Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

8842645045

COMBINED SCIENCE **0653/52**

Paper 5 Practical Test **May/June 2018**

1 hour 30 minutes

Candidates answer on the Question Paper.

Additional Materials: As listed in the Confidential Instructions.

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.
Notes for Use in Qualitative Analysis for this paper are printed on page 8.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use	
1	
2	
3	
Total	

This document consists of **8** printed pages.

CAMBRIDGE International Examinations

1 You are provided with a piece of banana, hot and cold water, and Benedict's solution.

Cut a slice of about 5 mm from one end of the banana.

Place it on the white tile with the cut surface uppermost.

(a) (i) Make an enlarged pencil drawing of the banana slice in the box below.

[2]

(ii) Measure the diameter of the slice of banana, in millimetres, to the nearest millimetre.

diameter = ... mm

Measure the diameter of your drawing of the banana, in millimetres, to the nearest millimetre.

diameter = ... mm
[3]

(iii) Use your measurements to calculate the magnification of your drawing.

Show your working.

magnification = ... [1]

(b) Cut a fresh slice of banana of approximately 5 mm in length and chop it into small pieces.

Place the pieces of banana in the test-tube and add about 1 cm depth of cold water.

Mash the banana gently using a stirring rod.

Carry out a test on the banana in the test-tube using the Benedict's solution.

You need to add Benedict's solution to at least the same depth as the banana and use the beaker and the hot water provided as a water-bath.

Record **and** explain your observations.

observations .....

explanation .....

.....

[2]

(c) A student tests banana for the presence of fat.

He uses the following method.

Method

1. Place some chopped banana in a test-tube.
2. Add 2 cm^3 water and stir.
3. Pour the water into another test-tube containing 2 cm^3 ethanol.

(i) Identify **one** error in the student's method.

.....

.....[1]

(ii) State the observation for a positive result from a correct fat test.

.....[1]

2 Notes for use in Qualitative Analysis for this question are printed on page 8.

You are going to investigate the reactions of metal oxide **H**.

(a) Heat the **smaller** test-tube containing solid **H**.

Continue heating in the hottest part of a blue flame for at least 2 minutes.

Record the colour of solid **H** after heating.

.....[1]

(b)
- To the sample of solid **H** in the **larger** test-tube add about 10 cm^3 of the unknown acid labelled **acid**.
- Carefully heat until the mixture boils, then stop heating.
- Leave to cool for approximately one minute.
- Filter the mixture.

(i) Record the colours of the filtrate and residue.

filtrate .....

residue .....
[2]

(ii) Place approximately 1 cm depth of the liquid filtrate into a clean test-tube.

Add sodium hydroxide solution slowly until there is no further change.

Record your observations.

.....

.....[1]

(iii) Place approximately 1 cm depth of the liquid filtrate into another clean test-tube.

Add a spatula load of magnesium powder.

Mix the contents of the test-tube.

Record your observations. Do **not** include any bubbling or temperature changes which may occur.

.....

.....

.....[2]

(c) (i) Using your observations in **(a)** and **(b)**, identify the metal in the metal oxide **H**.

State **one** piece of evidence you have used to make this identification.

metal is .....

piece of evidence .....

.....

[2]

(ii) The acid used in **(b)** is either hydrochloric acid or sulfuric acid.

Describe a test to identify the acid used in **(b)**. You should include the expected observations for the acids.

Do **not** carry out this test.

test .....

.....

observation for hydrochloric acid .....

.....

observation for sulfuric acid .....

.....

[2]

[Turn over

3 You are going to measure the approximate mass of a metre rule using a balancing method.

You are provided with a 200 g load labelled **P**, a 100 g load labelled **Q**, a metre rule and a pivot.

