Candidate Name	Centre Number	Candidate Number
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WJEC CBAC

GCSE

236/01

SCIENCE
FOUNDATION TIER
CHEMISTRY 1

P.M. WEDNESDAY, 18 June 2008

45 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**5**	
2.	**3**	
3.	**5**	
4.	**6**	
5.	**10**	
6.	**6**	
7.	**8**	
8.	**7**	
Total	**50**	

ADDITIONAL MATERIALS

In addition to this paper you may require a calculator and a ruler.

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.

Answer **all** *questions.*

1. The following table shows some compounds and their formulae.

Name of compound	*Formula*
water	H_2O
methane	CH_4
carbon dioxide	CO_2
ammonia	NH_3
hydrogen chloride	HCl

Use the information in the above table to answer the following questions.

(i) **Name** the compound that consists of the elements

I. carbon and hydrogen,

..... [1]

II. nitrogen and hydrogen.

..... [1]

(ii) **Name** the elements present in a molecule of

I. water,

..... and ..... [1]

II. hydrogen chloride.

..... and ..... [1]

(iii) Describe what is meant by the term ***compound***. [1]

.....

.....

2. Nanoscience involves the study of very small particles.

(i) Choose from the box below the size range of nanoparticles.

1-100 cm	**1-100 m**	**1-100 nm**

Nano-sized particles have sizes in the range ..... [1]

(ii) Nano-sized silver particles have antibacterial properties. Choose from the box below a use that depends on this property. [1]

jewellery	**sun-block**	**sterilising sprays**

Use .....

(iii) Nanomaterials are used more and more in everyday life. State why some scientists are concerned about their use. [1]

.....

.....

3. The chemical industry uses raw materials and changes them into useful products.

(a) The following list shows some materials:

iron **iron ore** **crude oil**

air **petrol**

Place the above materials into the correct columns in the table below. [2]
One has been done for you.

Raw materials	*Useful products*
iron ore	

(b) The following test was carried out in the laboratory.

Sodium carbonate powder is added to hydrochloric acid. Bubbles are produced, the temperature rises and the sodium carbonate disappears to form a colourless solution.

I. Give **two** reasons why this shows a chemical change has taken place. [2]

Reason 1 .....

Reason 2 .....

II. Name the gas produced in the reaction. [1]

.....

4. Read the information in the box below.

> In 1915, a scientist called Alfred Wegener suggested that the Earth's continents were once joined together. He suggested that the continents moved apart in a process called 'continental drift'. He gave two pieces of evidence to support his idea.
>
> 1. The coastlines of different continents fit together like a jigsaw.
> 2. Fossils found on different continents were very similar despite the continents being separated by large oceans.
>
> Other scientists did not believe Wegener. They believed that the continents and other features formed as the Earth cooled.
>
> It was not until after Wegener died that his ideas were accepted. It is now known that the Earth's crust (lithosphere) is made up of a number of pieces called tectonic plates. These plates are moving very slowly and it is this movement that is believed to be responsible for continental drift.

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

(i) Name the process by which the continents are believed to have moved apart. [1]

.....

(ii) Describe how the coastlines of continents provide evidence for this process. [1]

.....

.....

(iii) State how fossils provide evidence for this process. [1]

.....

.....

(iv) State why other scientists did not believe Wegener. [1]

.....

.....

(v) Describe what we now believe to be the reason for the separation of the continents. [2]

.....

.....

.....

5. *(a)* When magnesium ribbon is added to excess hydrochloric acid, magnesium chloride and hydrogen gas are produced.

(i) Give a **word equation** for the reaction taking place. [2]

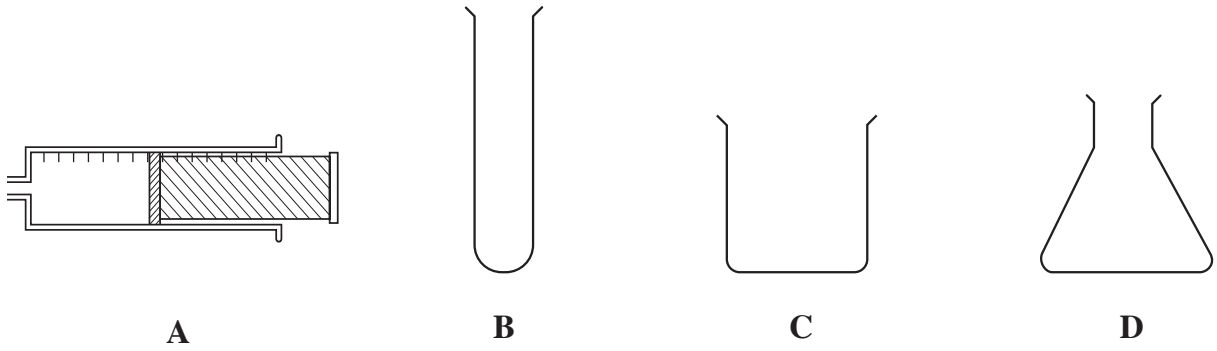
..... + ... ⟶ ..... + ...

