

GENERAL CERTIFICATE OF SECONDARY EDUCATION
GATEWAY SCIENCE
SCIENCE B
Unit 2 Modules B2 C2 P2
FOUNDATION TIER
FRIDAY 19 JANUARY 2007

F B622/01

Calculators may be used.
Additional materials: Pencil
Ruler (cm/mm)

Afternoon
Time: 1 hour



Candidate
Name

Centre
Number

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

Candidate
Number

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- **WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.**

INFORMATION FOR CANDIDATES

- The number of marks for each question 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.

| FOR EXAMINER'S USE | | |
|--------------------|-----------|------|
| Section | Max. | Mark |
| A | 20 | |
| B | 20 | |
| C | 20 | |
| TOTAL | 60 | |

This document consists of **22** printed pages and **2** blank pages.

2

EQUATIONS

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

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

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

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

3
BLANK PAGE

Section A starts on page 4.

PLEASE DO NOT WRITE ON THIS PAGE

Answer **all** the questions.

Section A

- 1 Look at the picture. It shows some plants growing in a forest.



© iStockphoto.com/Mark Huntington

- (a) Look at the list.

food

minerals

shelter

water

Finish the sentence by choosing the best words from the list.

Plants compete for light, and [2]

- (b) Some plants in the forest get **more** light than other plants.

Light affects the plant growth.

How will more light affect the plant growth?

Put a ring around the correct answer.

grow faster

grow slower

stay the same

[1]

(c) The plants need light for photosynthesis.

Plants also need other things for photosynthesis.

Look at the list.

carbon dioxide

chlorophyll

food

glucose

oxygen

water

Write down **three** things that plants need for photosynthesis.

Choose your answers from the list.

1

2

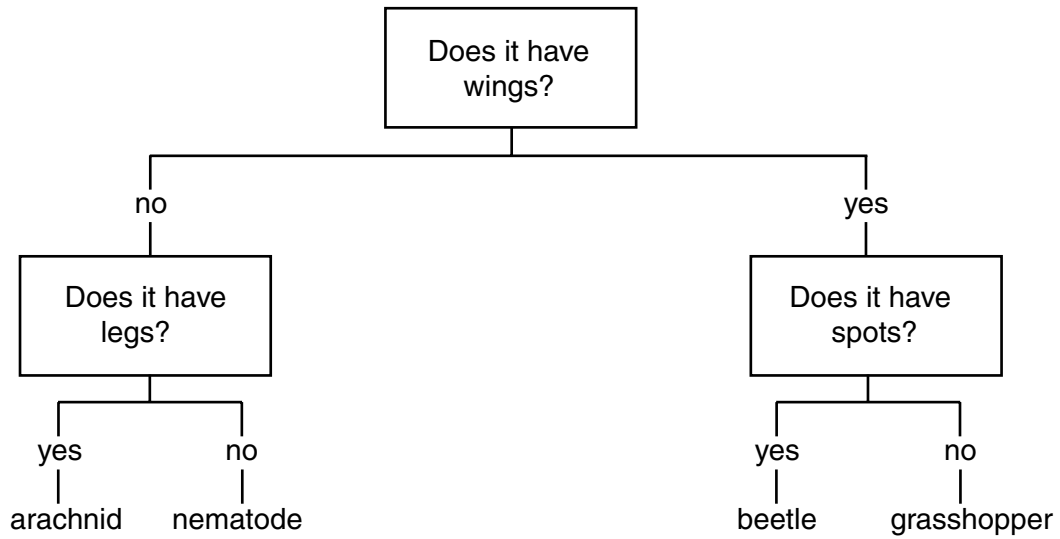
3

[3]

[Total: 6]

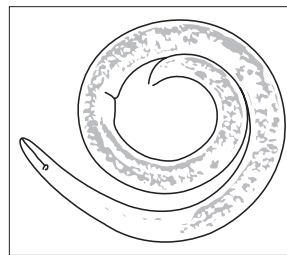
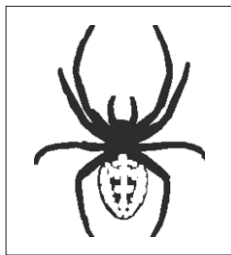
2 Sue collects some animals from the school grounds.

She writes a key to name four of the animals.



(a) The pictures show two animals Sue finds.

Use Sue's key to name the animals.



(i)

(ii)

[2]

(b) All the animals Sue finds belong to the same large group.

