Rewarding Learning

Centre Number

Candidate Number

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2016

Chemistry

Assessment Unit AS 3

assessing
Module 3: Practical Examination

Practical Booklet A

AC133

[AC133]

TUESDAY 10 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 blue or black ink only. **Do not write with a gel pen.**
Answer **both** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 24.
Question 1 is a practical exercise worth 10 marks.
Question 2 is a practical exercise worth 14 marks.
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 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.

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1 Titration exercise

(a) You are required to carry out a titration between solution **A** and hydrochloric acid.

You are provided with:

Solution **A**
0.10 mol dm^{-3} hydrochloric acid
Phenolphthalein indicator

Carry out the titration by:

- rinsing out the burette with the 0.10 mol dm^{-3} hydrochloric acid
- filling the burette with the 0.10 mol dm^{-3} hydrochloric acid
- transferring 25.0 cm^3 of solution **A** to the conical flask
- adding three drops of phenolphthalein indicator to the solution in the conical flask and titrating until the end point is reached.

Present your results in a table and calculate the average titre. [8]

(b) State the colour change at the end point.

_____ [2]

[Turn over

2 Observation

(a) You are provided with a mixture of two salts, labelled **B**.

Carry out the following tests on the mixture. Record your observations in the spaces below.

Test	Observations
1 Add a half spatula measure of the solid **B** to a test tube containing 5 cm^3 of dilute nitric acid. Add 4 drops of silver nitrate solution. Add 5 cm^3 of dilute ammonia solution.	[4]
2 Dissolve a spatula measure of solid **B** in a test tube containing 5 cm^3 of water. Add 1 cm^3 of magnesium nitrate solution. Warm gently.	[1]
3 Add a spatula measure of the solid **B** to 2 cm^3 of dilute sodium hydroxide in a test tube and warm gently and cautiously smell. Hold a glass rod dipped in concentrated hydrochloric acid at the mouth of the test tube.	[2]
4 Dip a nichrome wire loop in concentrated hydrochloric acid, touch solid **B** with the wire. Hold the wire in a blue Bunsen flame.	[1]

(b) You are provided with a solution containing an organic compound, labelled **C**.

Carry out the following tests on the solution. Record your observations in the spaces below.

Test	Observations
1 Describe the smell of solution **C**.	[1]
2 Place a drop of solution **C** onto Universal Indicator paper.	[1]
3 Add 10 drops of solution **C** to 2 cm^3 of acidified potassium dichromate solution in a test tube. Warm the mixture in a water bath.	[1]
4 Add a spatula measure of anhydrous sodium carbonate to a test tube one quarter full of solution **C**. Test any gas produced with limewater.	[3]

THIS IS THE END OF THE QUESTION PAPER

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Question Number	Marks	
	Examiner Mark	Remark
1		
2		
Total Marks		

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Rewarding Learning

ADVANCED SUBSIDIARY (AS)
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Chemistry

Assessment Unit AS 3

assessing

Module 3: Practical Examination
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TUESDAY 10 MAY, MORNING

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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.**

Practical Examination

Each candidate must be supplied with safety goggles or glasses.

Question No. 1

Each candidate must be supplied with:

- one 50 cm^3 burette of at least class B quality;
- a funnel for filling the burette;
- a retort stand and clamp;
- two beakers of 100 cm^3 capacity;
- one 25 cm^3 pipette of at least class B quality;
- a safety pipette filler;
- three conical flasks of 250 cm^3 capacity;
- phenolphthalein indicator with dropper;
- a white tile or white paper;
- a wash bottle containing deionised water;
- 150 cm^3 of 0.10 mol dm^{-3} hydrochloric acid labelled **0.10 mol dm^{-3} hydrochloric acid** and **caution;**
- 150 cm^3 of 0.10 mol dm^{-3} sodium hydroxide labelled **A** and **caution**.

