

Candidate Name	Centre Number	Candidate Number

WELSH JOINT EDUCATION COMMITTEE
General Certificate of Secondary Education



CYD-BWYLLGOR ADDYSG CYMRU
Tystysgrif Gyffredinol Addysg Uwchradd

236/01

SCIENCE

FOUNDATION TIER (Grades G-C)

CHEMISTRY 1

P. M. FRIDAY, 19 January 2007

(45 minutes)

For Examiner's use only	
Total Marks	

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator.

INSTRUCTIONS TO CANDIDATES

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

INFORMATION FOR CANDIDATES

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

You are reminded of the necessity for good English and orderly presentation in your answers.

The Periodic Table is printed on the back cover of the examination paper and the formulae for some common ions on the inside of the back cover.

No certificate will be awarded to a candidate detected in any unfair practice during the examination.

Answer **all** questions.

1. The table below shows physical properties of some elements.

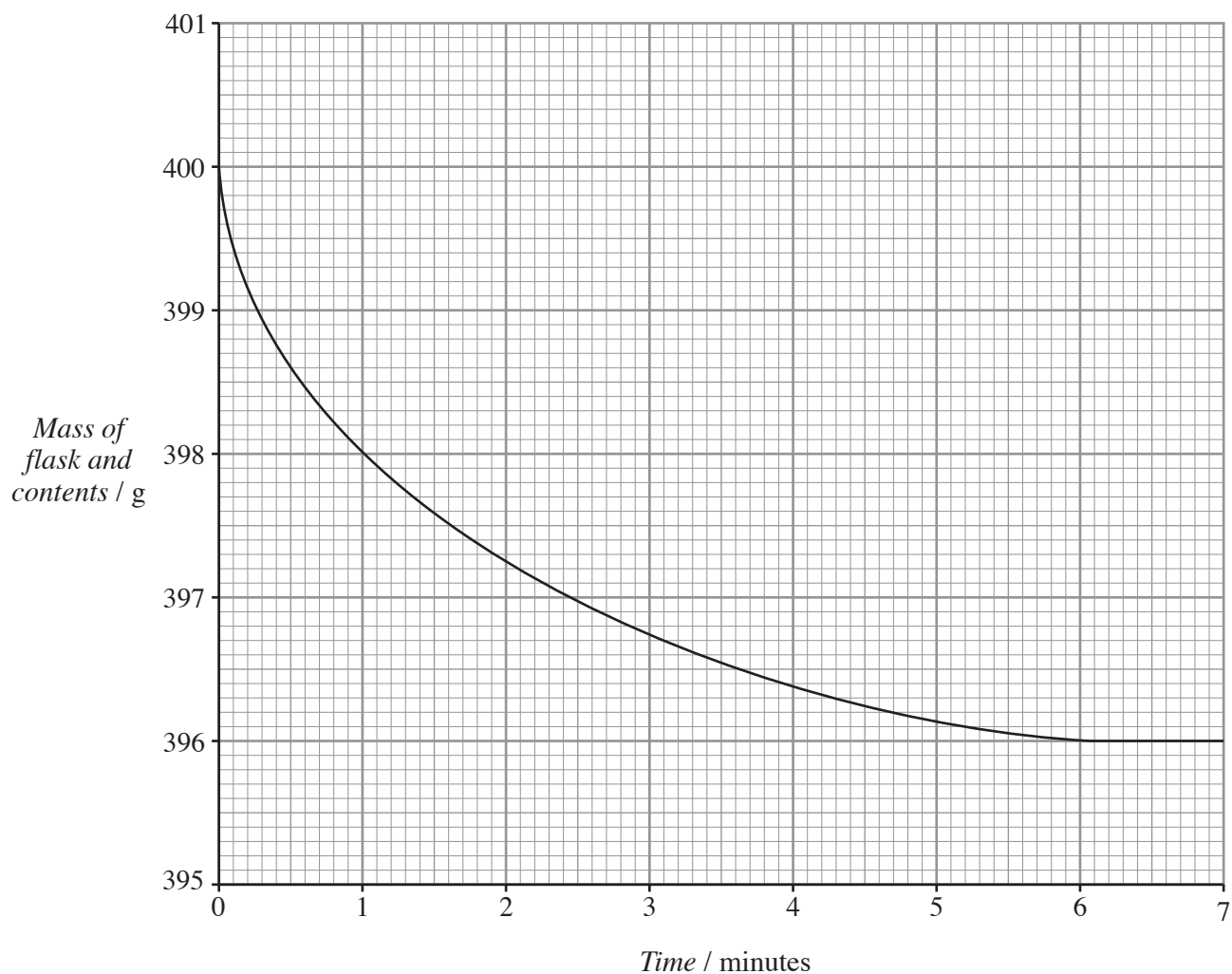
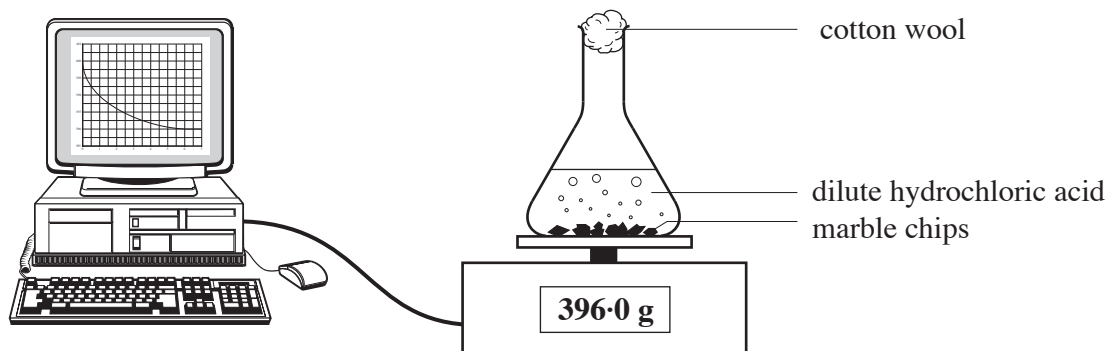
<i>Element</i>	<i>Melting point/°C</i>	<i>Boiling point/°C</i>	<i>Density/g cm⁻³</i>
copper	1083	2567	9.0
iodine	114	184	4.9
iron	1535	2750	7.9
phosphorus	44	280	1.8
silver	960	2122	10.5
sulphur	113	445	2.1