(ii) Describe **two** changes you would expect to observe during this reaction. [2]

Observation 1 .....

Observation 2 .....

(iii) The following diagrams show some pieces of chemical apparatus.

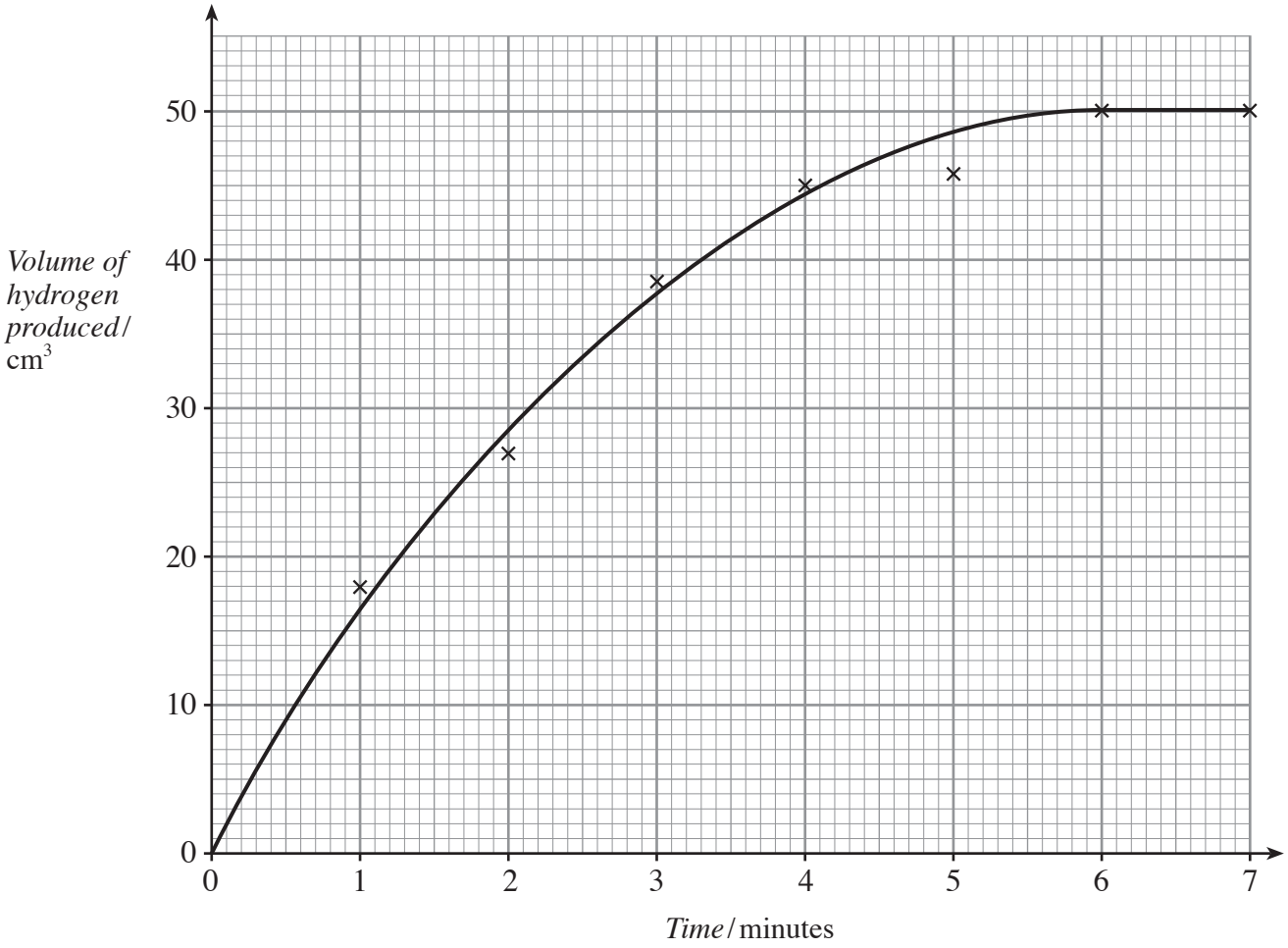


A **B** **C** **D**

Give the letter, **A**, **B**, **C** or **D** and the name of the piece of apparatus that would give the **most accurate** measurement of the volume of gas produced during the reaction. [2]

Letter ..... *Name* .....

(b) A scientist recorded the volume of gas produced over a period of time in the above reaction. The reaction was carried out at room temperature, 20 °C. The results obtained are shown in the graph below.



(i) From the graph above give

I. the total volume of gas produced,

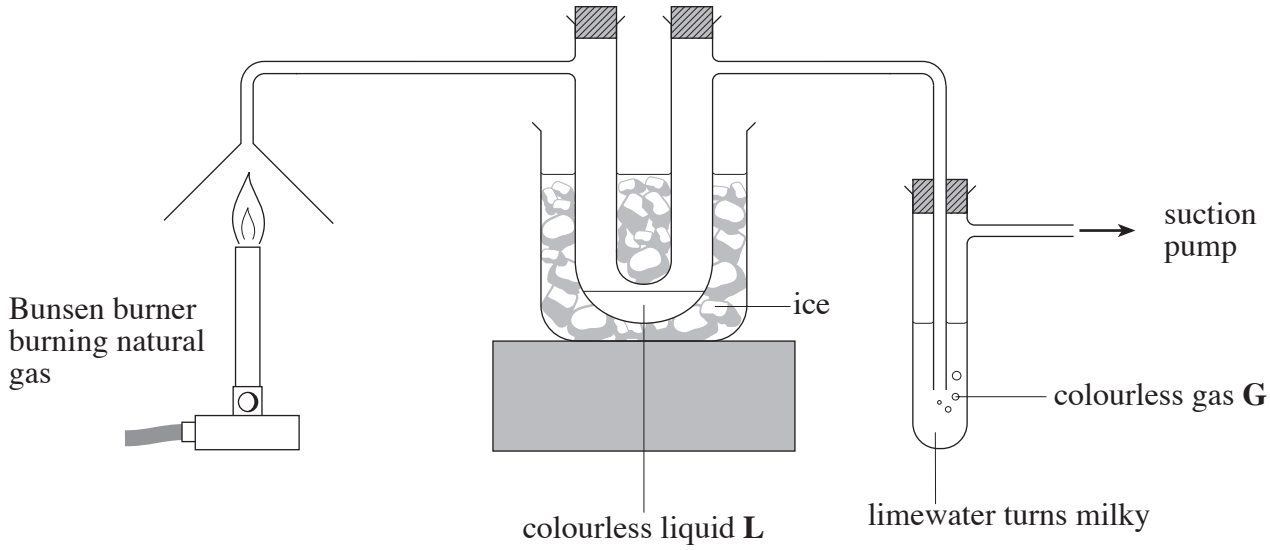
..... cm^3 [1]

II. the time taken for the reaction to end.

..... minutes [1]

(ii) The reaction was repeated at 40 °C using the same amounts of magnesium and acid. On the graph above, sketch the graph you would expect to be obtained at 40 °C. [2]

6. The following diagram shows the apparatus that can be used to investigate the products formed during the combustion of fuels.



(i) Natural gas contains methane, CH_4. Tick (✓) the box below that gives the name of the group of substances to which methane belongs. [1]

Alkali metals ☐

Halogens ☐

Hydrocarbons ☐

(ii) During the combustion of methane, new substances are formed. Name the product that is

I. colourless liquid **L**, ... [1]

II. colourless gas **G**. ..... [1]

(iii) Name the gas present in air that is necessary for the combustion of methane. [1]

.....

(iv) If the limewater is replaced by universal indicator, the indicator turns red indicating that an acidic substance is formed. This may be due to sulphur impurities in the methane.

I. Name the gas produced **from sulphur** that could be the cause of this. [1]

.....

II. Give the **name** of the environmental problem caused by this gas. [1]

.....

