UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

CHEMISTRY **0620/52**

Paper 5 Practical Test **May/June 2012**

1 hour 15 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 a pencil for any diagrams, graphs or rough working.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
Practical notes are provided 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	
Total	

This document consists of **7** printed pages and **1** blank page.

UNIVERSITY of CAMBRIDGE International Examinations

For Examiner's Use

1 You are going to investigate what happens when two different solids, **C** and **D**, dissolve in water.

Read all the instructions below carefully before starting the experiments.

Instructions
You are going to carry out two experiments.

(a) *Experiment 1*

Place the polystyrene cup in the 250 cm^3 beaker for support.

Use a measuring cylinder to pour 25 cm^3 of distilled water into the polystyrene cup. Measure the temperature of the water and record it in the table below.

Add all of solid **C** to the water, start the timer and stir the mixture with the thermometer.

Measure the temperature of the solution every 30 seconds for three minutes. Record your results in the table.

time / s	0	30	60	90	120	150	180
temperature of solution / °C							

[2]

(b) *Experiment 2*

Empty the polystyrene cup and rinse it with water.

Use a measuring cylinder to pour 25 cm^3 of distilled water into the polystyrene cup. Measure the temperature of the water and record it in the table below.

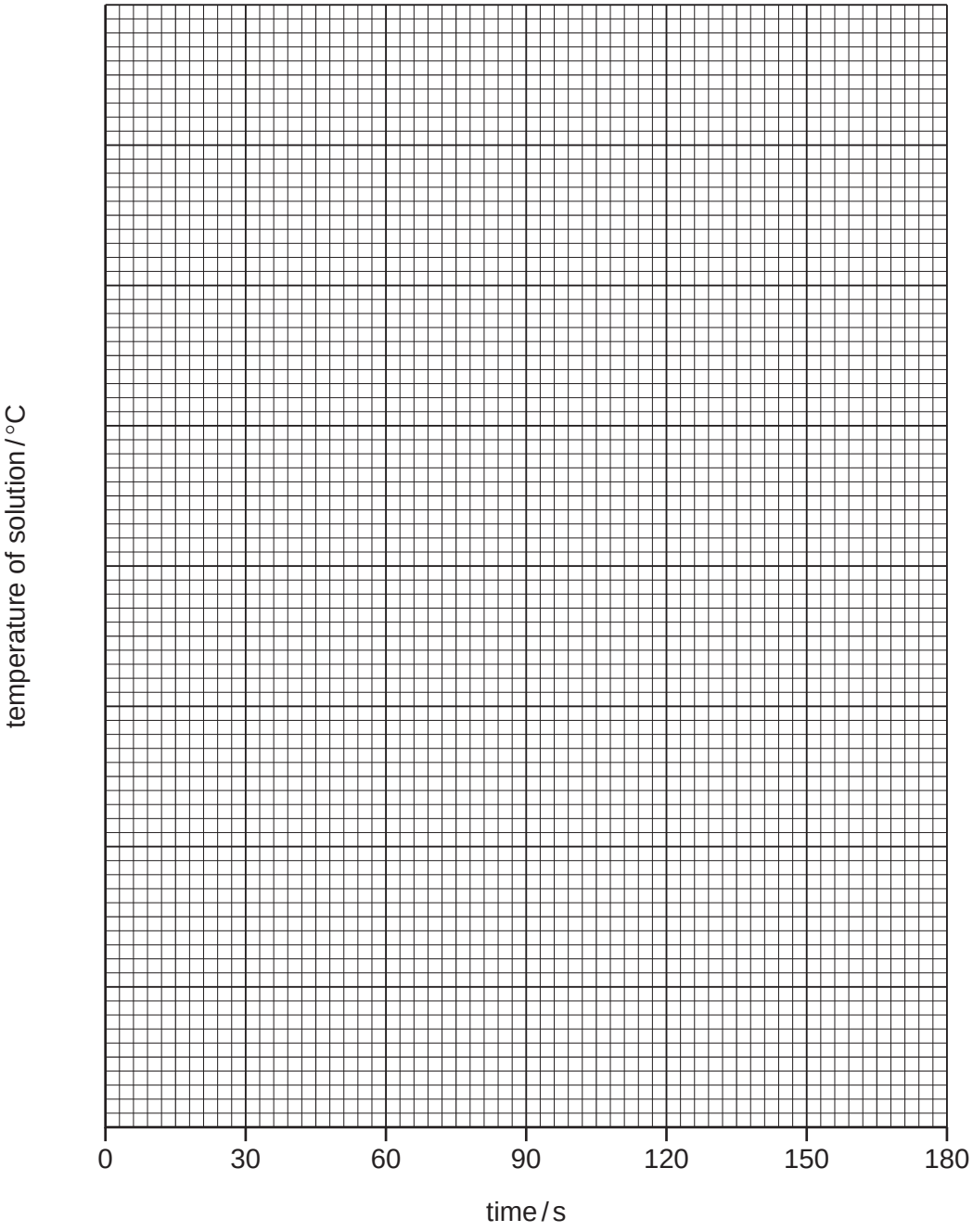
Add all of solid **D** to the water, start the timer and stir the mixture with the thermometer.

