UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CHEMISTRY

Paper 5 Practical Test

0620/05

October/November 2004

Candidates answer on the Question Paper.
Additional Materials: As listed in instructions to Supervisors

1 hour 15 minutes

Candidate Name

Centre Number

Candidate Number

READ THESE INSTRUCTIONS FIRST

Write your name, Centre number and candidate number on all the work you hand in.

Write in dark blue or black pen in the spaces provided on the Question Paper.

You may use a pencil for any diagrams, graphs or rough working.

DO **NOT** WRITE IN THE BARCODE.

DO **NOT** WRITE IN THE GREY AREAS BETWEEN THE PAGES.

Do not use staples, paper clips, highlighters, glue or correction fluid.

You may use a calculator.

Answer **all** questions.

The number of marks is given in brackets [ ] at the end of each question or part question.

Practical notes are provided on page 8.

FOR EXAMINER'S USE	
1	
2	
Total	

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

For Examiner's Use

1 You are going to investigate what happens when sodium thiosulphate dissolves in water.

Read **all** the **instructions** below carefully before starting the experiments.

Instructions

Experiment 1

Place a polystyrene cup in the beaker provided.

By using a measuring cylinder, pour 20 cm^3 of the distilled water into the polystyrene cup provided and record the temperature of the water in the table.

Add the 1 g of powdered sodium thiosulphate provided to the cup and stir the mixture with the thermometer. Measure and record the temperature of the solution after one minute. Pour the solution away and rinse the polystyrene cup.

Experiment 2

Repeat Experiment 1 using 2 g of the powdered sodium thiosulphate provided.

Record your results in the table.

Experiments 3, 4 and 5

Repeat Experiment 1 using 3 g, 4 g and 5 g of powdered sodium thiosulphate respectively. Record your results in the table.

