Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

2703862241

CHEMISTRY **0620/62**

Paper 6 Alternative to Practical **October/November 2014**

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 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.

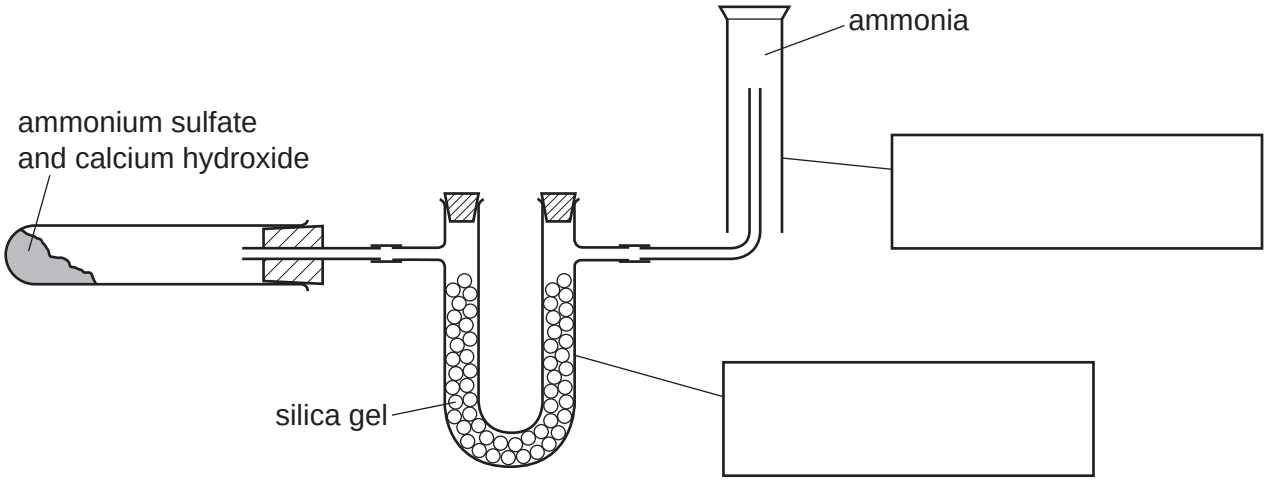
At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

This document consists of **10** printed pages and **2** blank pages.

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1 Ammonia gas can be prepared using the apparatus below. A mixture of two solids, ammonium sulfate and calcium hydroxide, is heated.



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

(ii) Show, by using an arrow, where heat is applied. [1]

(b) Why is the ammonia collected by upward delivery as shown, and **not** over water?

.....

..... [2]

(c) A stopper from a bottle of concentrated hydrochloric acid was placed near the ammonia gas. Clouds of white smoke were seen. Explain this observation.

.....

.....

..... [3]

(d) Give a different test for ammonia gas.

test .....

result .....
[2]

[Total: 10]

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2 Four bottles of liquids have lost their labels.
The liquids are known to be:

a solution of chlorine in water

dilute sulfuric acid

hexene

limewater

Outline the chemical tests you could do to identify and distinguish between the liquids in each bottle.

liquid	chemical test	result
a solution of chlorine in water		
dilute sulfuric acid		
hexene		
limewater		

[8]

[Total: 8]

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[Turn over

3 A student prepared crystals of magnesium sulfate, $MgSO_4.7H_2O$, from magnesium carbonate. The procedure followed was in three steps.

Step 1 Some solid magnesium carbonate was transferred from a bottle into a beaker.

Step 2 A dilute acid was slowly added to the beaker until all the magnesium carbonate had reacted. Magnesium sulfate solution was produced.

Step 3 The solution was evaporated to crystallising point in an evaporating dish.

(a) What should be used to transfer the magnesium carbonate in Step 1?

..... [1]

(b) (i) Name the acid used in Step 2.

..... [1]

(ii) Why was the acid not heated in Step 2?

..... [1]

(c) (i) Which reactant was in excess?

..... [1]

(ii) Suggest why this reactant should not have been in excess.

.....

..... [1]

(d) (i) How would the student know when the crystallisation point had been reached in Step 3?

.....

..... [1]

(ii) Suggest the effect of heating the magnesium sulfate crystals.