Question No. 2

Each candidate must be supplied with:

- six test tubes;
- a test tube/boiling tube holder;
- a test tube/boiling tube rack;
- a spatula;
- one glass rod;
- a heat proof mat;
- a Bunsen burner;
- a nichrome wire loop;
- a watch-glass;
- a beaker of 100 cm^3 capacity;
- a delivery tube fitted with a rubber bung (to fit test tube/boiling tube);
- a wooden splint;
- several plastic droppers;
- two 10 cm^3 measuring cylinders
- a wash bottle containing deionised water;
- a beaker for water bath;
- access to a kettle for boiling water;
- about 4 g of a mixture of 3.0 g of anhydrous sodium carbonate and 1.0 g of ammonium chloride crystals in a 50/100 cm^3 beaker labelled **B** and **irritant.** Mix thoroughly;
- about 10 cm^3 of dilute nitric acid in a reagent bottle/beaker labelled **dilute nitric acid** and **corrosive**. This should be approximately 1.0 mol dm^{-3};
- about 10 cm^3 of silver nitrate solution in a reagent bottle/beaker labelled **silver nitrate solution**. This solution should be approximately 0.1 mol dm^{-3} (17.0 g dm^{-3});
- about 20 cm^3 of dilute ammonia solution in a reagent bottle labelled **dilute ammonia solution** and **caution**. This solution should be approximately 2 mol dm^{-3};
- about 10 cm^3 of magnesium nitrate solution in a stoppered reagent bottle labelled **magnesium nitrate solution** and **oxidising**. This solution should be approximately 0.5 mol dm^{-3};
- about 10 cm^3 of dilute sodium hydroxide solution in a stoppered reagent bottle labelled **dilute sodium hydroxide solution** and **corrosive**. This solution should be approximately 2 mol dm^{-3};
- about 10 cm^3 of concentrated hydrochloric acid in a stoppered reagent bottle labelled **concentrated hydrochloric acid** and **corrosive**;

- about 10 cm^3 of ethanoic acid solution in a stoppered sample bottle labelled **C**. This solution should be approximately 1 mol dm^{-3};

- Universal Indicator paper (Johnson's pH 1–11);

- about 10 cm^3 of a saturated solution of calcium hydroxide in a reagent bottle/beaker labelled **limewater**;

- about 10 cm^3 of acidified potassium dichromate(VI) solution in a stoppered reagent bottle labelled **acidified potassium dichromate solution** and **caution**. This solution should be approximately 0.1 mol dm^{-3}, made by dissolving 30 g of potassium dichromate(VI) in 100 cm^3 of 1 mol dm^{-3} sulfuric acid and made up to 1 dm^3 with deionised water;

- about 2 g of anhydrous sodium carbonate in a stoppered reagent bottle labelled **anhydrous sodium carbonate** and **caution**.

Chemical	Notes	Emergency action
Hydrochloric acid ($0.1\ mol\ dm^{-3}$)	Solutions less than 2.7 M are not classified as hazardous. See Hazcard 47A. Wear eye protection.	**See standard procedure on Hazcard E.** In the eye – flood the eye with gently-running tap water for 10 minutes. See a doctor. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. Spilt on the skin or clothing – remove contaminated clothing. Especially with concentrated acid, quickly use a dry cloth or paper towel to wipe as much liquid as possible off the skin. Then drench the skin with plenty of water. If a large area is affected or blistering occurs, see a doctor. Spilt on the floor, bench, etc. – wipe up small amounts with a damp cloth and rinse it well. For larger amounts, and especially for (moderately) concentrated acid, cover with mineral absorbent (e.g, cat litter) and scoop into a bucket. Neutralise with sodium carbonate. Rinse with plenty of water.
Sodium hydroxide ($0.1\ mol\ dm^{-3}$)	IRRITANT Irritating to the eyes and skin.	**See standard procedure on Hazcard E.** In the eye – flood the eye with gently-running tap water for at least 20 minutes. See a doctor. If a visit to hospital is necessary, continue washing the eye during the journey in an ambulance. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. Spilt on the skin or clothing – remove contaminated clothing. Drench the skin with plenty of water. If a large area is affected or blistering occurs, see a doctor. Spilt on the floor, bench, etc. – wipe up small amounts with a damp cloth and rinse it well. For larger amounts, and especially for (moderately) concentrated solutions, cover with mineral absorbent (e.g. cat litter) and scoop into a bucket. Neutralise with citric acid. Rinse with plenty of water.
Phenolphthalein	Not classified as hazardous but should be used with caution. Skin contamination should be avoided.	In the eye – flood the eye with gently-running tap water for at least 10 minutes. See a doctor. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. Spilt on the skin or clothing – remove contaminated clothing. Wash off the skin with soap and plenty of water. Rinse contaminated clothing. Spilt on the floor, bench, etc. – wipe up with a damp cloth and rinse it well.