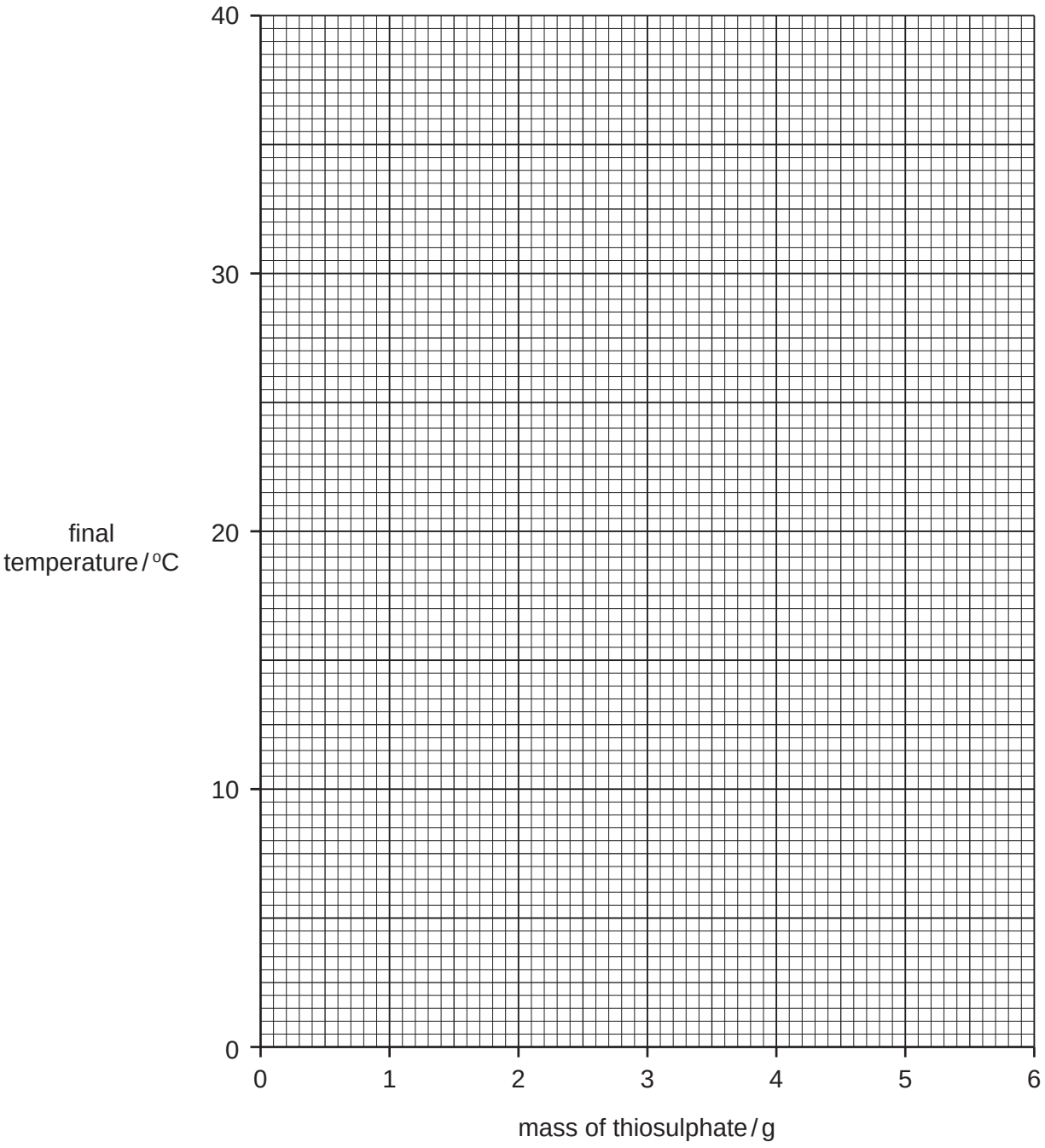
Table of results

mass of sodium thiosulphate / g	temperature / °C	
	initial	final
1		
2		
3		
4		
5		

[5]

(a) Plot the results of the experiments on the grid below. Draw a best-fit straight line graph.

For Examiner's Use



[5]

For Examiner's Use

(b) (i) **Use your graph** to estimate the temperature of the reaction mixture if 3.5 g of powdered sodium thiosulphate were added to 20 cm^3 of water.

Indicate **clearly** on the graph how you obtained your answer.

..... [2]

(ii) From your graph work out the temperature of the reaction mixture if 6 g of powdered sodium thiosulphate were added to 20 cm^3 of water.

Indicate **clearly** how you used your graph.

..... [2]

(c) What type of chemical reaction occurs when sodium thiosulphate dissolves in water?

..... [1]

(d) Explain how the temperature changes would differ in the experiments if 40 cm^3 of water were used.

.....

.....

..... [2]

(e) Explain why the sodium thiosulphate was powdered before being used.

.....

..... [2]

(f) Predict what the temperature of the reaction mixture in Experiment 5 would be after 1 hour. Explain your answer.

.....

..... [2]

(g) Suggest **one** change you could make to the **apparatus** used in the experiments to obtain more accurate results.

.....

..... [1]

2 You are provided with salt **E**.

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Carry out the following tests on **E**, recording all of your observations in the table. Do **not** write any conclusions in the table.

tests	observations
(a) Describe the appearance of **E**	..... [2]
(b) Using a spatula place about half of **E** in a hard glass test-tube. Inside the top of the tube suspend a piece of damp indicator paper. Heat **E** gently until gas comes out of the tube. Leave the tube to cool and study its appearance.	.... [2] appearance .... [2]
Dissolve the rest of **E** in about 6 cm^3 of water. **(c)** Test the pH of the solution using indicator paper.	..... [1]
(d) Divide the solution into three test-tubes. **(i)** To the first portion, add a few drops of dilute nitric acid and about 1 cm^3 of aqueous silver nitrate. **(ii)** To the second portion of solution **E**, add about 1 cm^3 of lead nitrate solution. **(iii)** To the third portion of solution **E**, add about 1 cm^3 of aqueous sodium hydroxide. Boil **gently** and test the gas given off with indicator paper.	.... [2] ..... [2] .... [2]

(e) Name the gas given off in test **(d)(iii)**.

..... [1]

(f) Explain the observations in test **(b)**.

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.....

..... [2]

(g) What conclusions can you draw about salt **E**?

.....

..... [2]

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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 aqueous lead(II) nitrate	yellow ppt.
nitrate (NO_3^-) [in solution]	add aqueous sodium hydroxide then aluminium foil; warm carefully	ammonia produced
sulphate (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., 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