Use the information above to answer parts (i) and (ii).

- (i) Give the name of the
- I. metal with the **highest** melting point, [1]
 - II. non-metal with the **lowest** density. [1]
- (ii) State how the melting points of the metals in the table differ from those of the non-metals. [1]
-
- (iii) Aluminium is a metal with a melting point of 660°C, a boiling point of 2467°C and a density of 2.7 g cm⁻³.
- State which of these properties is **not** typical of a metal. [1]
-

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2. (a) Marble chips were placed into a conical flask and **excess** dilute hydrochloric acid was added. The conical flask was immediately placed on an electronic balance which was connected to a computer. The mass of the flask and contents was continuously recorded and displayed on the computer screen.



(i) State the purpose of the cotton wool in the neck of the flask. [1]

.....

(ii) Use the graph to give the

I. mass of flask and contents after 1 minute, g [1]

II. total mass lost during the experiment, g [1]

III. time the reaction stopped. min [1]

(iii) Give **one** advantage of using a computer to record the mass. [1]

.....

(iv) State the effect on the speed of the reaction if

I. **powdered** marble was used instead of marble chips, [1]

.....

II. hydrochloric acid of **lower concentration** was used. [1]

.....

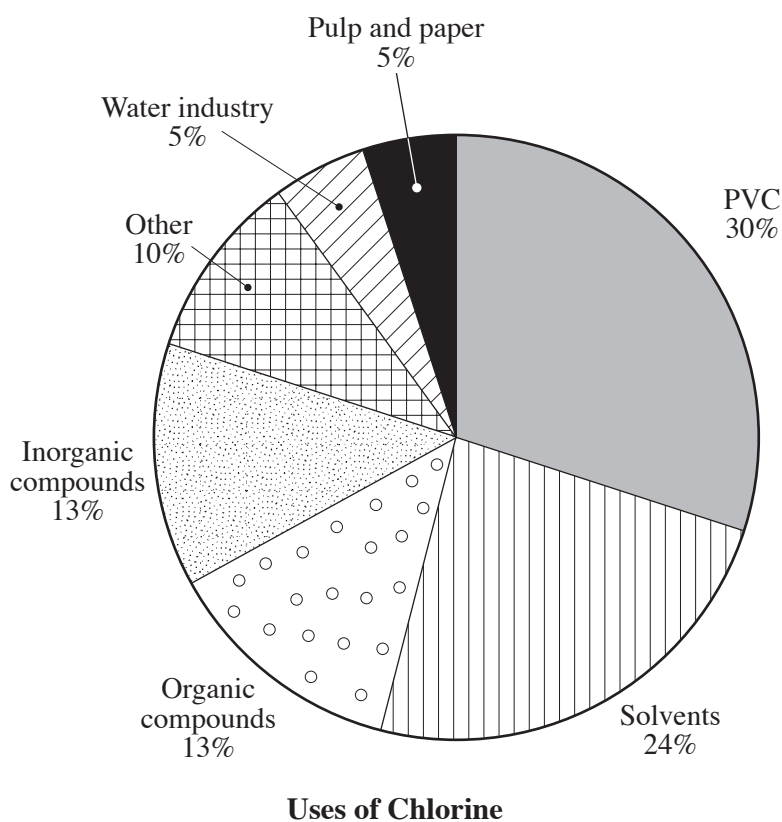
(b) This experiment can be carried out using metals instead of marble chips.

