Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2022

Centre Number

Candidate Number

Chemistry

Assessment Unit AS 3

assessing
Module 3: Basic
Practical Chemistry

Practical Booklet A

[SCH31]

SCH31

MONDAY 9 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.**
Answer **all** 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.

13003

1 You are provided with a sample of solid labelled **X**.

(a) Place a spatula measure of **X** on a watch glass. Dip nichrome wire into some deionised water and into **X**. Place in a blue Bunsen burner flame and observe the colour produced through cobalt glass. Record your observation below.

_____ [1]

(b) Add a half spatula measure of **X** to a test tube. In a fume cupboard, place the test tube in a test tube rack and add 5 drops of concentrated sulfuric acid. Record your observations below.
Leave this test tube in the fume cupboard.

_____

_____

_____ [2]

(c) Weigh out approximately 10 g of **X** in a 100 cm^3 beaker and dissolve completely in approximately 50 cm^3 of deionised water.

Carry out the following tests using the solution of **X**.

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

Record all observations.

(i) Place 5 cm^3 of the solution of **X** in a test tube. Add 2 cm^3 of silver nitrate solution. Then add 5 cm^3 of ammonia solution.

_____

_____ [2]

(ii) In a fume cupboard, place 5 cm^3 of the solution of **X** in a test tube. Add 5 cm^3 of chlorine water.

_____

_____ [1]

(iii) Place 5 cm^3 of the solution of **X** in a test tube. Add 1 cm^3 of lead(II) nitrate solution dropwise. Shake gently.

_____ [1]

Retain the remaining solution of X for use in part (d).

(d) Using a 6 V power pack and graphite electrodes, pass a direct current through the remaining solution of **X** in the beaker for 3 minutes. Do not allow the electrodes to touch.

Record what you observe.

_____

_____

_____

_____ [2]

Retain the resulting solution for use in part (e).

[Turn over

(e) Use the solution which was formed in **(d)** for the following tests.

All volumes are approximate and may be measured using a measuring cylinder or a graduated disposable pipette.

Record all observations.

(i) Place 5 cm^3 of the solution formed in **(d)** in a test tube. Add 2 drops of starch solution. Stopper and shake gently.

_____ [1]

(ii) Place 5 cm^3 of the solution formed in **(d)** in a second test tube. Add 2 cm^3 of heptane. Stopper and shake gently for 1 minute.

_____

_____ [2]

2 (a) • Weigh out approximately 20.0 g, 15.0 g, 10.0 g and 5.0 g of solid **X** into separate weighing boats. Record the masses to 1 decimal place in the table below.

• Using a measuring cylinder, add 50 cm^3 of deionised water to a polystyrene cup which is placed in a 250 cm^3 beaker.

Record all temperatures to the nearest whole number.

• Place a thermometer in the polystyrene cup and record the initial temperature of the water.

• Add the first mass of solid **X** to the deionised water in the polystyrene cup and stir using the thermometer.

• Record the final temperature when there is no further temperature change.

• Calculate the temperature change using the equation below and record this in the table.

temperature change = initial temperature – final temperature

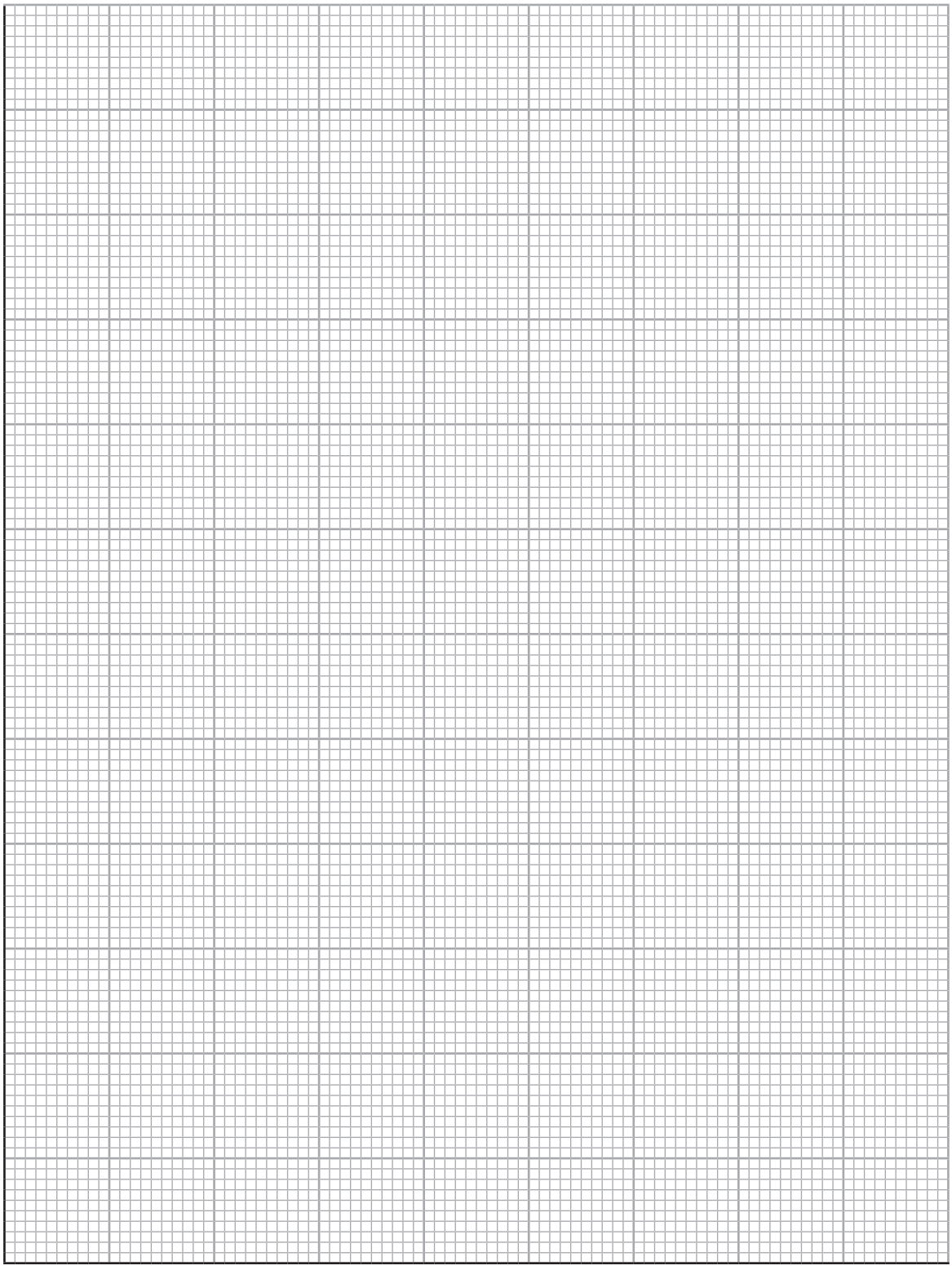
• Repeat the experiment for the other three masses of solid **X**. The polystyrene cup may be rinsed with deionised water between each test.

