



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE
NAME

CENTRE
NUMBER

--	--	--	--	--

CANDIDATE
NUMBER

--	--	--	--



CHEMISTRY

0620/63

Paper 6 Alternative to Practical

October/November 2013

1 hour

Candidates answer on the Question Paper.

No Additional Materials are required.

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.

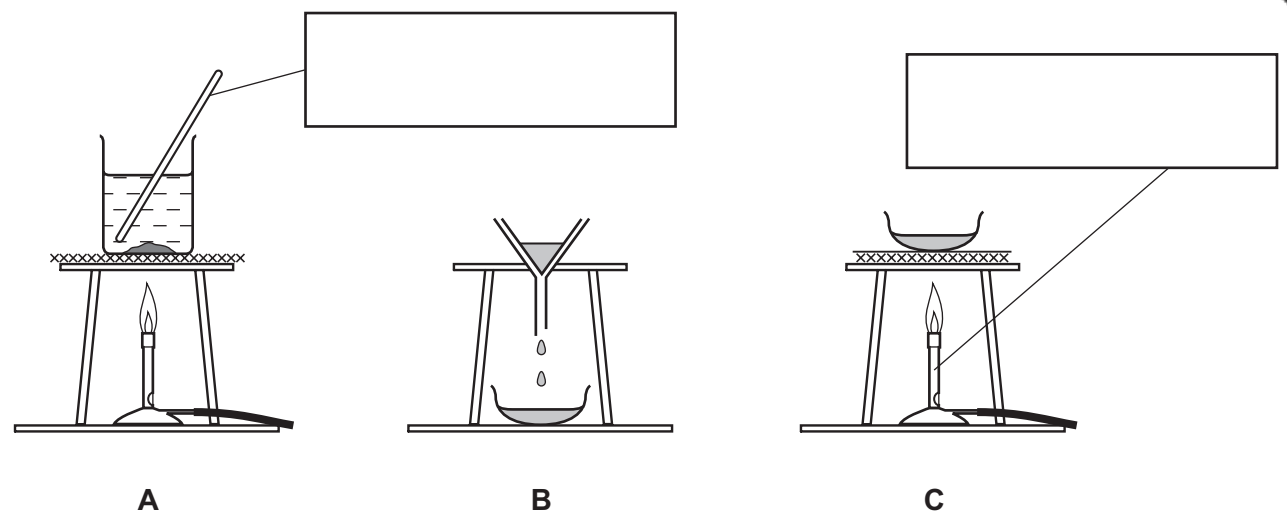
Answer **all** questions.
Electronic calculators may be used.
You may lose marks if you do not show your working or if you do not use appropriate units.

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.

This document consists of **9** printed pages and **3** blank pages.



1 A student tried to separate a mixture of salt and sand. Salt, sodium chloride, is soluble in water. Sand, silicon(IV) oxide, is insoluble in water. He added the mixture to water. Three sets of apparatus are shown.



(a) Complete the boxes to identify the pieces of apparatus. [2]

(b) Fill in the blanks in the following sentences.

Liquids that dissolve substances are called

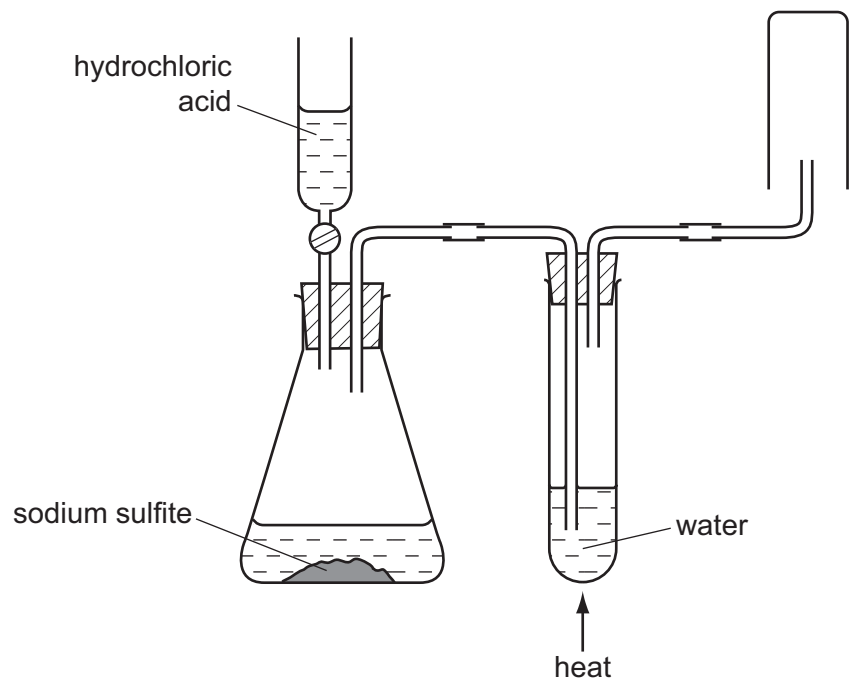
The clear liquid formed is a [2]

(c) Which set of apparatus should be used to obtain the sand, salt crystals? [2]

(d) What happened to the water used in the experiment? [1]

[Total: 7]

2 Sulfur dioxide is a poisonous gas which is denser than air and soluble in water. Sulfur dioxide can be prepared by adding dilute hydrochloric acid to sodium sulfite warming the mixture. Study the diagram of the apparatus used.