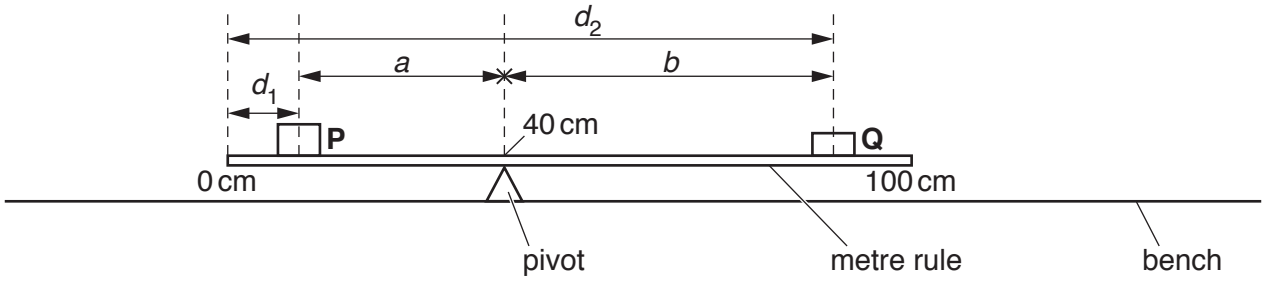

Fig. 3.1

(a) (i)
- Set up the apparatus as shown in Fig. 3.1.
- Place the pivot under the 40.0 cm mark. **The position of the pivot must not change during this experiment.**
- Place the load **P** on the rule so that its centre is a distance d_1 = 10.0 cm from the zero end of the rule, as shown in Fig. 3.1.
- Adjust the position of the load **Q** so that the rule is as close as possible to being balanced.

Record in Table 3.1 the distance d_2, to the nearest 0.1 cm, from the **zero** end of the rule to the centre of load **Q**. [1]

Table 3.1

d_1 / cm	d_2 / cm	$a = (40 - d_1)$ / cm	$b = (d_2 - 40)$ / cm
10.0			
15.0			
25.0			
30.0			

(ii) Repeat the procedure in **(a)(i)** for values of d_1 = 15.0 cm, 25.0 cm and 30.0 cm. [2]

(b) For each value of d_1 and d_2, calculate the distances a and b as shown in Table 3.1. Use the equations shown.

$$a = (40 - d_1)$$

$$b = (d_2 - 40)$$

Record in Table 3.1 your values of a and b. [1]

(c) (i) On the grid provided, plot a graph of a (vertical axis) against b.

Start your axes from the origin (0, 0). Draw the best-fit straight line. [3]

(ii) Extend your line until it cuts the axis.

Write down the value of the intercept I on the vertical axis.

I = ... [1]

(d) The mass m in grams of the metre rule is given by the equation shown.

$$m = 20 \times I$$

Use this equation to calculate a value for m. Give your answer to an appropriate number of significant figures.

m = ... g [1]

(e) Suggest one **practical** reason why, despite carrying out the experiment with care, your value for the mass of the rule is only approximate.

.....

.....[1]

NOTES FOR USE IN QUALITATIVE ANALYSIS

Tests for anions

anion	*test*	*test result*
carbonate (CO_3^{2-})	add dilute acid	effervescence, carbon dioxide produced
chloride (Cl^-) [in solution]	acidify with dilute nitric acid, then add aqueous silver nitrate	white ppt.
nitrate (NO_3^-) [in solution]	add aqueous sodium hydroxide, then aluminium foil; warm carefully	ammonia produced
sulfate (SO_4^{2-}) [in solution]	acidify with dilute nitric acid, then add aqueous barium nitrate	white ppt.

Tests for aqueous cations

cation	*effect of aqueous sodium hydroxide*	*effect of aqueous ammonia*
ammonium (NH_4^+)	ammonia produced on warming	–
copper(II) (Cu^{2+})	light blue ppt., insoluble in excess	light blue ppt., soluble in excess, giving a dark blue solution
iron(II) (Fe^{2+})	green ppt., insoluble in excess	green ppt., insoluble in excess
iron(III) (Fe^{3+})	red-brown ppt., insoluble in excess	red-brown ppt., insoluble in excess
zinc (Zn^{2+})	white ppt., soluble in excess giving a colourless solution	white ppt., soluble in excess giving a colourless solution

Tests for gases

gas	*test and test result*
ammonia (NH_3)	turns damp red litmus paper blue
carbon dioxide (CO_2)	turns limewater milky
chlorine (Cl_2)	bleaches damp litmus paper
hydrogen (H_2)	‘pops’ with a lighted splint
oxygen (O_2)	relights a glowing splint