Mass of X /g	Initial temperature /°C	Final temperature /°C	Temperature change /°C

[5]

[Turn over

(b) Plot a graph of temperature change against mass of **X** on the axes below. Label the axes. Draw a **straight best fit line starting at the origin**. [4]



(c) The gradient of this straight best fit line is calculated using:

$$\text{gradient} = \frac{\text{change in temperature change}}{\text{change in mass}}$$

From your graph calculate the gradient of the straight best fit line you have drawn. Show your working out.

[3]

(d) Using the gradient calculated in **(c)** and the expression below, calculate the enthalpy change when 1 mole of **X** dissolves in water.

$$\text{enthalpy change (kJ mol}^{-1}) = \frac{\text{gradient} \times 50.0 \times 4.2 \times 166}{1000}$$

[1]

THIS IS THE END OF THE QUESTION PAPER

DO NOT WRITE ON THIS PAGE

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

Examiner Number

Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2022

Chemistry

Assessment Unit AS 3

Basic Practical Chemistry

Practical Booklet A

[SCH31]

MONDAY 9 MAY, MORNING

APPARATUS AND MATERIALS LIST

Advice for centres

- All chemicals used should be at least laboratory reagent specification and labelled with appropriate safety symbols, e.g. irritant.
- 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. Up to date information can be obtained at www.cleapss.org.uk

Apparatus and Materials List
Each candidate must be supplied with safety goggles or glasses.

Question 1

- at least 10 disposable pipettes
- 1 × 100 cm^3 beaker
- 1 × 100 cm^3 measuring cylinder
- 1 × 10 cm^3 measuring cylinder (rinsed out between uses)
- 1 × spatula
- 6 × test tubes
- 1 × test tube rack
- 1 × piece of nichrome wire
- 1 × cobalt glass
- 1 × Bunsen burner
- 1 × heatproof mat
- 1 × watch glass
- 2 × graphite electrodes
- 2 × crocodile clips
- 2 × electrical leads
- 1 × power pack (capable of being set to 6 V supply)
- several stoppers for test tubes
- 1 × wash bottle of deionised water
- 1 × glass rod
- 1 × stopclock
- about 70 g of solid potassium iodide labelled **X** (for use in question 1 and 2) in a sealed container
- about 10 cm^3 of silver nitrate solution (0.1 mol dm^{-3}/bench solution) labelled **silver nitrate solution** and **handle with caution**
- about 10 cm^3 of ammonia solution labelled (0.5 mol dm^{-3}) **ammonia solution**
- about 10 cm^3 of lead(II) nitrate solution (0.01 mol dm^{-3}) labelled **lead(II) nitrate solution** and **handle with caution**
- access to concentrated sulfuric acid and labelled **concentrated sulfuric acid** and **corrosive** (keep in fume cupboard)
- access to **starch solution**
- access to **chlorine water** in a sealed container
- access to heptane labelled **heptane** and **flammable** and **handle with caution** and **dangerous to the environment** and **health hazard** (keep in fume cupboard)
- access to an electronic balance (accurate to at least 1 decimal point)

Question 2

- solid potassium iodide labelled **X** (which should be carried over from question 1)
- 1 × thermometer (capable of reading between 0 and 50 °C clearly to nearest whole number)
- 1 × 50 cm^3 measuring cylinder
- 1 × polystyrene cup
- 1 × spatula
- 1 × 250 cm^3 beaker
- 4 × weighing boats
- 1 × wash bottle of deionised water
- 1 × marker for labelling weighing boats
- access to an electronic balance (accurate to at least 1 decimal place)

Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2022

Chemistry

Assessment Unit AS 3

Practical Assessment

Practical Booklet A

[SCH31]

MONDAY 9 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 Wednesday 4 May 2022.** 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 4 May 2022.**

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]

Monday 9 May 2022

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 . . . . . .