(a) Identify and explain **three** mistakes in the diagram.

- 1 mistake
- reason [2]
- 2 mistake
- reason [2]
- 3 mistake
- reason [2]

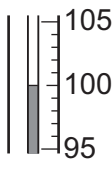
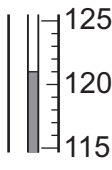

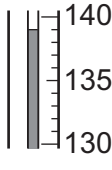
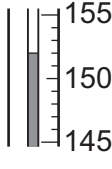

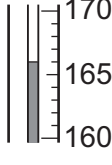
(b) State **one** precaution that should be taken when carrying out this experiment.

..... [1]

[Total: 7]

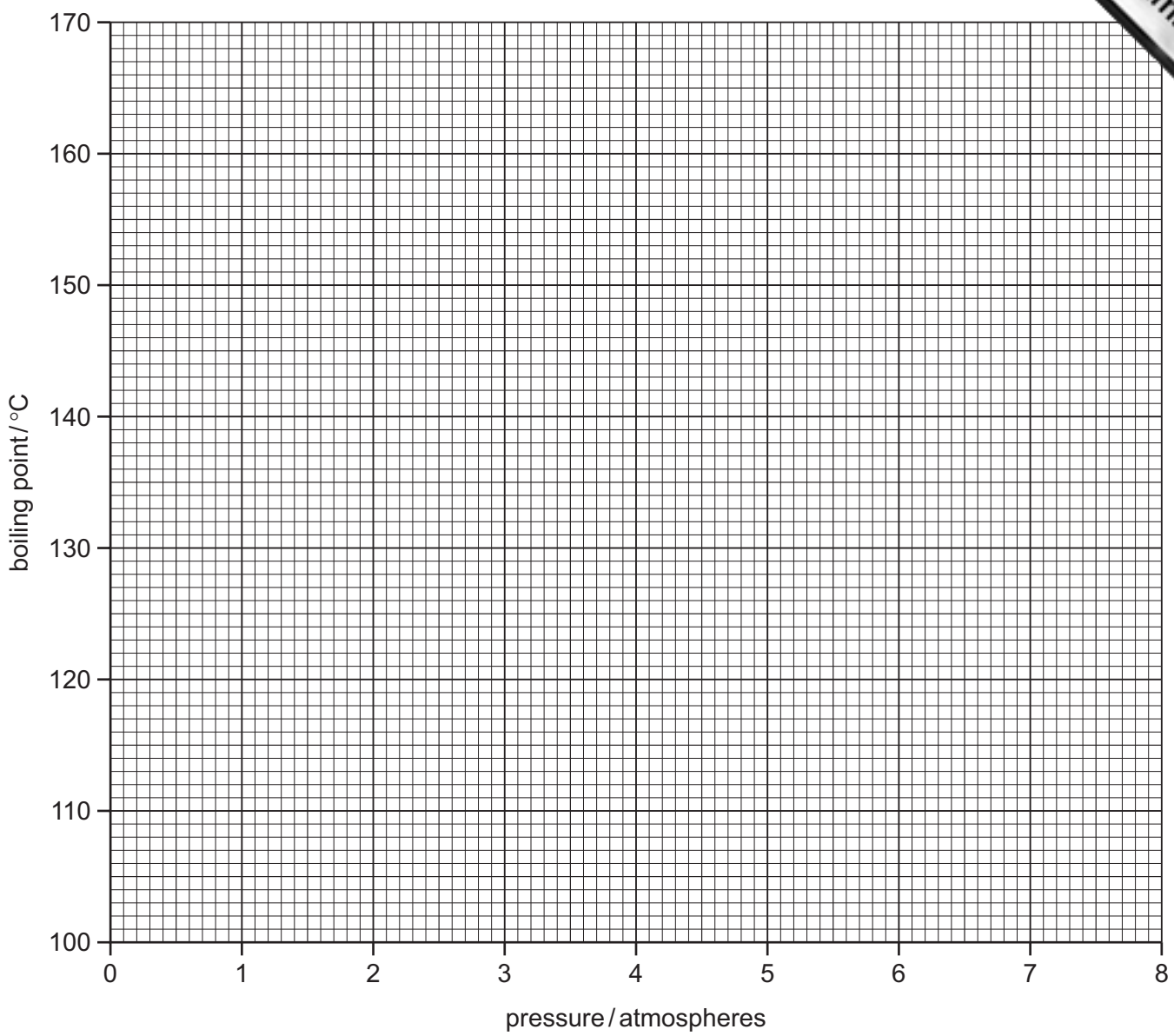
3 A scientist measured the boiling point of water at different pressures.