Chemical	Notes	Emergency action
Anhydrous sodium carbonate	IRRITANT. See Hazcard 95A. Irritating to the eyes. The anhydrous solid presents a greater risk as it is finely powdered whereas the hydrate is crystalline.	In the eye – flood the eye with gently-running tap water for 10 minutes. See a doctor if pain persists. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. Spilt on the skin or clothing – brush solid off contaminated clothing. Rinse clothing or the skin as necessary. Spilt on the floor, bench, etc. – brush up solid spills, trying to avoid raising dust, then wipe with a damp cloth. Wipe up solution spills with a cloth and rinse it well.
Ammonium chloride	HARMFUL IF SWALLOWED. IRRITATING TO EYES. See Hazcard 9A. Wear eye protection.	**See standard procedure on Hazcard E.** In the eye – flood the eye with gently-running tap water for 10 minutes. See a doctor if pain persists. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. Spilt on the skin or clothing – brush solid off contaminated clothing. Rinse clothing or the skin as necessary.
Nitric acid ($0.5\ mol\ dm^{-3}$)	CORROSIVE. OXIDISING. See Hazcard 67	**See standard procedure on Hazcard E.** In the eye – flood the eye with gently-running tap water for 10 minutes. See a doctor. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. If chemical splashes on the skin: skin turns yellow on contact and may peel off. If the splashed area is treated correctly with water, peeling will happen gradually over several days. If the contamination is not treated quickly, peeling may be severe and painful. It will require medical attention. If spilt in the laboratory – keep others away. Wear eye protection and chemical-resistant gloves. Ventilate the area of the spill as much as possible. Cover with mineral absorbent and clear up into a bucket. Wash the area of the spill thoroughly.

Chemical	Notes	Emergency action
Silver nitrate ($0.1\ mol\ dm^{-3}$)	Low hazard. See Hazcard 44A. Very dilute solutions are adequate for most school work when testing for halides in solution.	In the eye – flood the eye with gently-running tap water for at least 10 minutes. See a doctor. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. Spilt on the skin or clothing – remove contaminated clothing and rinse it. Wash off the skin with plenty of water. If the silver nitrate produces more than small burns, see a doctor. Spilt on the floor, bench, etc. – wear eye protection and gloves. Rinse the area with water and wipe up, rinsing repeatedly. Rinse the mop or cloth thoroughly.
Ammonia solution ($2\ mol\ dm^{-3}$)	IRRITANT. Solution is CORROSIVE if equal or greater in strength than 6 $mol\ dm^{-3}$ See Hazcard 6.	In the eye – flood the eye with gently-running tap water until a first aider arrives. Send the affected person to hospital and ensure that irrigation is continued during the journey. Take steps to ventilate the area. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. Spilt on the skin or clothing – remove contaminated clothing and rinse it. Wash off the skin with plenty of water. Spilt on the floor, bench, etc. – wear eye protection and gloves. Rinse the area with water and wipe up, rinsing repeatedly. Rinse the mop or cloth thoroughly. Open all windows and outside doors.
Magnesium nitrate ($0.1\ mol\ dm^{-3}$)	OXIDISING. Contact with combustible material may cause fire. See Hazcard 59B.	In the eye – flood the eye with gently-running tap water for at least 10 minutes. See a doctor. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. Spilt on the skin or clothing – remove contaminated clothing. Wash off the skin with soap and plenty of water. Rinse contaminated clothing. Spilt on the floor, bench, etc. – wipe up with a damp cloth and rinse it well.

