

**GENERAL CERTIFICATE OF SECONDARY EDUCATION**  
**GATEWAY SCIENCE**  
**SCIENCE B**

Unit 2 Modules B2 C2 P2  
 (Foundation Tier)

**B622/01**

Candidates answer on the question paper  
 A calculator may be used for this paper

**OCR Supplied Materials:**

None

**Other Materials Required:**

- Pencil
- Ruler (cm/mm)

**Thursday 15 January 2009**  
**Afternoon**

**Duration: 1 hour**



Candidate Forename						Candidate Surname					
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Centre Number							Candidate Number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- A list of physics equations is printed on page two.
- The Periodic Table is printed on the back page.
- The total number of marks for this paper is **60**.
- This document consists of **20** pages. Any blank pages are indicated.

FOR EXAMINER'S USE		
Section	Max.	Mark
A	20	
B	20	
C	20	
<b>TOTAL</b>	<b>60</b>	

## EQUATIONS

$$\text{efficiency} = \frac{\text{useful energy output}}{\text{total energy input}}$$

$$\text{wave speed} = \text{frequency} \times \text{wavelength}$$

$$\text{power} = \text{voltage} \times \text{current}$$

$$\text{energy (kilowatt hours)} = \text{power (kW)} \times \text{time (h)}$$

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**Question 1 begins on page 4.**

**PLEASE DO NOT WRITE ON THIS PAGE**

Answer **all** the questions.

**Section A – Module B2**

1 Chris is collecting animals in the school grounds.

(a) He uses different pieces of equipment to collect different types of animals.

Draw a straight line from each type of **animal** to the best piece of **equipment** to use to collect it.

**animal**

**equipment**

ants on a tree trunk

net

beetles on the ground  
at night

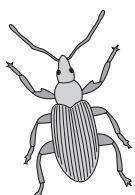
pit-fall trap

butterflies in the air

pooter

[2]

**(b)** Look at some of the beetles Chris collects.



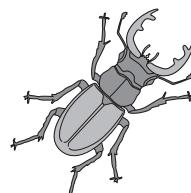
A



B



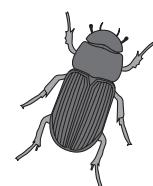
C



D



E



F

**(i)** The beetles show variation.

Describe **two** ways you can see in the diagram that they show variation.

1 .....

2 ..... [2]

**(ii)** Two of the beetles are the same species.

Which **two** are the same species? .....

Explain your answer. ....

..... [2]

**(c)** Beetles have existed for over 265 million years.

What is the evidence for this?

.....

..... [1]

[Total: 7]

2 Look at the picture of an osprey.

Ospreys live in a few places in Scotland.

They eat fish which they hunt and catch from the water.



(a) Look at the list.

**bird**

**fish**

**invertebrate**

**mammal**

**parasite**

**predator**

**prey**

Which **two** words describe ospreys?

Choose from the list.

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

(b) Look at the picture. Ospreys are adapted to hunt and catch fish.

Describe how ospreys are adapted.

In your answer include

- their adaptations
- how their adaptations help ospreys hunt and catch fish.

.....  
.....  
.....  
.....  
.....

[4]

(c) The places where ospreys live are guarded.

This is because ospreys are **endangered**.

What does endangered mean?

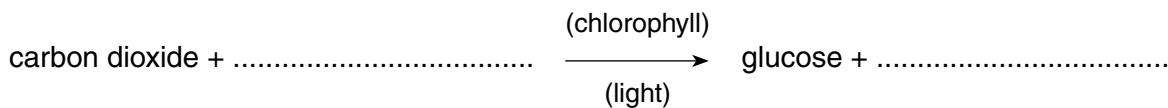
.....  
.....

[1]

**[Total: 7]**

3 Trees, like all plants, make food by photosynthesis.

(a) Complete the word equation for photosynthesis.



[2]

(b) Many people think that planting more trees will help reduce global warming.

Explain why planting more trees may help reduce global warming.

.....  
.....

[1]

(c) In a forest, very few short trees survive if they are surrounded by tall trees.