..... [1]

[Total: 7]

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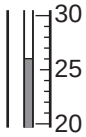
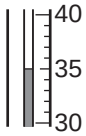
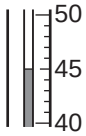
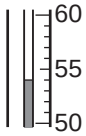
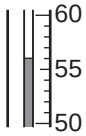
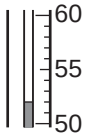
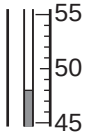
4 A student carried out an experiment to measure the temperature changes when aqueous sodium hydroxide reacted with dilute hydrochloric acid.
One experiment was carried out.

Using a measuring cylinder, 25 cm^3 of the aqueous solution of sodium hydroxide was poured into a polystyrene cup. The initial temperature of the solution was measured.

A burette was filled with dilute hydrochloric acid to the 0.0 cm^3 mark.
10.0 cm^3 of dilute hydrochloric acid was added to the aqueous sodium hydroxide in the cup and the mixture stirred. The maximum temperature of the solution was measured. A further 10.0 cm^3 of dilute hydrochloric acid was added to the cup and the mixture stirred. The highest temperature of the mixture was measured.

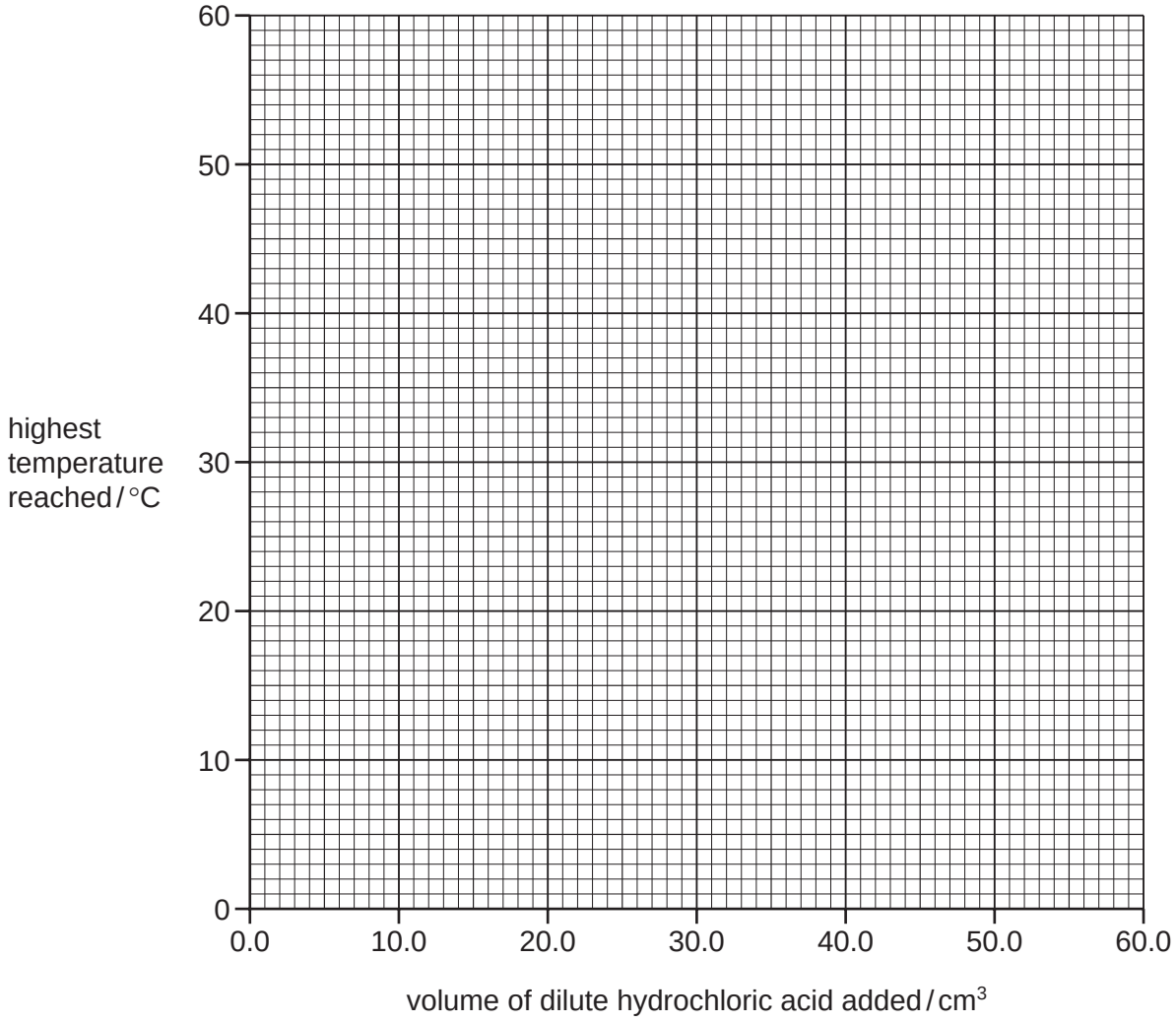
Further 10.0 cm^3 portions of dilute hydrochloric acid were added to the cup, until a total volume of 60 cm^3 of hydrochloric acid had been added. After each addition the mixture was stirred and the highest temperature measured.

