New Specification

Rewarding Learning

Centre Number

Candidate Number

ADVANCED
General Certificate of Education
2018

Chemistry

Assessment Unit A2 3
assessing
Further Practical Chemistry
Practical Booklet A

MV18

[ACH31]

THURSDAY 10 MAY, MORNING

Time

1 hour 15 minutes, plus your additional time allowance.

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 on blank pages.
Complete in black ink only.
Answer **all three** questions.

Information for Candidates

The total mark for this paper is 30.
Figures in brackets printed at the end of each question 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 must be worn at all times and care should be taken during the practical examination.

1 You are required to measure the temperature change when sodium hydroxide solution reacts with dilute sulfuric acid.

You are provided with:

- 1 mol dm^{-3} sodium hydroxide solution
- 1 mol dm^{-3} sulfuric acid
- a burette
- a 25 cm^3 measuring cylinder
- a thermometer
- a polystyrene cup
- a beaker

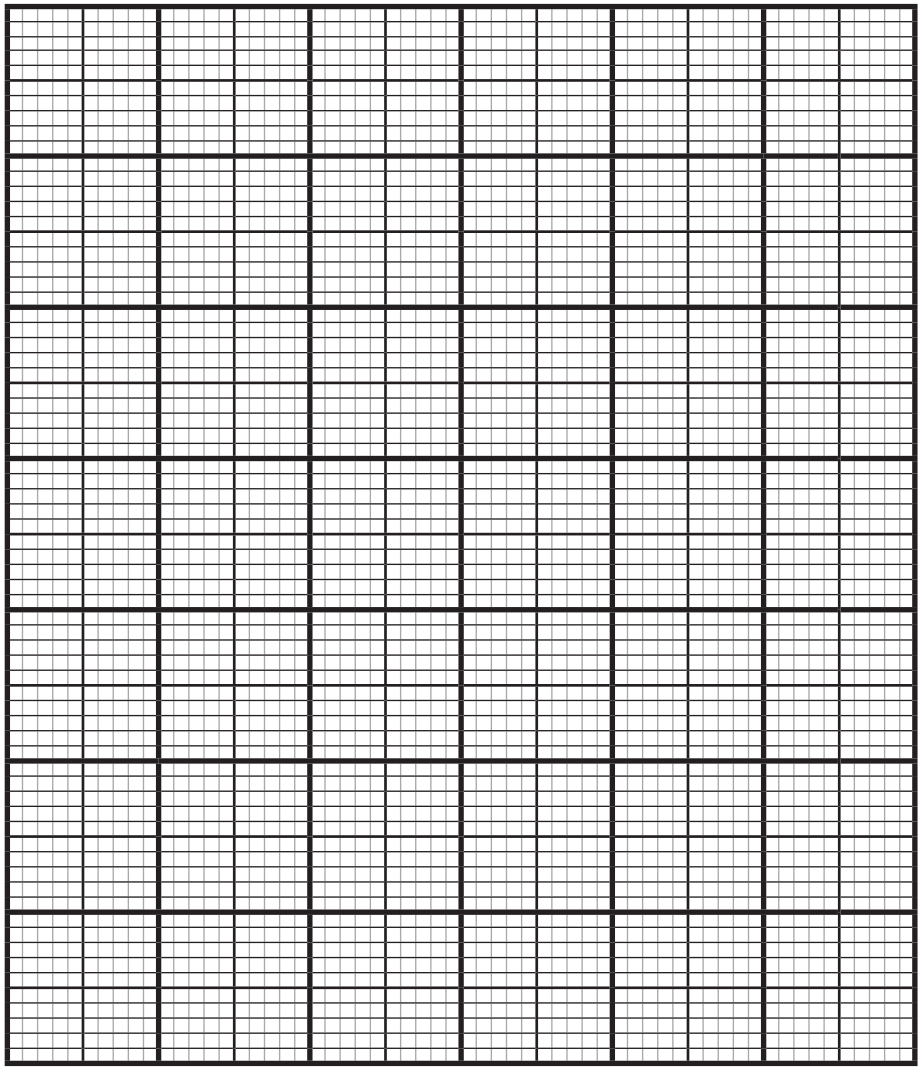
You should:

1. Fill the burette with the sulfuric acid.
2. Use the measuring cylinder to place 25 cm^3 of the sodium hydroxide solution in a polystyrene cup placed in the beaker.
3. Record the temperature of the sodium hydroxide solution.
4. Add 5 cm^3 of sulfuric acid to the sodium hydroxide solution, stir using the thermometer and record the highest temperature.
5. Rinse out the cup with deionised water.
6. Repeat steps 2–5 adding 10, 15, 20 and 25 cm^3 of sulfuric acid to different 25 cm^3 samples of sodium hydroxide solution.