(a) Use the thermometer diagrams in the table to complete the boiling point temperatures.

pressure / atmospheres	thermometer diagram	boiling point / °C
1		
2		
3		
4		
5		
6		
7		

[3]

(b) Plot the points on the grid and draw a smooth line graph.



[4]

(c) State which point is inaccurate. Why have you chosen this point?

.....
..... [2]

(d) Use your graph to find the boiling point of water at a pressure of 7.5 atmospheres. Show clearly on the grid how you obtained your answer.

..... [3]

(e) State a chemical test for water.

test

result [2]

[Total: 14]

4 A student investigated the reaction between aqueous potassium manganate(VII), which is purple, and two different colourless acidic solutions, **D** and **E**.

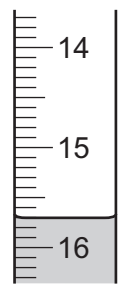
Three experiments were carried out.

(a) *Experiment 1*

A burette was filled with the solution of potassium manganate(VII) to the 0.0 cm³ mark. Using a measuring cylinder, 25 cm³ of solution **D** was poured into a conical flask.

Potassium manganate(VII) solution was added to the flask until the mixture just turned permanently pink.

Use the burette diagram to record the final volume in the table and complete the table.



final reading

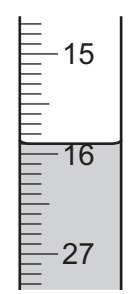
	burette reading
final burette reading / cm ³	
initial burette reading / cm ³	
difference / cm ³	

[2]

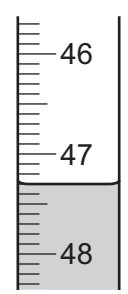
(b) *Experiment 2*

Experiment 1 was repeated using 25 cm³ of solution **E** instead of solution **D**.

Use the burette diagrams to record the readings in the table and complete the table.



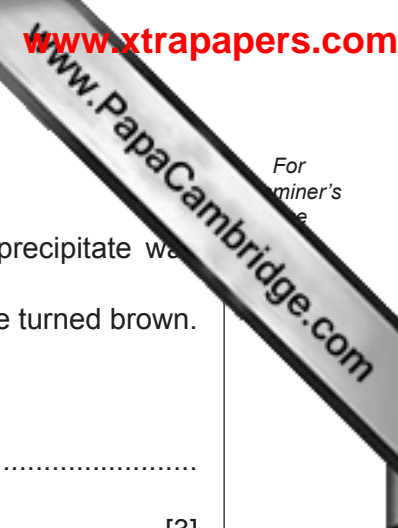
initial reading



final reading

	burette reading
final burette reading / cm ³	
initial burette reading / cm ³	
difference / cm ³	

[2]



For
aminer's
e

(c) Experiment 3

Aqueous ammonia was added to solution **E** in a test-tube. A green precipitate was observed.
The mixture was left to stand for 5 minutes. The surface of the precipitate turned brown.

What conclusions can you draw from these observations?

.....
..... [3]

(d) (i) What colour change was observed as potassium manganate(VII) solution was added to the flask in Experiment 1?

..... [1]

(ii) Why was an indicator not added to the flask?

..... [1]

(e) (i) In which experiment was the greatest volume of potassium manganate(VII) solution used?

..... [1]

(ii) Compare the volumes of potassium manganate(VII) used in Experiments 1 and 2.

..... [1]

(iii) Suggest an explanation for the difference in volumes.

.....
.....
..... [2]

(f) If Experiment 2 was repeated using 12.5 cm³ of solution **E**, what volume of potassium manganate(VII) solution would be used? Explain your answer.

.....
..... [2]

(g) Give one advantage and one disadvantage of using a measuring cylinder for solutions **D** and **E**.

advantage

disadvantage [2]

[Total: 17]

5 Two liquids, **F** and **G**, were analysed. **G** was an aqueous solution of potassium chloride. The tests on the liquids and some of the observations are in the following table. Complete the observations in the table.

tests	observations
<u>tests on liquid F</u>	
(a) (i) Appearance of liquid F . The pH of the liquid was tested.	yellow solution pH = 7
(ii) An equal volume of dilute sulfuric acid was added to liquid F . Excess aqueous sodium hydroxide was then added to the mixture.	solution turned orange solution turned from orange to yellow
(b) Dilute sulfuric acid was added to liquid F followed by hydrogen peroxide. The mixture was shaken and the gas given off tested with a splint.	rapid effervescence glowing splint relit
<u>tests on liquid G</u>	
(c) Dilute nitric acid was added to liquid G followed by aqueous barium nitrate. [1]
(d) Dilute nitric acid was added to liquid G followed by aqueous silver nitrate. [2]

(e) What does test (a)(i) tell you about liquid **F**?
.....
..... [2]

(f) What type of reaction happened in test (a)(ii)? Explain your answer.
type of reaction
explanation
..... [2]

(g) Identify the gas given off in test (b).
..... [1]

[Total: 8]



Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.