Put a tick (✓) in the box next to this group.

| | |
|---------------|--------------------------|
| amphibians | <input type="checkbox"/> |
| invertebrates | <input type="checkbox"/> |
| reptiles | <input type="checkbox"/> |
| vertebrates | <input type="checkbox"/> |

[1]

[Total: 3]

3 Household waste is rubbish collected from homes.

Look at the table.

It shows the amount of household waste collected in Smilestown over five years.

| year | amount of household waste in tonnes |
|------|-------------------------------------|
| 1997 | 22 317 |
| 1998 | 24 588 |
| 1999 | 26 337 |
| 2000 | 25 057 |
| 2001 | 25 109 |

(a) In which year was **most** household waste collected?

..... [1]

(b) A recycling scheme was started in Smilestown.

Look at the table. Suggest which year recycling started to have an effect.

Explain your answer.

year

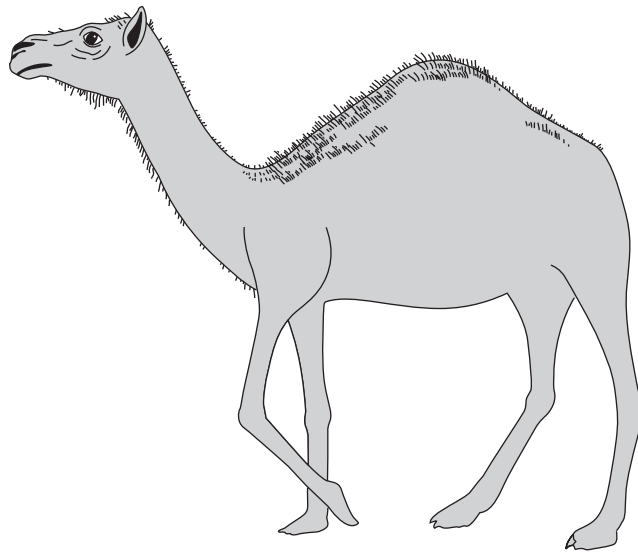
explanation

.....

..... [2]

[Total: 3]

4 The picture shows a camel.



Camels are adapted to live in the desert.

They can close their nostrils.

This stops the sand getting in.

Write about **other** ways they are adapted to live in the desert.

.....

.....

.....

.....

..... [3]

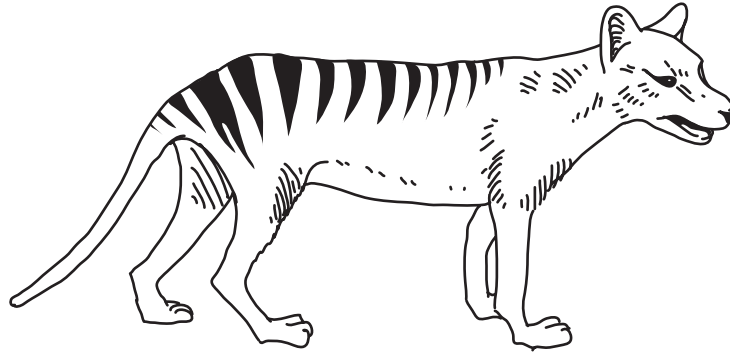
[Total: 3]

5 The Tasmanian tiger once lived on the island of Tasmania.

It was a large predator.

It became extinct in 1936.

This was a number of years after Europeans settled in Tasmania to farm sheep.



(a) Suggest **two** reasons why the Tasmanian tiger became extinct.

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

(b) There are many other species close to extinction.

(i) Look at the list of British animals.

Put a **ring** around the species that is close to extinction.

fox **wood pigeon** **red squirrel** **rabbit** **rat** [1]

(ii) What name do we use to describe a species that is close to extinction?

..... [1]

(iii) Describe **one** way in which species close to extinction can be saved.

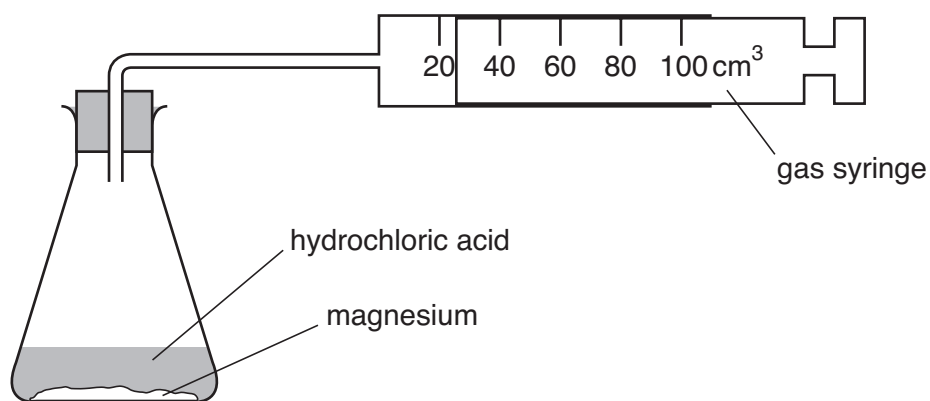
.....
.....
..... [1]