Explain why.

.....  
.....

[1]

(d) Trees are taller than other plants because the wood in their stems is strong enough to support their weight.

Wood contains a lot of cellulose.

What substance is cellulose made from?

.....

[1]

(e) Some trees have a plant called mistletoe growing on them.

Mistletoe is a parasite.

What is meant by the term **parasite**?

.....  
.....

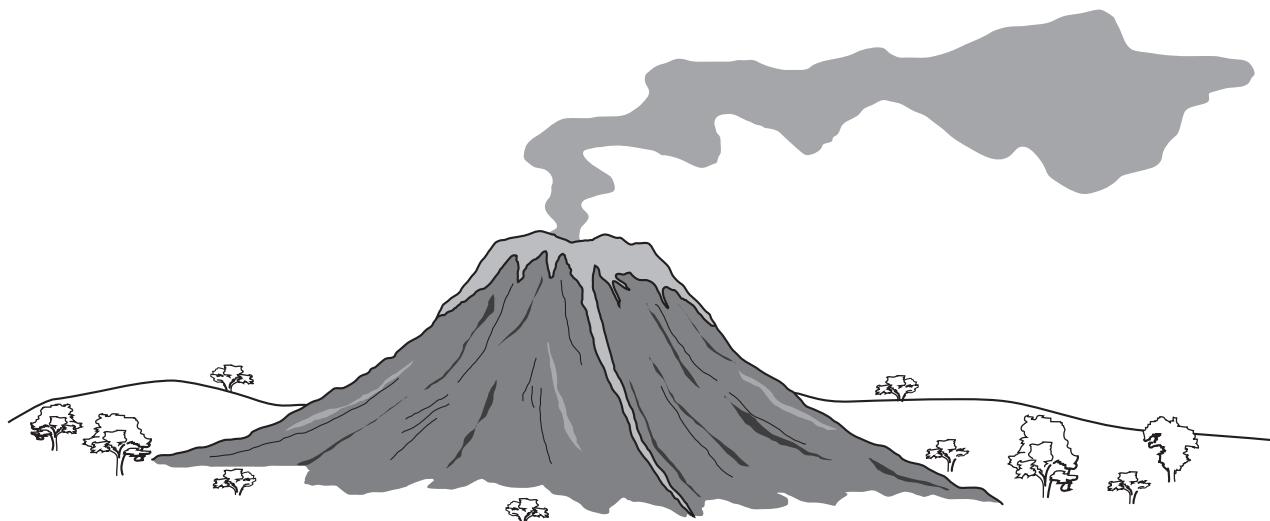
[1]

**[Total: 6]**

Section B – Module C2

4 This question is about rocks.

Look at the picture of a volcano.



(a) Igneous rocks are made when a volcano erupts.

Describe how **igneous** rocks are made.

.....  
.....

[1]

(b) What is **lava**?

.....

[1]

(c) Geologists study volcanoes.

Write down **two** reasons why geologists study volcanoes.

.....  
.....  
.....

[2]

**[Total: 4]**

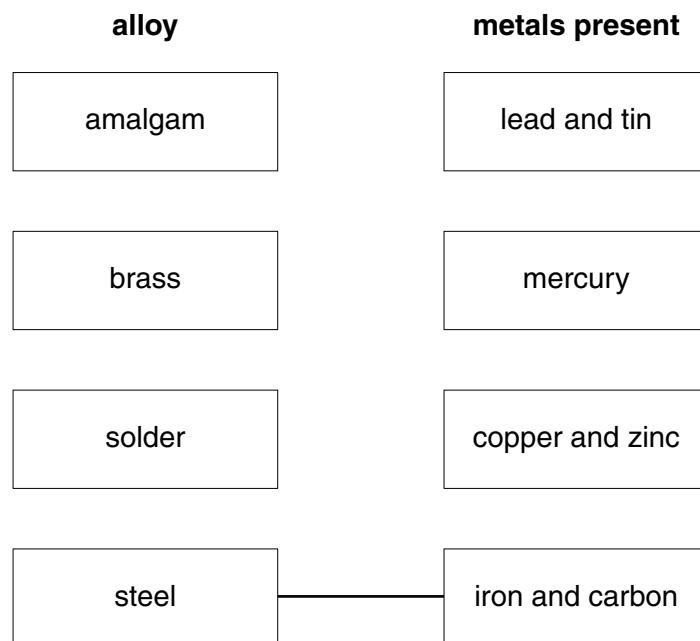
10

5 This question is about metals and alloys.

(a) Brass, solder, steel and amalgam are alloys.

