examiner Number

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will be happy to rectify any omissions of acknowledgement in future if notified.

SCH31/7
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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 dm³

Avogadro Constant = 6.02×10^{23} mol⁻¹

Planck Constant = 6.63×10^{-34} Js

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

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



Characteristic absorptions in IR spectroscopy

Wavenumber/cm ⁻¹	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 ₆ H ₅ –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 ₆ H ₅	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

THE PERIODIC TABLE OF ELEMENTS																		
Group																		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1 H Hydrogen 1																		4 He Helium 2
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10	
23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18	
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	64 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36	
85 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	98 Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54	
133 Cs Caesium 55	137 Ba Barium 56	139 La [*] Lanthanum 57	178 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86	
223 Fr Francium 87	226 Ra Radium 88	227 Ac [†] Actinium 89	261 Rf Rutherfordium 104	262 Db Dubnium 105	266 Sg Seaborgium 106	264 Bh Bohrium 107	277 Hs Hassium 108	268 Mt Meitnerium 109	271 Ds Darmstadtium 110	272 Rg Roentgenium 111	285 Cn Copernicium 112							
			140 Ce Cerium 58	141 Pr Praseodymium 59	144 Nd Neodymium 60	145 Pm Promethium 61	150 Sm Samarium 62	152 Eu Europium 63	157 Gd Gadolinium 64	159 Tb Terbium 65	162 Dy Dysprosium 66	165 Ho Holmium 67	167 Er Erbium 68	169 Tm Thulium 69	173 Yb Ytterbium 70	175 Lu Lutetium 71		
			232 Th Thorium 90	231 Pa Protactinium 91	238 U Uranium 92	237 Np Neptunium 93	242 Pu Plutonium 94	243 Am Americium 95	247 Cm Curium 96	245 Bk Berkelium 97	251 Cf Californium 98	254 Es Einsteinium 99	253 Fm Fermium 100	256 Md Mendelevium 101	254 No Nobelium 102	257 Lr Lawrencium 103		
			^a X ^b a = relative atomic mass (approx) x = atomic symbol b = atomic number * 58 – 71 Lanthanum series † 90 – 103 Actinium series															

* 58 – 71 Lanthanum series
† 90 – 103 Actinium series

$\begin{matrix} a \\ \boxed{X} \\ b \end{matrix}$ a = relative atomic mass (approx)
x = atomic symbol
b = atomic number



Rewarding Learning

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

Chemistry

Assessment Unit AS 3

Basic Practical Chemistry

Practical Booklet A

[SCH31]

FRIDAY 2 MAY, MORNING

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.
- 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 cm³ burette of at least class B quality
- 1 × funnel for filling the burette
- 1 × burette clamp and retort stand
- 1 × 250 cm³ beaker (for waste solution)
- 1 × 25 cm³ pipette of at least class B quality
- 1 × safety pipette filler
- 3 × conical flasks of 250 cm³ 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 cm³ of 0.1 mol dm⁻³ sodium carbonate solution labelled **0.1 mol dm⁻³ sodium carbonate solution**
- 150 cm³ of 0.2 mol dm⁻³ 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 cm³)
- 1 × watch glass
- 1 × heat proof mat
- 1 × splint
- 1 × tweezers
- 1 × Bunsen burner (to light splint)
- 1 × 250 cm³ 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 cm³ 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 cm³ 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 cm³ of 0.1 mol dm⁻³ 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**



Rewarding Learning

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

Chemistry

Assessment Unit AS 3

Practical Assessment

Practical Booklet A

[SCH31]

FRIDAY 2 MAY, MORNING

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.

Northern Ireland Council for the Curriculum, Examinations and
Assessment

General Certificate of Education

Advanced Subsidiary

Chemistry

Practical Booklet A

[SCH31]

Friday 2 May 2025

Centre Number

71

Candidate Number

This report must be completed by the Supervisor during the examination.
The complete report should include all candidates taking this Practical
Examination. This Supervisor's Report should be copied and attached to
Each Advice Note bundle and returned to CCEA in the normal way.

Comments:

Supervisor's Signature Date



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]

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 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 mol dm^{-3} sodium carbonate solution.
2. Pipette 25.0 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.

[Turn over

14553.04



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14553.04



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

[Turn over



Test

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





THIS IS THE END OF THE QUESTION PAPER

14553.04



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Question Number	Marks
1	
2	
3	
Total Marks	

Examiner Number

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