[Total: 5]

10
Section B

6 Louise and Ann investigate the reaction between magnesium and hydrochloric acid.

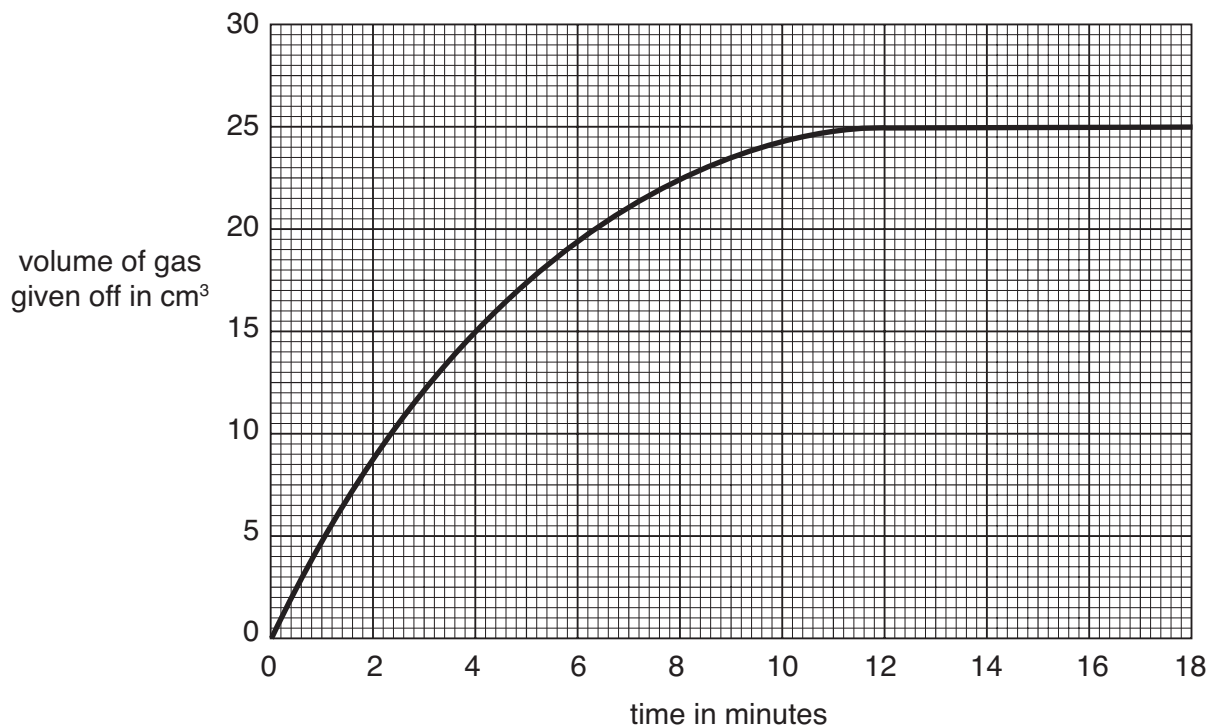
Look at the diagram. It shows the apparatus they use.



They use 0.2 g magnesium and 25 cm³ hydrochloric acid.

The temperature of the acid is 25 °C.

Look at the graph. It shows their results.



(a) What volume of gas is made in the first 4 minutes?

..... cm³ [1]

(b) The reaction eventually stops.

Explain why.

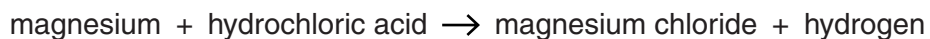
..... [1]

(c) Louise and Ann do the experiment again. They keep everything the same except the temperature.

This time they use a **higher** temperature.

On the grid, draw the graph they should get. [2]

(d) The word equation for the reaction is



Write down the name of **one** reactant.

..... [1]

[Total: 5]

7 This question is about paints.



(a) Paints are made of three types of substance.

Two of these types are **pigments** and a **binding medium**.

Write down the name of the third type of substance.

Choose from

amalgam

dye

solvent

answer [1]

(b) What is the job of the pigment?

..... [1]

(c) Paints are used on many different surfaces.

Write down **one** reason why paints are used.

..... [1]

(d) Paints are **colloids**.

Explain what is meant by a colloid.