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7. *(a)* The following table gives information about some elements.
The Periodic Table of Elements is shown on the back page of this examination paper.

Element	*Electronic structure*	*Group number*	*Period in which element is found*
lithium	2,1	1	2
chlorine	.....	7	3
magnesium	2,8,2	.....	.....
.....	2,8,1	1	3

(i) Complete the table above. [4]

(ii) Describe how the electronic structure of an element can be used to work out

I. the group number of the element, [1]

.....

.....

II. the number of the period in which the element is found, [1]

.....

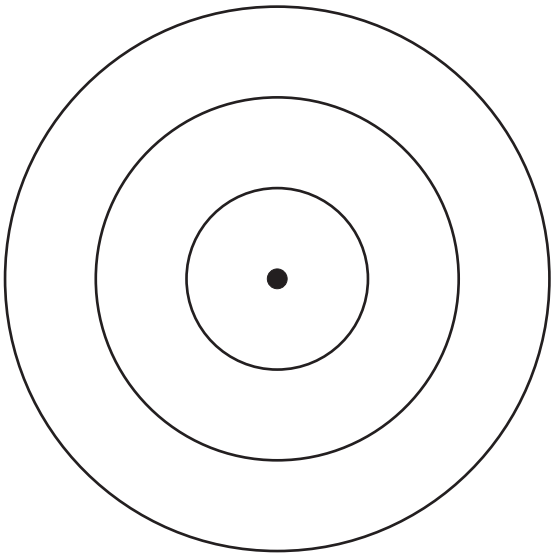
.....

III. the atomic number of the element. [1]

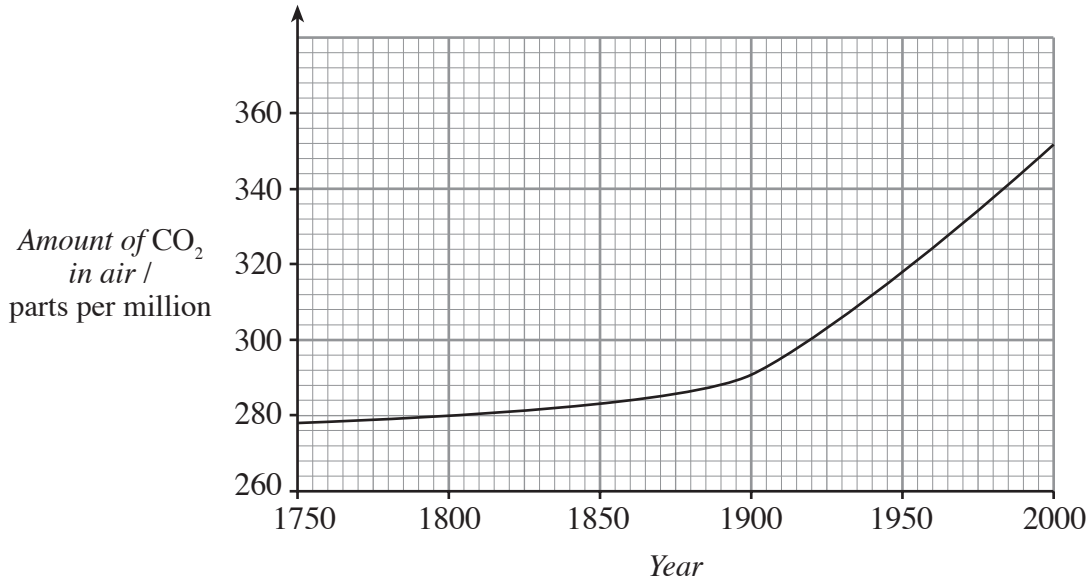
.....

.....

(b) Complete the diagram below to show the electronic configuration of aluminium, atomic number 13. [1]



8. The following graph shows how levels of carbon dioxide in the air have changed between 1750 and the year 2000.



(i) Compare the pattern of change shown in the graph before and after 1900. [2]

.....

.....

(ii) Give **two** possible reasons for the change seen after 1900. [2]

.....

.....

(iii) I. Describe what effect these changes in levels of carbon dioxide are believed to be having on the temperature of the Earth's atmosphere. [1]

.....

II. What is the name given to this effect? [1]

.....

III. Give **one** possible result of this change in the temperature of the Earth's atmosphere. [1]

.....

.....