(i) Join the boxes to show the metals present in each alloy.

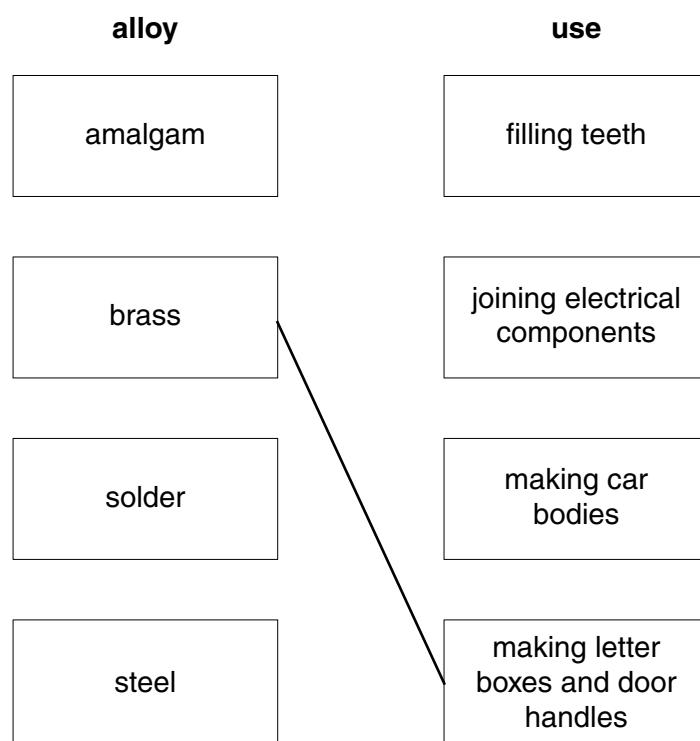
Steel has been done for you.



[2]

(ii) Join the boxes to show the use of each alloy.

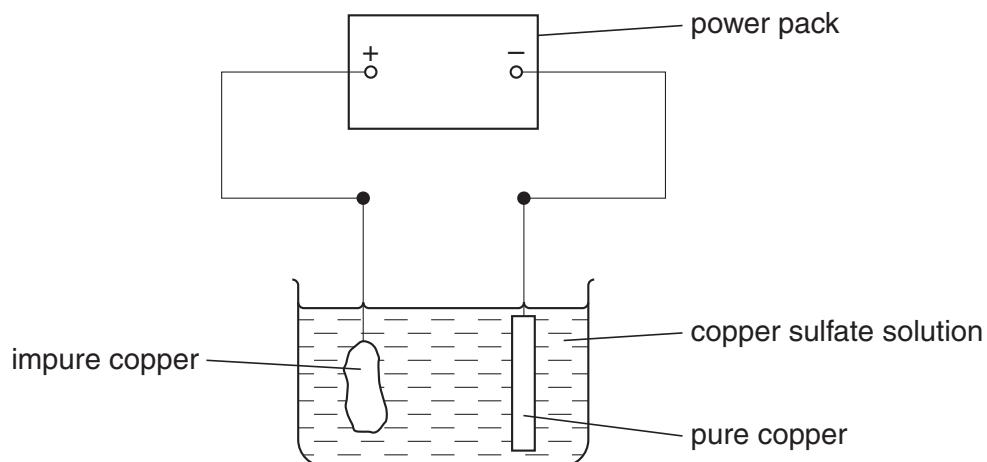
Brass has been done for you.



[2]

(b) Wayne and Helen are purifying copper.