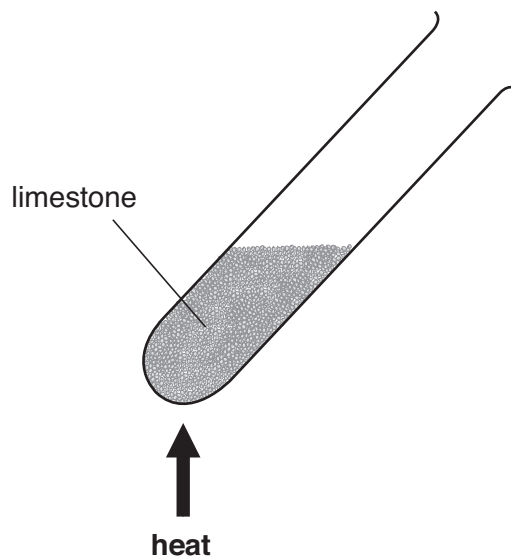
.....
.....
..... [2]

[Total: 5]

- 8 (a) Tom and Phil are heating some limestone.

The chemical name for limestone is calcium carbonate.

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



- (i) Calcium carbonate breaks down when it is heated.

It makes calcium oxide and carbon dioxide.

Complete the word equation to show what is made.

calcium carbonate \rightarrow + [2]

- (ii) What is the name of this process?

..... [1]

(b) Limestone is dug out of the ground. This is called **quarrying**.



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Write about **one** problem caused by quarrying.

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

(c) The formula of calcium carbonate is CaCO_3 .

How many **elements** are in calcium carbonate?

..... [1]

[Total: 5]

9 This question is about metals and alloys.

(a) Mixtures of metals are called alloys.

Write down the name of an alloy.

Choose from the list.

aluminium

brass

copper

iron

answer [1]

(b) Solder is an alloy.

Write down **one** use of solder.

..... [1]

(c) Which **two** metals make up solder?

..... and [1]

(d) Iron and aluminium are metals. They are both used to make car bodies.

Iron is more dense than aluminium.

Write about **another** way that iron and aluminium are different and **one** way that they are similar.

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

[Total: 5]

17
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Section C starts on page 18.

PLEASE DO NOT WRITE ON THIS PAGE

18
Section C

10 Power stations produce electricity by burning fuels.

Look at the picture.



© iStockphoto.com/Mark Richardson

(a) (i) Write down the name of one **fossil** fuel burned in power stations.

Choose from the list.

- coal manure wood

..... [1]

(ii) Write down the name of one **renewable** fuel burned in power stations.

Choose from the list.

- coal oil wood

..... [1]

(b) The generator in the power station produces a voltage (pd) of 20000V.

It generates a current of 60 A.

Calculate the power output of the generator.

.....
.....

answer W [2]

[Total: 4]

11 This question is about nuclear radiation.

(a) Complete this sentence.

The three types of nuclear radiation are , beta and gamma. [1]

(b) Mr Boyle shows his class an experiment.

He uses radioactive materials. Radioactive materials can be dangerous.

(i) The radioactive materials give out radiation.

Suggest how this radiation can harm people.

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

(ii) Mr Boyle handles the radioactive materials safely when he does the experiment.

Suggest **two** safety precautions he uses.

1st precaution
.....
2nd precaution
..... [2]

[Total: 4]

12 This question is about generating electricity.

(a) Look at the picture. It shows some photocells.



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Photocells use light energy from the Sun.

They transfer this energy into electrical energy.

(i) Suggest one **advantage** of using photocells.

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

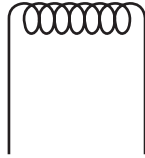
(ii) Suggest one **disadvantage** of using photocells.

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

(b) Paul wants to generate electricity using different equipment.

Look at the equipment he has.

coil of wire



ammeter



magnet



He puts this equipment together to generate electricity.

Explain how.

Your answer should include

- a labelled diagram of the equipment
- how he uses this equipment.

.....

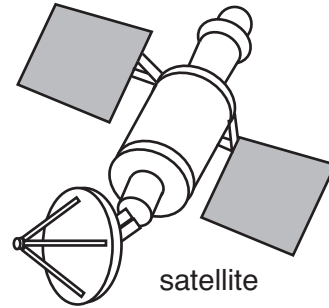
.....

.....

..... [3]

[Total: 5]

13 Satellites orbit the Earth.



not to scale

(a) The Moon is a **natural** satellite.

Suggest how the Moon was formed.

.....

.....

..... [2]

(b) Information from **artificial** satellites can help us predict the weather.

Suggest two **other** uses for artificial satellites.