Measure the temperature of the solution every 30 seconds for three minutes. Record your results in the table.

time / s	0	30	60	90	120	150	180
temperature of solution / °C							

[2]

(c) Plot the results for Experiments 1 and 2 on the grid and draw two smooth line graphs. Clearly label your graphs.



[6]

(d) (i) **From your graph**, deduce the temperature of the solution in Experiment 1 after 45 seconds.
Show clearly **on the graph** how you worked out your answer.

..... °C [2]

(ii) **From your graph**, deduce how long it takes for the **initial** temperature of the solution in Experiment 2 to change by 1 °C.
Show clearly **on the graph** how you worked out your answer.

..... s [2]

(e) What type of change occurs when substance **D** dissolves in water?

..... [1]

(f) Suggest and explain the effect on the results if Experiment 1 was repeated using 50 cm^3 of distilled water.

.....

..... [2]

(g) Predict the temperature of the solution in Experiment 2 after 1 hour. Explain your answer.

.....

..... [2]

(h) When carrying out the experiments, what would be the advantage of taking the temperature readings every 15 seconds?

.....

..... [2]

[Total: 21]

2 You are provided with solid **E** and liquid **F**.
Carry out the following tests on **E** and **F**, recording all of your observations in the table.
Conclusions must **not** be written in the table.

tests	observations
tests on solid **E** **(a)** Describe the appearance of solid **E**.	..... [1]
(b) Place half of solid **E** in a test-tube. Heat the test-tube gently. Test any gas given off.	.... [3]
(c) **(i)** Add half of the remaining solid **E** to about 5 cm^3 of dilute sulfuric acid in a test-tube. Allow the mixture to settle. Decant off the liquid into a test-tube. Divide the solution into two equal portions in test-tubes. Add 1 cm depth of distilled water to each test-tube and shake. Carry out the following tests. **(ii)** Add several drops of aqueous sodium hydroxide to the first portion of the solution and shake the test-tube. Now add excess sodium hydroxide to the test-tube. **(iii)** Add several drops of aqueous ammonia to the second portion of the solution and shake the test-tube. Now add excess aqueous ammonia to the test-tube.	.... [2] .... [2] .... [3]

tests	observations
tests on liquid **F** **(d)** Describe the appearance and smell of liquid **F**.	appearance ..... [1] smell ..... [1]
(e) Use pH indicator paper to measure the pH of liquid **F**.	pH ..... [1]
(f) Add about 3 cm^3 of liquid **F** to the rest of solid **E** in a test-tube. Leave to stand for five minutes.	.... [2]

(g) Identify solid **E**.

..... [2]

(h) Draw **one** conclusion about liquid **F**.

..... [1]

[Total: 19]

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NOTES FOR USE IN QUALITATIVE ANALYSIS

Test 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.
iodide (I^-) [in solution]	acidify with dilute nitric acid, then add aqueous silver nitrate	yellow 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 aqueous barium nitrate	white ppt.

Test for aqueous cations

cation	*effect of aqueous sodium hydroxide*	*effect of aqueous ammonia*
aluminium (Al^{3+})	white ppt., soluble in excess giving a colourless solution	white ppt., insoluble in excess
ammonium (NH_4^+)	ammonia produced on warming	–
calcium (Ca^{2+})	white ppt., insoluble in excess	no ppt., or very slight white ppt.
copper (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

Test for gases

gas	*test and test results*
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