Chemical	Notes	Emergency action
Sodium hydroxide ($2\ mol\ dm^{-3}$)	CORROSIVE. See Hazcard 91. Causes severe burns; it is particularly dangerous to the eyes. Wear goggles.	**See emergency procedure on Hazcard E.** In the eye – flood the eye with gently-running tap water for at least 20 minutes. See a doctor. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. Spilt on the skin or clothing – remove contaminated clothing and rinse it. Wash off the skin with plenty of water. If the silver nitrate produces more than small burns, see a doctor. Spilt on the floor, bench, etc. – wear eye protection and gloves. Wipe up small amounts with a damp cloth and rinse it well. For larger amounts, and especially for (moderately) concentrated solutions, cover with mineral absorbent (e.g. cat litter) and scoop into a bucket. Neutralise with citric acid. Rinse with plenty of water.
Concentrated hydrochloric acid.	CORROSIVE. See Hazcard 47A. Wear goggles. Use a fume cupboard. Wear disposable nitrile gloves.	**See emergency procedure on Hazcard E.** In the eye – flood the eye with gently-running tap water for at least 10 minutes. See a doctor. Vapour breathed in – remove to fresh air. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. Spilt on the skin or clothing – remove contaminated clothing and rinse it. Wash off the skin with plenty of water. If the silver nitrate produces more than small burns, see a doctor. Spilt on the floor, bench, etc. – for release of gas, consider the need to evacuate the laboratory and open all windows. For large spills, and especially for (moderately) concentrated acid, cover with mineral absorbent (e.g. cat litter) and scoop into a bucket. Neutralise with sodium carbonate. Rinse with plenty of water. Wipe up small amounts with a damp cloth and rinse it well.
Potassium dichromate	TOXIC. OXIDISING. See Hazcard 78. Toxic by inhalation or if swallowed. It may cause sensitization and/or ulcers in contact with the skin. It may cause cancer by inhalation.	**See emergency procedure on Hazcard E.** In the eye – flood the eye with gently-running tap water for at least 20 minutes. See a doctor. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. Spilt on the skin or clothing – remove contaminated clothing and rinse it. Wash off the skin with plenty of water. Spilt on the floor, bench, etc. – wear eye protection and gloves. Scoop up the solid. Rinse the area with water and wipe up, rinsing repeatedly. Rinse the mop or cloth thoroughly.

Chemical	Notes	Emergency action
Ethanoic acid (1.0 mol dm^{-3})	Low hazard It may still cause harm in the eyes or in a cut.	In the eye – flood the eye with gently-running tap water for at least 10 minutes. See a doctor. Vapour breathed in – remove to fresh air. Call a doctor if breathing is difficult. Swallowed – do no more than wash out the mouth with water. Do not induce vomiting. Sips of water may help cool the throat and help keep the airway open. See a doctor. Spilt on the skin or clothing – remove contaminated clothing. Drench the skin with plenty of water. If a large area is affected or blistering occurs, see a doctor. Spilt on the floor, bench, etc. – wipe up small amounts with a damp cloth and rinse it well. For larger spills, and especially for (moderately) concentrated acid, cover with mineral absorbent (e.g. cat litter) and scoop into a bucket. Neutralise with sodium carbonate.

Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2016

Chemistry

Assessment Unit AS 3

Practical Assessment

Practical Booklet A

[AC133]

TUESDAY 10 MAY

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 Thursday 5 May 2015.** 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 5 May 2015.**

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 he/she is on the premises.

7. Pipettes and burettes 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 him/herself 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 need 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.

Northern Ireland Council for the Curriculum, Examinations and Assessment

General Certificate of Education

Advanced Subsidiary

Chemistry

Practical Booklet A

Tuesday 10 May 2016

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 . . . . . .