(a) Record your results in a table. [2 marks]

(b) How would you determine the uncertainty when two burette readings are used to calculate the volume of acid delivered from the burette? [2 marks]

(c) Plot a graph of temperature change against the volume of sulfuric acid. [4 marks]



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(Questions continue overleaf)

2 You are supplied with substances **A** and **B** and are required to carry out the following tests.

(a) Place all of sample **A** in a boiling tube and add 10 cm^3 of dilute sulfuric acid. Gently heat the boiling tube and describe what you see. [1 mark]

_____

_____

(b) Pour the solution from **(a)** into a small beaker leaving any solid, if present, behind.
Divide the solution equally into **three** test tubes and carry out the following tests.

(i) Test tube 1: Add an equal volume of dilute sodium hydroxide solution. Describe what you see.
[1 mark]

_____

_____

(ii) Test tube 2: Add a spatula measure of iron filings and gently shake the test tube.
Give **four** observations. [4 marks]

_____

_____

_____

_____

(iii) Test tube 3: Add 3 cm^3 of concentrated hydrochloric acid and gently mix the contents. Describe what you see. [1 mark]

_____

_____

(c) Place a spatula measure of **B** in a test tube.

(i) Heat the test tube and describe the colour change that takes place. [1 mark]

_____

(ii) Allow the test tube to cool to room temperature and describe what you see. [1 mark]

_____

(d) (i) Add half a spatula measure of **B** to a boiling tube followed by 10 cm^3 of dilute nitric acid. Shake the boiling tube and describe what you see. Keep the mixture for **part (ii)**. [1 mark]

_____

(ii) Add 2 cm^3 of dilute sodium hydroxide solution to the mixture from **part (i)** followed by a further 5 cm^3. Shake the boiling tube and describe what you see. [2 marks]

_____

_____

3 You are supplied with **three** organic liquids labelled **X**, **Y** and **Z**. You are required to carry out the following tests on the liquids and complete the table opposite giving your observations. [10 marks]

Test	Observations		
	X	Y	Z
Place 2 cm^3 of the liquid in a test tube and add 2–3 cm^3 of dilute sulfuric acid followed by 2 cm^3 of potassium manganate(VII) solution. Leave the test tube for 5 minutes.			
Test each liquid with Universal Indicator paper. Record the pH of the liquid in the test tube.			
Place a few drops of the liquid on a watch glass and carefully touch the liquid with a lighted splint.			
Place 2 cm^3 of the liquid in a test tube and add 1 cm of magnesium ribbon.			

THIS IS THE END OF THE QUESTION PAPER

11603.04 **MV18**

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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.
- 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

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 B quality
- a funnel
- a retort stand and clamp
- a measuring cylinder with 25 cm^3 capacity
- a polystyrene cup
- a 250 cm^3 beaker
- a -10°–110°C thermometer
- approximately 200 cm^3 of 1 mol dm^{-3} sodium hydroxide solution labelled **dilute sodium hydroxide solution** and **corrosive/irritant**
- approximately 200 cm^3 of 1 mol dm^{-3} sulfuric acid solution labelled **dilute sulfuric acid** and **corrosive/irritant**
- deionised water should be available

Question No. 2

Each candidate must be supplied with:

- a spatula
- 2 boiling tubes
- 4 test tubes
- test tube/boiling tube holder
- Bunsen burner
- small beaker
- 25 cm^3 measuring cylinder
- heatproof mat
- 2 droppers
- 2 test tube stoppers
- access to a fume cupboard
- approximately 2 g of copper(II) oxide labelled **A**
- approximately 2 g of zinc oxide labelled **B**
- approximately 20 cm^3 of 2 mol dm^{-3} sulfuric acid labelled **dilute sulfuric acid** and **corrosive/irritant**
- approximately 2 g of iron filings
- a bottle of concentrated hydrochloric acid in a fume cupboard labelled **concentrated hydrochloric acid** and **corrosive/irritant**
- approximately 20 cm^3 of 1 mol dm^{-3} nitric acid labelled **dilute nitric acid** and **corrosive/irritant**
- approximately 50 cm^3 of 2 mol dm^{-3} sodium hydroxide solution labelled **dilute sodium hydroxide solution** and **corrosive/irritant**

Question No. 3

Each candidate must be supplied with:

- 6 test tubes
- 3 wooden splints
- a test tube/boiling tube rack
- a heatproof mat
- access to Universal Indicator paper with appropriate colour chart (Johnson's, 1–11)
- Bunsen burner
- 3 watch glasses
- 2 droppers
- approximately 20cm^3 of 0.02 mol dm^{-3} potassium manganate(VII) solution labelled **potassium manganate(VII) solution** and **oxidising**
- approximately 20 cm^3 of 2 mol dm^{-3} sulfuric acid labelled **dilute sulfuric acid** and **corrosive/irritant**
- 3 approximately 1 cm pieces of magnesium ribbon
- approximately 20 cm^3 of propanone labelled **X** and **flammable**
- approximately 20 cm^3 of ethanol labelled **Y** and **flammable**
- approximately 20 cm^3 of 1 mol dm^{-3} ethanoic acid labelled **Z** and **irritant**