(a) Use the thermometer diagrams to record the temperatures measured in the table.

volume of dilute hydrochloric acid added / cm^3	thermometer diagrams	temperature of solution in polystyrene cup / °C
0.0		
10.0		
20.0		
30.0		
40.0		
50.0		
60.0		

[3]

(b) Plot the results for the experiment on the grid. Draw two straight lines through the points and extend them until they cross.



[4]

(c) (i) **Use your graph** to estimate the temperature of the reaction mixture when 25.0 cm^3 of dilute hydrochloric acid were added to 25 cm^3 of aqueous sodium hydroxide.
Show clearly **on the grid** how you worked out your answer.

..... [2]

(ii) What volume of dilute hydrochloric acid was needed to completely neutralise 25 cm^3 of aqueous sodium hydroxide?
Show clearly **on the grid** how you worked out your answer.

..... [3]

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(d) Which reactant had the highest concentration? Explain your answer.

.....

..... [2]

(e) What type of chemical reaction, other than neutralisation, occurs when dilute hydrochloric acid reacts with aqueous sodium hydroxide?

..... [1]

(f) Predict the temperature of the mixture after two hours. Explain your answer.

.....

..... [2]

(g) Suggest how the reliability of the results could be checked.

.....

..... [2]

[Total: 19]

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[Turn over

5 Two metallic salt solutions, **A** and **B**, were analysed. **A** was aqueous iron(III) chloride.
The tests on the solutions and some of the observations are in the table.
Complete the observations in the table.

tests	observations
<u>tests on solution **A**</u> **(a)** Appearance of solution **A**.	..... [1]
(b) Aqueous sodium hydroxide was added to about 1 cm^3 of solution **A**.	..... [2]
(c) Aqueous ammonia was added to about 1 cm^3 of solution **A**.	..... [1]
(d) Dilute nitric acid and aqueous silver nitrate were added to about 1 cm^3 of solution **A**.	..... [1]
<u>tests on solution **B**</u> **(e)** Appearance of solution **B**.	colourless liquid
(f) Drops of aqueous sodium hydroxide were added to solution **B**. Excess sodium hydroxide was then added to the mixture.	white precipitate formed precipitate dissolved
(g) Drops of aqueous ammonia were added to solution **B**. Excess ammonia was then added.	white precipitate formed precipitate remained
(h) Dilute nitric acid and aqueous barium nitrate were added to about 1 cm^3 of solution **B**.	white precipitate formed

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(i) Identify solution **B**?

.....

..... [2]

[Total: 7]

6 **Oven cleaners**

(a) Some liquid oven cleaners contain particles of an insoluble solid, bentonite, suspended in an aqueous solution.
Outline an experiment to obtain a **pure** sample of bentonite from the oven cleaner.

.....

.....

.....

.....

..... [3]

(b) Oven cleaners contain an aqueous solution of sodium hydroxide.
Plan an investigation to show which of two different oven cleaners, **C** and **D**, contains the more concentrated solution of sodium hydroxide.
You are provided with common laboratory apparatus and chemicals.

.....

.....

.....

.....

.....

.....

.....

.....

.....

..... [6]

[Total: 9]

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