A pupil suggested using potassium metal. The teacher replies “Definitely not!”

Why did the teacher refuse to use potassium in the experiment? [1]

.....

3. (a) (i) The pie chart below shows some uses of chlorine.



Use the pie chart to complete the following sentences.

- I. The **biggest** use of chlorine is [1]
- II. The water industry uses % of the total chlorine used. [1]
- (ii) Chlorine is added to all supplies of drinking water in Britain.
- I. Give the **reason** for the chlorination of drinking water. [1]
-
- II. Give the **property** of chlorine which makes it suitable for this use. [1]
-

(b) Another chemical added to some drinking water in Britain is sodium fluoride.

(i) Give the **reason** for the fluoridation of some drinking water. [1]

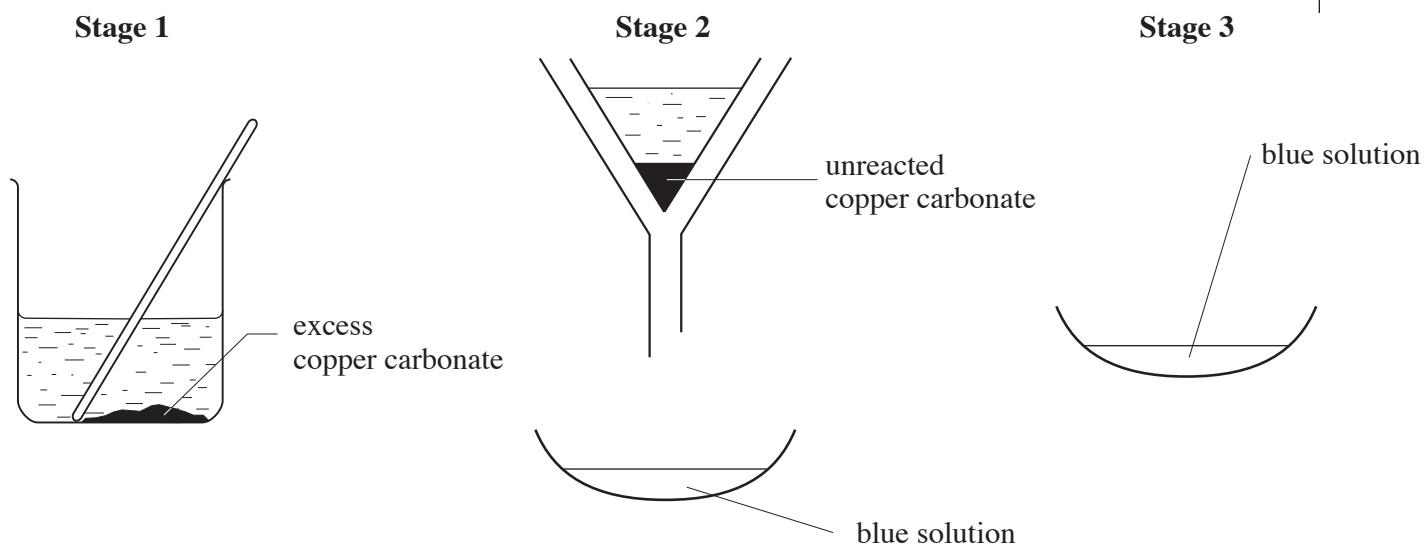
.....

(ii) Some people do not agree with the fluoridation of drinking water.
State why you think the chlorination of water supplies is accepted by nearly everyone
but not the fluoridation of water. [1]

.....

.....

4. The diagrams below show stages in making the compound copper sulphate by reacting copper carbonate with dilute sulphuric acid.



Excess copper carbonate is added to dilute sulphuric acid and the mixture is continuously stirred.

Unreacted copper carbonate is removed.

The blue solution is left in an evaporating basin at room temperature to obtain blue crystals of copper sulphate.

- (i) Explain why copper carbonate is added in *excess*. [1]

.....