Look at the diagram. It shows the apparatus they use.



What is the name of this process?

Choose from the list.

**combustion**

**decomposition**

**electrolysis**

**respiration**

answer ..... [1]

[Total: 5]

12

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6 (a) Look at the table. It compares the properties of iron and aluminium.

**Complete** the table.

property	iron	aluminium
magnetism	magnetic	not magnetic
density	high density	.....
corrosion (rusting)	.....	does not corrode
electrical conductor	good electrical conductor	.....

[3]

(b) Iron and aluminium are used to make cars.

The materials from scrapped cars are **recycled**.

Write down **one** advantage of recycling these materials.

.....

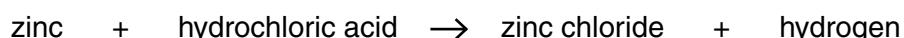
[1]

**[Total: 4]**

## 14

7 Colin and Ann investigate the reaction between zinc and hydrochloric acid.

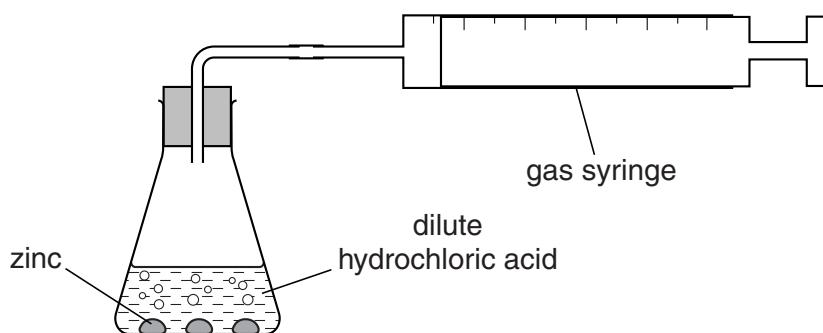
The word equation for the reaction is



(a) Write down the name of one **reactant**.

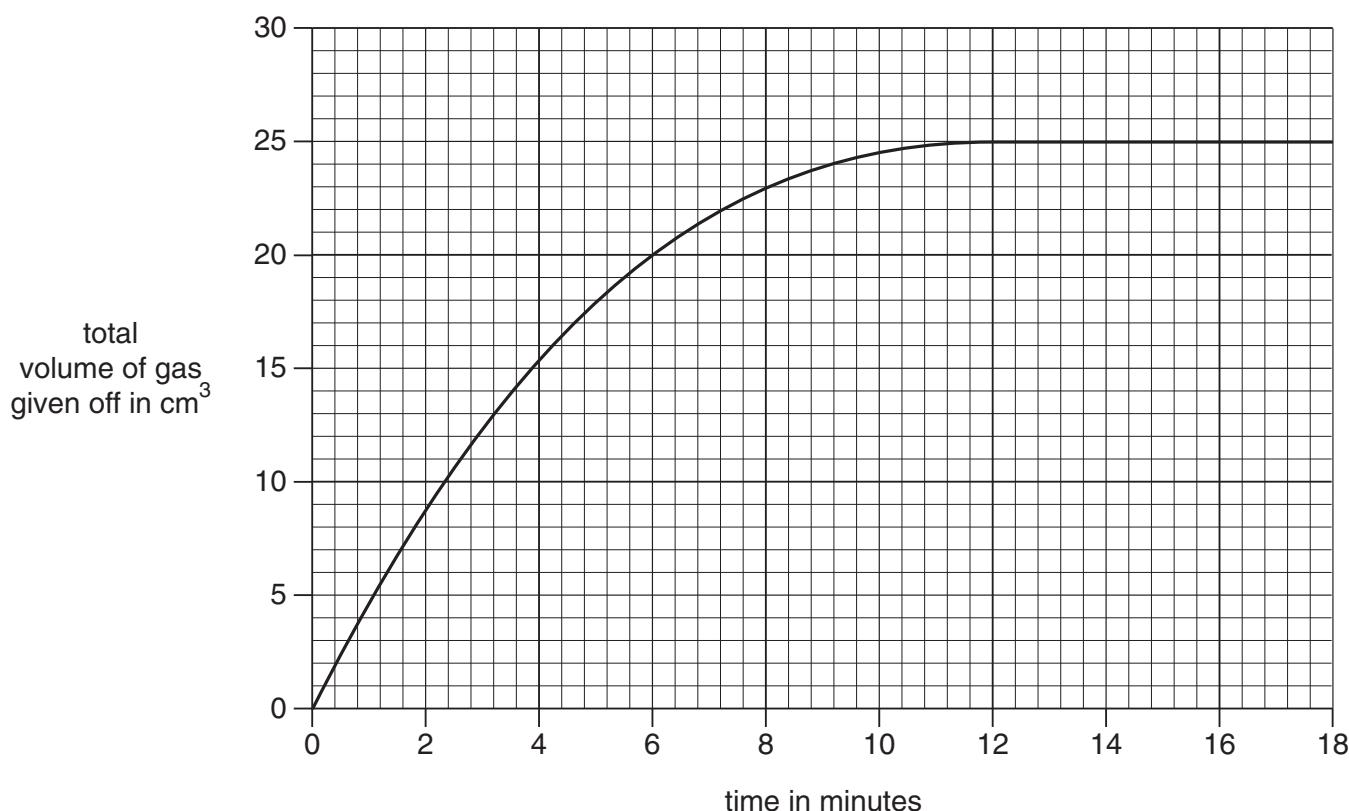
..... [1]