1st use

2nd use [2]

[Total: 4]

14 Asteroids are made of rock.

They are mainly found in the asteroid belt.

(a) Where in the Solar System is the asteroid belt?

Put a tick (✓) in the correct box.

| place in solar system | tick |
|-----------------------------|------|
| between the Sun and Mercury | |
| between Earth and Mars | |
| between Mars and Jupiter | |
| between Neptune and Pluto | |

[1]

(b) When were the asteroids formed?

Put a tick (✓) in the correct box.

| asteroids were left over from | tick |
|-----------------------------------|------|
| the formation of the Solar System | |
| the formation of our Moon | |
| the formation of Venus | |
| comets colliding | |

[1]

(c) In the past, asteroids have hit the Earth.

Suggest what happened to the Earth when an asteroid hit.

.....

..... [1]

[Total: 3]

END OF QUESTION PAPER

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The Periodic Table of the Elements

| | | | | | | | | | |
|--|-------------------------------------|--------------------------------------|--|-------------------------------------|---------------------------------------|---------------------------------------|---|--|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 0 | | |
| 7 Li lithium 3 | 9 Be beryllium 4 | 11 Na sodium 11 | 12 C carbon 6 | 13 Al aluminium 13 | 14 N nitrogen 7 | 15 P phosphorus 15 | 16 O oxygen 8 | 17 F fluorine 9 | 18 Ne neon 10 |
| 19 K potassium 19 | 20 Ca calcium 20 | 23 V vanadium 23 | 24 Cr chromium 24 | 25 Mn manganese 25 | 26 Fe iron 26 | 27 Co cobalt 27 | 28 Ni nickel 28 | 29 Cu copper 29 | 30 Zn zinc 30 |
| 37 Rb rubidium 37 | 38 Sr strontium 38 | 40 Ca calcium 20 | 41 Nb niobium 41 | 42 Mo molybdenum 42 | 43 Tc technetium [98] | 44 Ru ruthenium 44 | 45 Rh rhodium 45 | 46 Pd palladium 46 | 47 Ag silver 47 |
| 55 Cs caesium 55 | 56 Ba barium 56 | 57 La* lanthanum 57 | 72 Hf hafnium 72 | 73 Ta tantalum 73 | 74 W tungsten 74 | 75 Re rhenium 75 | 76 Os osmium 76 | 77 Ir iridium 77 | 78 Pt platinum 78 |
| 87 Fr francium 87 | 88 Ra radium 88 | 89 Ac* actinium 89 | 104 Rf rutherfordium 104 | 105 Db dubnium 105 | 106 Sg seaborgium 106 | 107 Bh bohrium 107 | 108 Hs hassium 108 | 109 Mt meitnerium 109 | 110 Ds darmstadtium 110 |
| 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 |
| 223 Fr francium 87 | 226 Ra radium 88 | 227 Ac* actinium 89 | 261 Rf rutherfordium 104 | 262 Db dubnium 105 | 266 Sg seaborgium 106 | 268 Mt meitnerium 109 | 271 Ds darmstadtium 110 | 272 Rg roentgenium 111 | 201 Hg mercury 80 |
| 131 Xe xenon 54 | 127 I iodine 53 | 128 Te tellurium 52 | 119 Sn tin 50 | 122 Sb antimony 51 | 125 Te tellurium 52 | 128 Te tellurium 52 | 131 Xe xenon 54 | 135 At astatine 85 | 136 Rn radon 86 |
| 84 Kr krypton 36 | 80 Br bromine 35 | 79 Se selenium 34 | 75 As arsenic 33 | 73 Ge germanium 32 | 65 Zn zinc 30 | 63.5 Cu copper 29 | 59 Ni nickel 28 | 59 Co cobalt 27 | 56 Fe iron 26 |
| 40 Ar argon 18 | 35.5 Cl chlorine 17 | 32 S sulfur 16 | 31 P phosphorus 15 | 28 Si silicon 14 | 27 Al aluminium 13 | 27 Al aluminium 13 | 27 Al aluminium 13 | 27 Al aluminium 13 | 27 Al aluminium 13 |
| 4 He helium 2 | 20 Ne neon 10 | 16 O oxygen 8 | 14 N nitrogen 7 | 12 C carbon 6 | 11 B boron 5 | 11 B boron 5 | 11 B boron 5 | 11 B boron 5 | 11 B boron 5 |
| <p>Key</p> <p>relative atomic mass atomic symbol name atomic (proton) number</p> | | | | | | | | | |
| <p>Elements with atomic numbers 112-116 have been reported but not fully authenticated</p> | | | | | | | | | |

* 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