

CANDIDATE

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

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CHEMISTRY		0620/52
CENTRE NUMBER	CANDIDATE NUMBER	
NAME		

Paper 5 Practical Test

October/November 2010

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.

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1		
2		
Total		

This document consists of 8 printed pages.



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

Read all instructions below carefully before starting the experiments.

Instructions

You are going to carry out two sets of experiments.

(a) Experiment 1

Using a measuring cylinder, pour 20 cm³ of distilled water into the polystyrene cup provided. Put the cup into a 250 cm³ beaker for support. Measure the temperature of the water and record it in the table below.

Add 2g of solid **A** provided to the cup and stir the mixture with a thermometer. Measure and record the temperature of the solution after one minute. Pour the solution away and rinse the polystyrene cup.

Repeat the experiment using 3g of the solid **A** provided. Record your results in the table. Repeat the experiment using 4g of the solid **A** provided. Record your results in the table. Repeat the experiment using 6g of the solid **A** provided. Record your results in the table.

mass of solid A /g	initial temperature/°C	final temperature/°C
2		
3		
4		
6		

[3]

(b) Experiment 2

Repeat experiment 1 using 2g, 3g and 4g of solid **B** respectively. Record your results in the table below.

mass of solid B /g	initial temperature/°C	final temperature/°C
2		
3		
4		

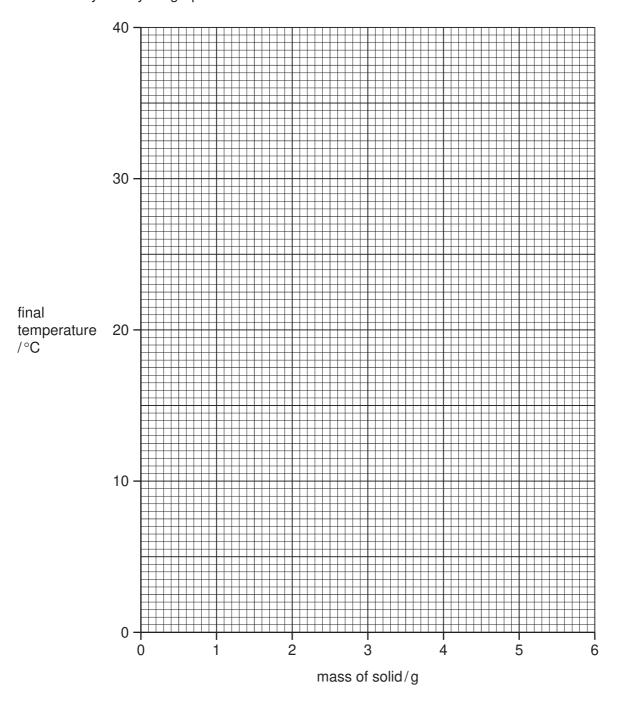
[2]

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(c) Plot the results of the experiments on the grid below. Draw two best-fit straight line graphs.

Clearly label your graphs.



[6]

(d)	(i)	Use your graph to estimate the temperature of the reaction mixture if 6 g of solid B was added to 20 cm ³ of water. Show clearly on the grid how you worked out your answer.
		[2]
	(ii)	From your graph , work out the temperature of the reaction mixture if 5 g of solid A was added to 20 cm³ of water. Show clearly on the graph how you worked out your answer.
		[2]
(e)	Wh	at type of chemical reaction occurs when solid A dissolves in water?
		[1]
(f)		plain how the temperature changes would differ in the experiments if 40 cm ³ of water used.
		[2]
(g)		dict the effect of using lumps of solid B in Experiment 2. Explain your answer.
		[2]
		[-]
(h)	_	gest one change you could make to the apparatus used in the experiments to obtain re accurate results.
		[1]
		[Total: 21]

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You are provided with a mixture of two solids, **C** and **D**. Solid **C** is water-soluble and **D** is insoluble. Carry out the following tests on **C** and **D**, recording all of your observations in the table.

Conclusions must **not** be written in the table.

	tests	observations
Add 15 cm³ of distilled water to the mixture in the boiling tube. Stopper and shake the boiling tube for two minutes. Filter the contents of the tube, keeping the filtrate and the residue for the following tests.		
test	on the filtrate	
(a)	To about 1 cm³ of the solution, add a few drops of dilute nitric acid and about 1 cm³ of aqueous potassium iodide.	[2]
(b)	To about 1 cm³ of the solution add about 1 cm³ of dilute hydrochloric acid.	[1]
(c)	To about 1 cm ³ of the solution add an equal volume of aqueous sodium hydroxide. Now add a small spatula measure of aluminium powder and warm the mixture carefully . Test any gases given off.	[2]

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		tests	observations
tests on the residue		the residue	
Wash the residue in the filter paper with a little distilled water.		·	
Using a spatula, transfer some of the solid residue from the filter paper into two test-tubes.		sidue from the filter paper into two	
(d)		t the solid in the first test-tube gently then strongly. Leave the test-tube to l.	[2]
(e) Add about 2 cm³ of dilute hydrochloric acid to the second test-tube. Test the gas given off with limewater.		ne second test-tube. Test the gas given	[2]
(f) After 2 minutes, add an equal volume of distilled water and shake the test-tube. Decant off the liquid and divide into two approximately equal portions.		lled water and shake the test-tube. ant off the liquid and divide into two	
	(i)	To the first portion add aqueous sodium hydroxide a little at a time until in excess.	[2]
	(ii)	To the second portion add aqueous ammonia a little at a time until in excess.	[2]

(g)	Identify the gas given off in test (c).
	[1]
(h)	Identify solid C.
	[2]
(i)	What conclusions can you draw about solid D ?
	[3]
	[Total: 19]

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 (Al³+)	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

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