- (ii)

boiling	evaporating	dissolving	filtering
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Choose, from the box above, the name for the process occurring in

I. Stage 2

[1]

II. Stage 3

[1]

(iii)

carbon dioxide copper carbonate copper sulphate
sulphuric acid water

Using the substances in the box above, write a **word** equation which represents the reaction described in stage 1. [2]

..... + → + +

(iv) If sodium carbonate were used instead of copper carbonate, give the chemical name of the crystals formed in the evaporating basin in stage 3. [1]

.....

5. Read the information in the box below.

Nanoscience is the study of extremely small particles. Atoms and molecules are examples of nano-sized particles. A nanometre is a thousand million times smaller than a metre.

i.e. 1 nm = 0.000 000 001 m

The nano-size range is usually thought of as from 1 to 100 nm. Nano-sized materials have very different properties from the same material at a larger size. Nano-sized silver is anti-bacterial and is used in wound dressings. Nano-sized titanium dioxide is water repellent and is used in the manufacture of self-cleaning windows.

Use only the information in the box above to answer the following questions.

- (i) Give
 - I. the size range of nano-sized particles, [1]
 - II. an example of a material having nano-sized particles. [1]

- (ii) State an important difference between nano-sized materials and the same material at a larger size. [1]

.....

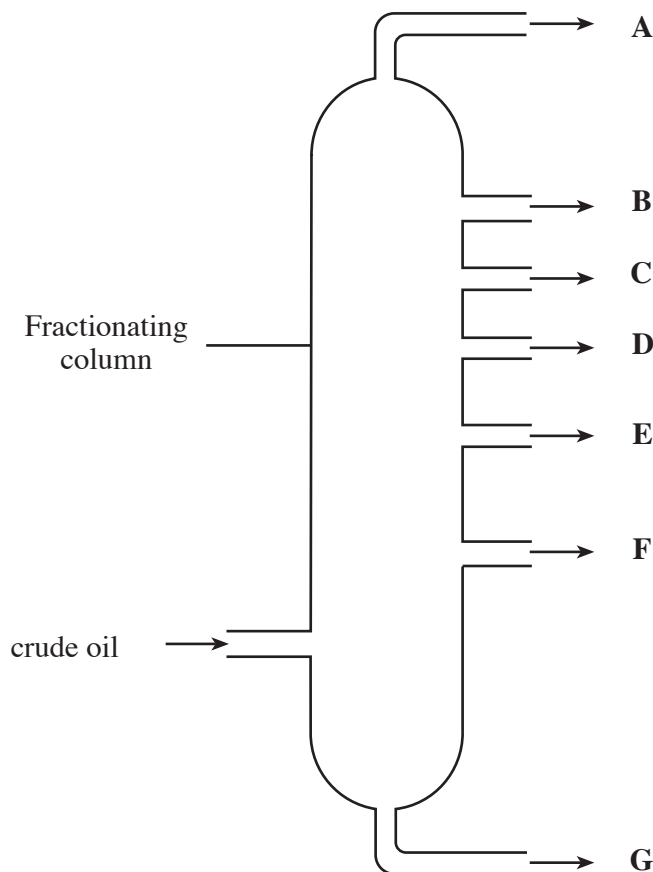
- (iii) Give the property of nano-sized silver which enables it to be used in wound dressings. [1]

.....

- (iv) State **one** use of nano-sized titanium dioxide. [1]

.....

6. (a) Crude oil is a mixture of compounds called hydrocarbons which are separated in a fractionating column.



- (i) Give the name of the **two** elements found in hydrocarbons. [2]

..... and

- (ii) Use the letters **A** to **G**, shown in the above diagram, to state where you would find the fraction with

I. the **largest** molecules, [1]

II. the **lowest** boiling points. [1]

- (b) Fossil fuels are mainly hydrocarbons but also contain some sulphur. Burning fossil fuels forms sulphur dioxide.

Name the environmental problem caused by the release of sulphur dioxide into the atmosphere and give **one** effect of this problem. [2]

.....
.....

7. (a) Use the **data** and **key** on the Periodic Table of Elements, shown on the **back page** of the examination paper, to complete the following sentences.