(b) The diagram shows the apparatus they use.



Look at the graph.

It shows their results when 1 g of zinc lumps reacts with 20 cm<sup>3</sup> of dilute hydrochloric acid.



15

(i) How long does it take to make  $20\text{ cm}^3$  of gas?

..... minutes

[1]

(ii) Some unreacted zinc is left at the end of the reaction.

Why does the reaction stop?

.....

[1]

(iii) Colin and Ann want the reaction to go faster.

They do not want to change the volume of acid or mass of zinc.

Write about ways they could make the reaction go faster.

.....  
.....  
.....

[2]

(c) Zinc, Zn, reacts with hydrochloric acid,  $\text{HCl}$ .

Zinc chloride,  $\text{ZnCl}_2$ , and hydrogen,  $\text{H}_2$ , are made.

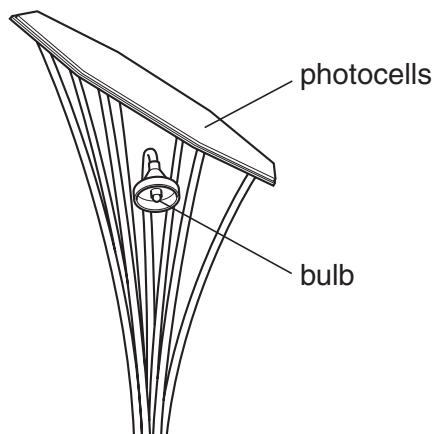
Write a balanced **symbol** equation for this reaction.

.....

[2]

[Total: 7]

8 The solar *sunFLOWER*™ lamp is used to light a footpath.



© OCR

(a) Finish the sentences by choosing the **best** words from this list.

**alternating**

**direct**

**electricity**

**heat**

**light**

Photocells on top of the lamp transfer ..... energy from the Sun into ..... This energy is stored in a battery to light a bulb when it gets dark.

Both the battery and the photocell produce ..... current. [3]

(b) Write down **one** advantage of using photocells to produce electricity.

.....

..... [1]

(c) The Sun is a renewable energy source.

Write down **another** renewable energy source.

.....

[Total: 5]

9 Near Earth Objects (NEOs) are asteroids or comets that may collide with Earth.



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(a) What equipment does an astronomer use to look at a comet?

..... [1]

(b) What **two** materials is a comet made from?

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

(c) A planet has a near circular orbit.

What **shape** is the orbit of a comet?

..... [1]

(d) About 65 million years ago, an asteroid hit the Earth.

This caused a lot of fires.