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FORMULAE FOR SOME COMMON IONS

POSITIVE IONS		NEGATIVE IONS	
Name	**Formula**	**Name**	**Formula**
Aluminium	Al^{3+}	Bromide	Br^{-}
Ammonium	NH_4^{+}	Carbonate	CO_3^{2-}
Barium	Ba^{2+}	Chloride	Cl^{-}
Calcium	Ca^{2+}	Fluoride	F^{-}
Copper(II)	Cu^{2+}	Hydroxide	OH^{-}
Hydrogen	H^{+}	Iodide	I^{-}
Iron(II)	Fe^{2+}	Nitrate	NO_3^{-}
Iron(III)	Fe^{3+}	Oxide	O^{2-}
Lithium	Li^{+}	Sulphate	SO_4^{2-}
Magnesium	Mg^{2+}		
Nickel	Ni^{2+}		
Potassium	K^{+}		
Silver	Ag^{+}		
Sodium	Na^{+}		

Turn over.

(236-01)

PERIODIC TABLE OF ELEMENTS

1	2	Group										3	4	5	6	7	0
								$^{1}_{1}$H Hydrogen									$^{4}_{2}$He Helium
$^{7}_{3}$Li Lithium	$^{9}_{4}$Be Beryllium											$^{11}_{5}$B Boron	$^{12}_{6}$C Carbon	$^{14}_{7}$N Nitrogen	$^{16}_{8}$O Oxygen	$^{19}_{9}$F Fluorine	$^{20}_{10}$Ne Neon
$^{23}_{11}$Na Sodium	$^{24}_{12}$Mg Magnesium											$^{27}_{13}$Al Aluminium	$^{28}_{14}$Si Silicon	$^{31}_{15}$P Phosphorus	$^{32}_{16}$S Sulphur	$^{35}_{17}$Cl Chlorine	$^{40}_{18}$Ar Argon
$^{39}_{19}$K Potassium	$^{40}_{20}$Ca Calcium	$^{45}_{21}$Sc Scandium	$^{48}_{22}$Ti Titanium	$^{51}_{23}$V Vanadium	$^{52}_{24}$Cr Chromium	$^{55}_{25}$Mn Manganese	$^{56}_{26}$Fe Iron	$^{59}_{27}$Co Cobalt	$^{59}_{28}$Ni Nickel	$^{64}_{29}$Cu Copper	$^{65}_{30}$Zn Zinc	$^{70}_{31}$Ga Gallium	$^{73}_{32}$Ge Germanium	$^{75}_{33}$As Arsenic	$^{79}_{34}$Se Selenium	$^{80}_{35}$Br Bromine	$^{84}_{36}$Kr Krypton
$^{86}_{37}$Rb Rubidium	$^{88}_{38}$Sr Strontium	$^{89}_{39}$Y Yttrium	$^{91}_{40}$Zr Zirconium	$^{93}_{41}$Nb Niobium	$^{96}_{42}$Mo Molybdenum	$^{99}_{43}$Tc Technetium	$^{101}_{44}$Ru Ruthenium	$^{103}_{45}$Rh Rhodium	$^{106}_{46}$Pd Palladium	$^{108}_{47}$Ag Silver	$^{112}_{48}$Cd Cadmium	$^{115}_{49}$In Indium	$^{119}_{50}$Sn Tin	$^{122}_{51}$Sb Antimony	$^{128}_{52}$Te Tellurium	$^{127}_{53}$I Iodine	$^{131}_{54}$Xe Xenon
$^{133}_{55}$Cs Caesium	$^{137}_{56}$Ba Barium	$^{139}_{57}$La Lanthanum	$^{179}_{72}$Hf Hafnium	$^{181}_{73}$Ta Tantalum	$^{184}_{74}$W Tungsten	$^{186}_{75}$Re Rhenium	$^{190}_{76}$Os Osmium	$^{192}_{77}$Ir Iridium	$^{195}_{78}$Pt Platinum	$^{197}_{79}$Au Gold	$^{201}_{80}$Hg Mercury	$^{204}_{81}$Tl Thallium	$^{207}_{82}$Pb Lead	$^{209}_{83}$Bi Bismuth	$^{210}_{84}$Po Polonium	$^{210}_{85}$At Astatine	$^{222}_{86}$Rn Radon
$^{223}_{87}$Fr Francium	$^{226}_{88}$Ra Radium	$^{227}_{89}$Ac Actinium															

Key: