OCR
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

GATEWAY SCIENCE

B622/01

SCIENCE B

Unit 2 Modules B2 C2 P2
(Foundation Tier)

*C U P / T 6 7 3 9 1 *

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

B 6 2 2 0 1

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

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**	
TOTAL	**60**	

EQUATIONS

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

wave speed = frequency × wavelength

power = voltage × current

energy (kilowatt hours) = power (kW) × time (h)

BLANK PAGE

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.

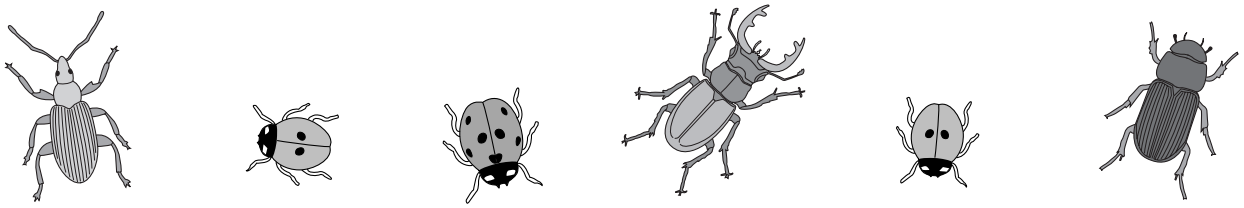
(a) He uses different pieces of equipment to collect different types of animals.

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.

carbon dioxide + ... $\xrightarrow[\text{(light)}]{\text{(chlorophyll)}}$ glucose + ...

[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**?

.....

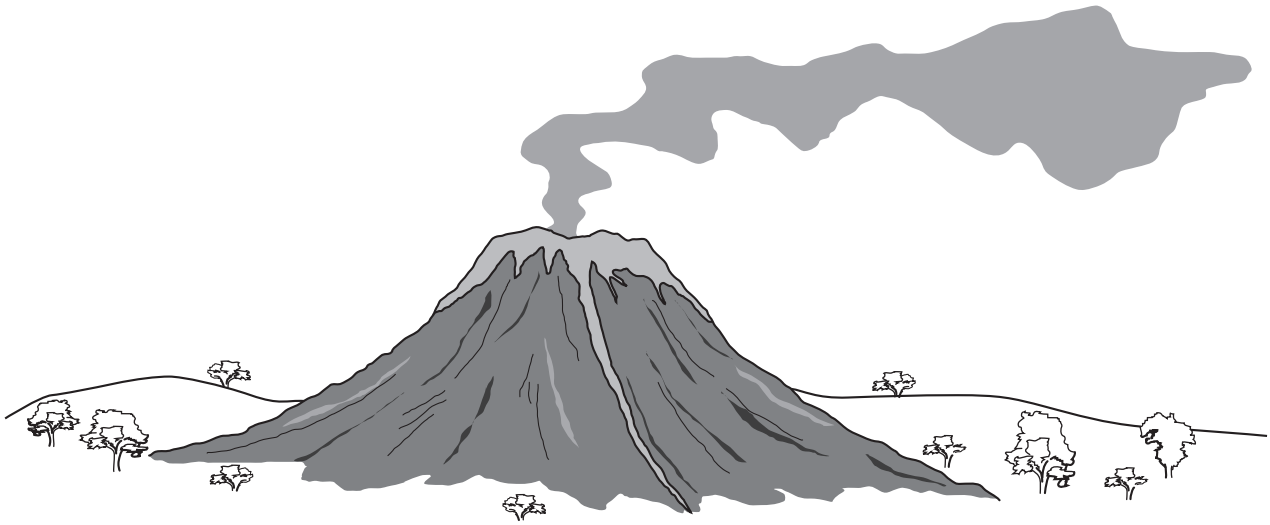
..... **[1]**

[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]

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.

alloy	metals present
amalgam	lead and tin
brass	mercury
solder	copper and zinc
steel	iron and carbon

[2]

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

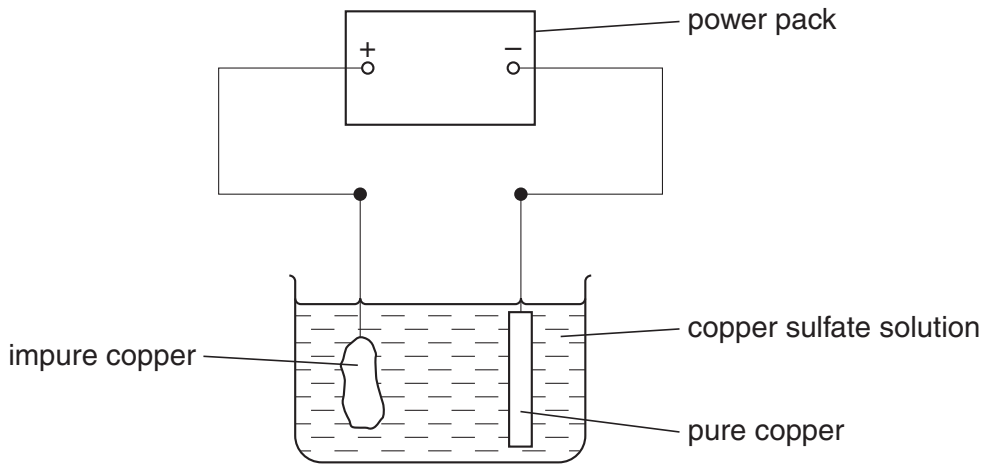
Brass has been done for you.

alloy	use
amalgam	filling teeth
brass	joining electrical components
solder	making car bodies
steel	making letter boxes and door handles

[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]

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE

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]

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

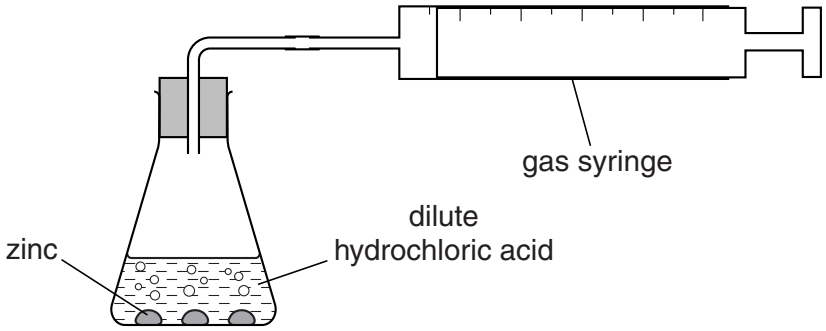
The word equation for the reaction is

zinc + hydrochloric acid → zinc chloride + hydrogen

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

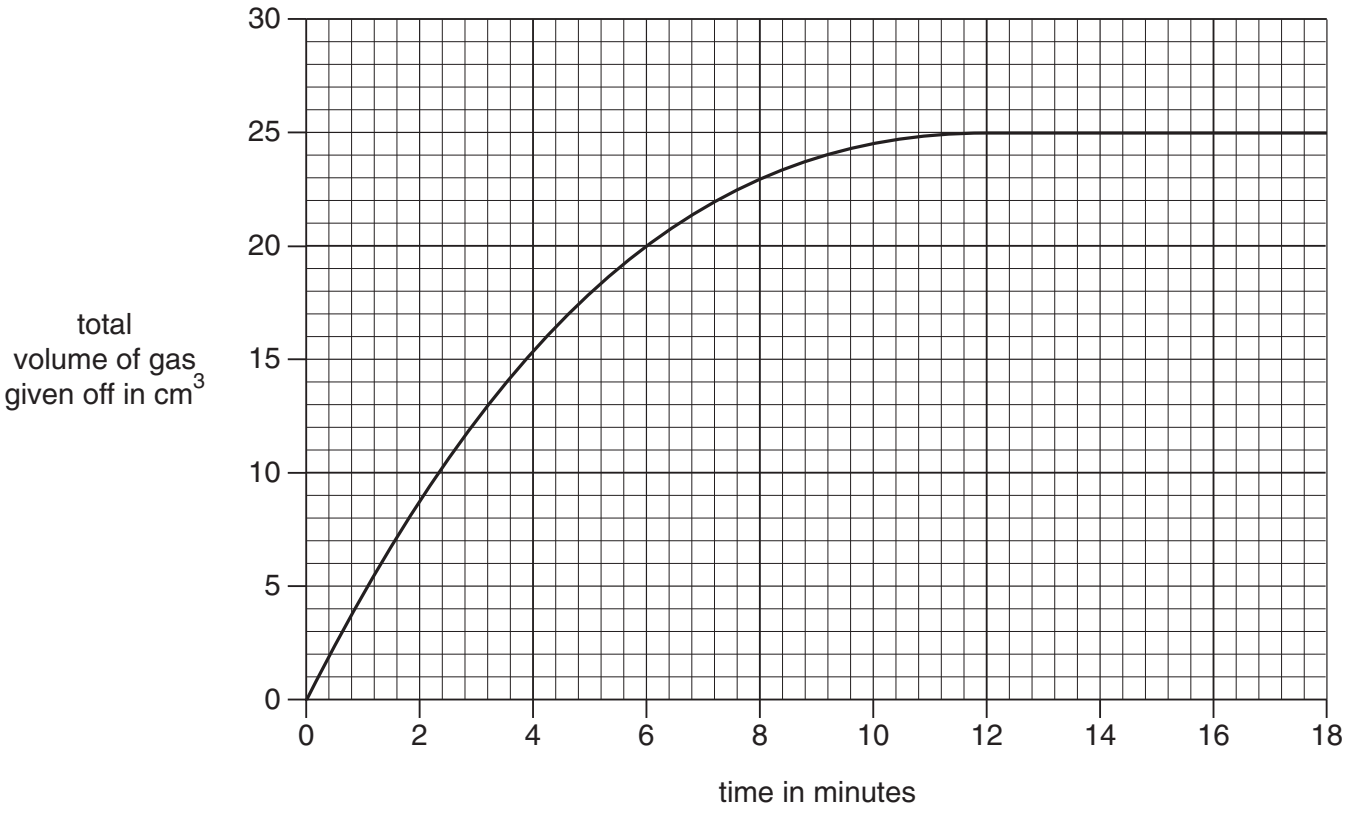
..... **[1]**

(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^3 of dilute hydrochloric acid.



(i) How long does it take to make 20 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, HC*l*.

Zinc chloride, $ZnCl_2$, and hydrogen, H_2, are made.

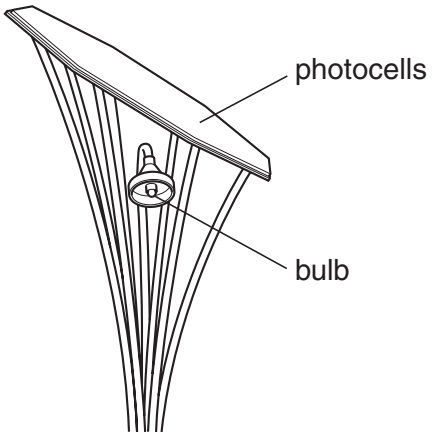
Write a balanced **symbol** equation for this reaction.

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

[Total: 7]

Section C – Module P2

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



(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.

..... **[1]**

[Total: 5]

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

(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 ..... **[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 ..... **[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

The Periodic Table of the Elements

1	2											3	4	5	6	7	0
							1 **H** hydrogen 1										4 **He** helium 2
7 **Li** lithium 3	9 **Be** beryllium 4											11 **B** boron 5	12 **C** carbon 6	14 **N** nitrogen 7	16 **O** oxygen 8	19 **F** fluorine 9	20 **Ne** neon 10
23 **Na** sodium 11	24 **Mg** magnesium 12											27 **Al** aluminium 13	28 **Si** silicon 14	31 **P** phosphorus 15	32 **S** sulfur 16	35.5 **Cl** chlorine 17	40 **Ar** argon 18
39 **K** potassium 19	40 **Ca** calcium 20	45 **Sc** scandium 21	48 **Ti** titanium 22	51 **V** vanadium 23	52 **Cr** chromium 24	55 **Mn** manganese 25	56 **Fe** iron 26	59 **Co** cobalt 27	59 **Ni** nickel 28	63.5 **Cu** copper 29	65 **Zn** zinc 30	70 **Ga** gallium 31	73 **Ge** germanium 32	75 **As** arsenic 33	79 **Se** selenium 34	80 **Br** bromine 35	84 **Kr** krypton 36
85 **Rb** rubidium 37	88 **Sr** strontium 38	89 **Y** yttrium 39	91 **Zr** zirconium 40	93 **Nb** niobium 41	96 **Mo** molybdenum 42	[98] **Tc** technetium 43	101 **Ru** ruthenium 44	103 **Rh** rhodium 45	106 **Pd** palladium 46	108 **Ag** silver 47	112 **Cd** cadmium 48	115 **In** indium 49	119 **Sn** tin 50	122 **Sb** antimony 51	128 **Te** tellurium 52	127 **I** iodine 53	131 **Xe** xenon 54
133 **Cs** caesium 55	137 **Ba** barium 56	139 **La*** lanthanum 57	178 **Hf** hafnium 72	181 **Ta** tantalum 73	184 **W** tungsten 74	186 **Re** rhenium 75	190 **Os** osmium 76	192 **Ir** iridium 77	195 **Pt** platinum 78	197 **Au** gold 79	201 **Hg** mercury 80	204 **Tl** thallium 81	207 **Pb** lead 82	209 **Bi** bismuth 83	[209] **Po** polonium 84	[210] **At** astatine 85	[222] **Rn** radon 86
[223] **Fr** francium 87	[226] **Ra** radium 88	[227] **Ac*** actinium 89	[261] **Rf** rutherfordium 104	[262] **Db** dubnium 105	[266] **Sg** seaborgium 106	[264] **Bh** bohrium 107	[277] **Hs** hassium 108	[268] **Mt** meitnerium 109	[271] **Ds** darmstadtium 110	[272] **Rg** roentgenium 111	Elements with atomic numbers 112-116 have been reported but not fully authenticated						

Key

relative atomic mass
atomic symbol
name
atomic (proton) number

**** 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.