Write down two **other** things that could happen if a large asteroid hits the Earth.

1 .....

2 .....

(e) Describe evidence found on Earth to support past asteroid collisions.

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

**[Total: 7]**

10 Beta radiation is one type of nuclear radiation.

(a) What are the names of the other **two** types of nuclear radiation?

Put **(rings)** around the **two** correct answers.

alpha

gamma

infrared

microwave

ultraviolet

[2]

(b) Beta radiation is used to check the thickness of paper.

The thickness of the paper **increases**.

What happens to the amount of beta radiation passing through?

..... [1]

(c) Phil's teacher is showing the class an experiment using a source of beta radiation.

Write down **two** safety precautions the teacher uses.

1 .....

2 .....

[Total: 5]

11 Jo works out how much it costs **each week** to use different kitchen appliances.

She writes information into this table.

appliance	power rating in W	time used in hours	cost in pence
kettle	2800	1.50	50.4
toaster	1200	0.50	7.2
microwave	800	1.75	16.8
blender	333	0.50	2.0
fridge	70	60.00	50.4

(a) The power rating of the kettle is much higher than the power rating of the fridge.

Why do they both cost exactly the same amount each week?

..... [1]

(b) Jo uses her blender for half an hour each week for a year.

There are 52 weeks in one year.

How much does this cost? Use the information in the table.

.....  
.....

answer ..... pence [1]

(c) Write down the **name** of the unit of power. .... [1]

[Total: 3]

**END OF QUESTION PAPER**



RECOGNISING ACHIEVEMENT

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# The Periodic Table of the Elements

1	2	3	4	5	6	7	0
7 <b>Li</b> lithium 3	9 <b>Be</b> beryllium 4	11 <b>B</b> boron 5	12 <b>C</b> carbon 6	14 <b>N</b> nitrogen 7	16 <b>O</b> oxygen 8	19 <b>F</b> fluorine 9	20 <b>Ne</b> neon 10
23 <b>Na</b> sodium 11	24 <b>Mg</b> magnesium 12	27 <b>Al</b> aluminum 13	28 <b>Si</b> silicon 14	31 <b>P</b> phosphorus 15	32 <b>S</b> sulfur 16	35.5 <b>Cl</b> chlorine 17	40 <b>Ar</b> argon 18
39 <b>K</b> potassium 19	40 <b>Ca</b> calcium 20	45 <b>Sc</b> scandium 21	48 <b>Ti</b> titanium 22	51 <b>V</b> vanadium 23	52 <b>Cr</b> chromium 24	55 <b>Mn</b> manganese 25	56 <b>Fe</b> iron 26
85 <b>Rb</b> rubidium 37	88 <b>Sr</b> strontium 38	89 <b>Y</b> yttrium 39	91 <b>Nb</b> niobium 41	93 <b>Zr</b> zirconium 40	96 <b>Mo</b> molybdenum 42	[98] <b>Tc</b> technetium 43	101 <b>Ru</b> ruthenium 44
133 <b>Cs</b> caesium 55	137 <b>Ba</b> barium 56	139 <b>La*</b> lanthanum 57	178 <b>Hf</b> hafnium 72	181 <b>Ta</b> tantalum 73	184 <b>W</b> tungsten 74	186 <b>Re</b> rhenium 75	190 <b>Os</b> osmium 76
[226] <b>Ra</b> radium 87	[227] <b>Ac*</b> actinium 89	[261] <b>Rf</b> rutherfordium 104	[262] <b>Db</b> dubnium 105	[266] <b>Sg</b> seaborgium 106	[264] <b>Bh</b> bohrium 107	[277] <b>Hs</b> hassium 108	[271] <b>Mt</b> meitnerium 109
[272] <b>Ds</b> darmstadtium 110	[272] <b>Rg</b> roentgenium 111						

Elements with atomic numbers 112-116 have been reported but not fully authenticated

\* The lanthanoids (atomic numbers 58-71) and the actinoids (atomic numbers 90-103) have been omitted.

The relative atomic masses of copper and chlorine have not been rounded to the nearest whole number.