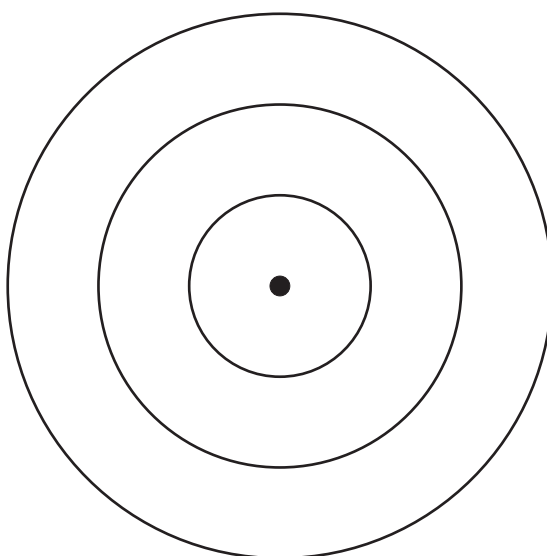
(i) The chemical symbol for caesium is [1]

(ii) The element with the atomic number 5 is [1]

(iii) The element which has the electronic structure 2,8,7 is [1]

(iv) The element which is in Group 2 and Period 2 is [1]

(b) Using **X** to represent an electron, complete the following diagram to show the electronic structure for an atom of sulphur. [1]



(c) In 1869 Mendeleev published a periodic table of elements, although many elements known today had not been discovered at that time.

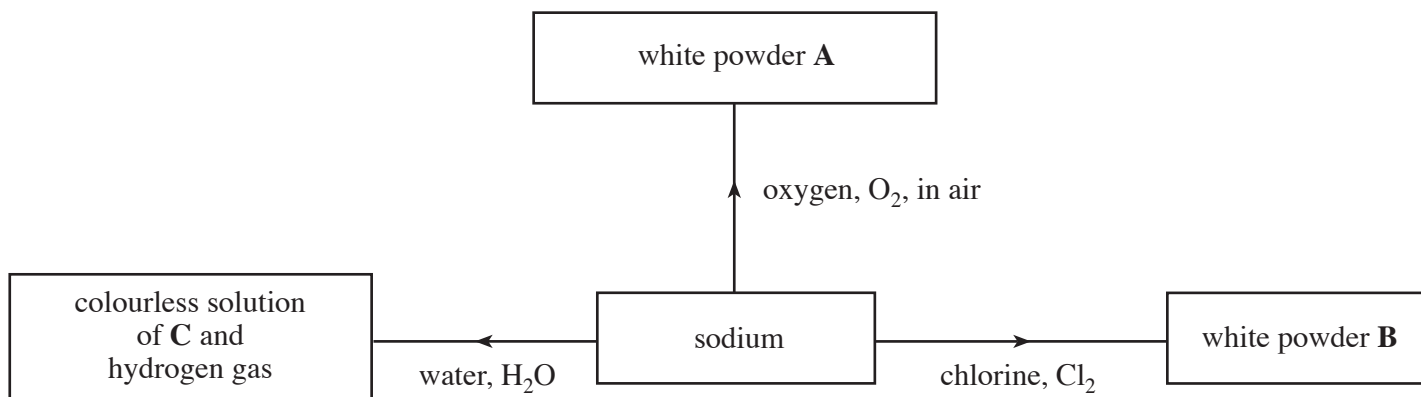
(i) How did Mendeleev overcome the problem of the unknown elements when constructing his periodic table? [1]

.....

(ii) What was Mendeleev able to predict about the unknown elements once he had constructed his periodic table? [1]

.....

8. The diagram below shows some reactions of sodium.



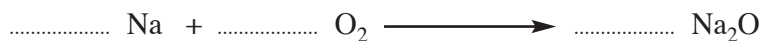
(i) Give the chemical **name** for

I. **A** [1]

II. **B** [1]

III. **C** [1]

(ii) Balance the **symbol** equation for the reaction between sodium and oxygen. [1]



(iii) A flame test was carried out on the white powder **B**. Describe what you would expect to see during the flame test and give the reason for the observation. [2]

Observation

Reason

(iv) Before carrying out the experiment to show sodium reacting with water, a teacher needs to complete a risk assessment and take safety precautions to minimise the risk. Give **one** safety risk and what can be done to minimise it. [2]

Safety risk

Action to minimise risk

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FORMULAE FOR SOME COMMON IONS

POSITIVE IONS		NEGATIVE IONS	
Name	Formula	Name	Formula
Aluminium	Al³⁺	Bromide	Br⁻
Ammonium	NH₄⁺	Carbonate	CO₃²⁻
Barium	Ba²⁺	Chloride	Cl⁻
Calcium	Ca²⁺	Fluoride	F⁻
Copper(II)	Cu²⁺	Hydroxide	OH⁻
Hydrogen	H⁺	Iodide	I⁻
Iron(II)	Fe²⁺	Nitrate	NO₃⁻
Iron(III)	Fe³⁺	Oxide	O²⁻
Lithium	Li⁺	Sulphate	SO₄²⁻
Magnesium	Mg²⁺		
Nickel	Ni²⁺		
Potassium	K⁺		
Silver	Ag⁺		
Sodium	Na⁺		

