



Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2024

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 3 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 only. **Do not write with a gel pen or a pencil.**

Answer **both** 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.

A Periodic Table of the Elements (including some data) is provided.

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

Safety glasses should be worn at all times and care should be taken during this practical examination.

14205



08SCH3101

1 You are provided with two samples labelled **A** and **B**.

For the following tests, volumes are approximate and may be measured using a graduated disposable pipette or a measuring cylinder.

(a) Describe the appearance of **A**.

_____ [1]

(b) Place 10 drops of **A** onto a watch glass. Dip a piece of universal indicator paper into **A** and complete the table below.

Colour of universal indicator paper	Approximate pH

[2]

(c) Light a Bunsen burner. Ignite the sample of **A** on the watch glass using a lit splint. Describe the appearance of the flame. **Turn off the Bunsen burner.**

_____ [1]

(d) Place 1 cm³ of **A** into a test tube. Add 10 drops of potassium dichromate(VI) solution and 1 cm³ of sulfuric acid to the test tube. Place the test tube in a beaker half-filled with hot water from a kettle and leave for 2 minutes. State the colour change observed in the test tube.

_____ [2]



(e) (i) Place 2 cm³ of **A** into a test tube. Add 2 cm³ of **B**. Shake gently. Describe the appearance of the contents of the test tube.

_____ [1]

(ii) Add 1 cm³ of bromine water to the mixture in (e)(i), stopper and shake gently. Place the test tube in the test tube rack and leave for 2 minutes. State what is observed in the test tube.

_____ [2]

(f) Place 10 drops of **B** onto a watch glass. Dip a piece of universal indicator paper into **B** and complete the table below.

Colour of universal indicator paper	Approximate pH

[2]

(g) Light a Bunsen burner. Ignite the sample of **B** on the watch glass using a lit splint. Describe the appearance of the flame. **Turn off the Bunsen burner.**

_____ [2]

(h) (i) Place 1 cm³ of **B** into a test tube. Add 1 cm³ of alkaline potassium manganate(VII) solution. Describe the appearance of the contents of the test tube.

_____ [1]

(ii) Stopper and shake the test tube in (h)(i). State what is observed in the test tube.

_____ [1]

[Turn over



2 You are provided with a spirit burner containing liquid **A**.

(a) Weigh the spirit burner containing liquid **A** and record the mass to 2 decimal places.

_____ [1]

(b) Measure 100 cm³ of deionised water, using a measuring cylinder, and transfer into a 250 cm³ beaker. Place the beaker on a wire gauze and tripod on a heatproof mat. Record the temperature of the deionised water to the nearest whole number.

_____ [1]

(c) Read the instructions below. Draw a results table in the space below. Carry out the instructions and record your results in the table.

1. Remove the cap from the spirit burner and place the spirit burner on the heatproof mat underneath the tripod and wire gauze.
2. Light the Bunsen burner. Light the spirit burner using a lit splint and record the temperature of the water to the nearest whole number, every minute for 5 minutes. Continually stir the water with the thermometer. **After the spirit burner is lit, turn off the Bunsen burner.**

[3]



- (d) Place the cap back on the spirit burner to extinguish the flame. Allow to cool and reweigh the spirit burner. Record the mass to 2 decimal places.

_____ [1]

- (e) Use your answers to (a) and (d) to calculate the mass of **A** used.

_____ [1]

- (f) Use your answers to (b) and (c) to calculate the temperature change (ΔT) of the water in the experiment.

_____ [1]

- (g) Calculate the heat transferred to the water, in kJ, using the temperature change (ΔT) calculated in (f) and the expression:

$$\text{heat transferred} = \frac{4.2 \times \Delta T}{10}$$

Answer _____ kJ [1]

- (h) Calculate the relative formula mass of **A**, using the mass of **A** calculated in (e), the heat transferred calculated in (g) and the expression:

$$\text{relative formula mass} = \frac{1367 \times \text{mass of A}}{\text{heat transferred}}$$

Give your answer to the nearest whole number.

Answer _____ [1]



THIS IS THE END OF THE QUESTION PAPER

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08SCH3106





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08SCH3107

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

Examiner Number

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SCH31/4
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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



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**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2024**

Chemistry

Assessment Unit AS 3

Basic Practical Chemistry

Practical Booklet A

[SCH31]

FRIDAY 3 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, to carry out a thorough risk assessment and to check that hazard labelling is accurate for all chemicals used. Up to date information can be obtained at www.cleapss.org.uk

Question 1

Each candidate must be supplied with:

- 2 × watch glasses
- 2 × pieces of universal indicator paper pH range 1-14 or pH range 1-11 and colour chart
- 1 × Bunsen burner
- access to lighter for Bunsen burner
- 1 × heat proof mat
- 2 × wooden splints
- 10 × plastic graduated disposable pipettes
- 3 × test tubes
- 1 × test tube rack
- 1 × stopclock
- 2 × stoppers for test tubes
- 1 × 250 cm³ beaker
- approximately 10 cm³ of ethanol in a stoppered container labelled **A** and with the hazard symbols for **flammable**, **health hazard (exclamation mark label)** and **serious health hazard**.
- approximately 10 cm³ of cyclohexene in a stoppered tube labelled **B** and with the hazard symbols for **flammable**, **health hazard (exclamation mark label)**, **serious health hazard** and **toxic to aquatic life**.
- access to 0.1 M potassium dichromate(VI) solution labelled **potassium dichromate(VI) solution** and with the hazard symbols for **corrosive**, **health hazard (exclamation mark label)** and **serious health hazard** (approximately 2 cm³ required per candidate).
- access to 1 M sulfuric acid labelled **sulfuric acid** and with the hazard symbol for **health hazard (exclamation mark label)** (approximately 2 cm³ required per candidate).
- access to approximately 0.1 M bromine water labelled **bromine water** and with the hazard symbol for **health hazard (exclamation mark label)** (approximately 1 cm³ required per candidate).
- access to alkaline potassium manganate(VII) solution. This is prepared by dissolving 1 g of potassium manganate(VII) in 100 cm³ of deionised water followed by dissolving 10 g of anhydrous sodium carbonate in the resulting solution. This should be labelled **alkaline potassium manganate(VII) solution** (approximately 2 cm³ required per candidate).
- access to warm water from a kettle

Question 2

Each candidate must be supplied with:

- approximately 150 cm³ deionised water
- 1 × 100 cm³ measuring cylinder
- 1 × heat proof mat
- 1 × Bunsen burner
- access to lighter for Bunsen burner
- 1 × wooden splint
- 1 × tripod
- 1 × wire gauze
- 1 × 250 cm³ beaker
- 1 × thermometer (−10 to 110 °C or −20 to 110 °C)
- 1 × stopclock
- access to an electronic balance (2 decimal places)
- 1 × spirit burner with cap containing 25 cm³ of ethanol labelled **A** and with the hazard symbols for **flammable, health hazard (exclamation mark label) and serious health hazard**.



Rewarding Learning

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General Certificate of Education
2024**

Chemistry

Assessment Unit AS 3

Practical Assessment

Practical Booklet A

[SCH31]

FRIDAY 3 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 30 April 2024.** 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 30 April 2024.**
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.

