

GENERAL CERTIFICATE OF SECONDARY EDUCATION

GATEWAY SCIENCE

B624/01

ADDITIONAL SCIENCE B

Unit 2 Modules B4 C4 P4
(Foundation Tier)

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)

Wednesday 10 June 2009

Afternoon

Duration: 1 hour



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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MODIFIED LANGUAGE

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.

EQUATIONS

$$\text{speed} = \frac{\text{distance}}{\text{time taken}}$$

$$\text{acceleration} = \frac{\text{change in speed}}{\text{time taken}}$$

$$\text{force} = \text{mass} \times \text{acceleration}$$

$$\text{work done} = \text{force} \times \text{distance}$$

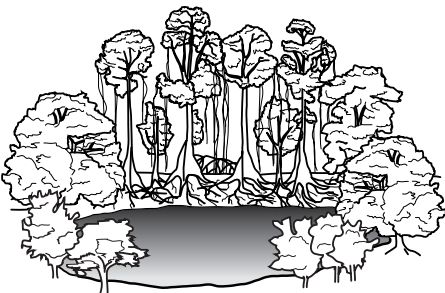
$$\text{power} = \frac{\text{work done}}{\text{time}}$$

$$\text{resistance} = \frac{\text{voltage}}{\text{current}}$$

Answer **all** the questions.

Section A – Module B4

1 Read this newspaper article carefully.



The blue hole

Scientists have just discovered a deep, blue hole in a forest in the Bahamas.

The hole is full of water and is about 35 metres deep.

The water is pure at the surface. It becomes more and more salty and contains less oxygen deeper in the hole.

At the bottom of the hole scientists have found the bodies of animals and plants that have not decayed. They are thousands of years old.

“The plants are so well preserved they still have green chloroplasts” said one scientist.

(a) (i) The bodies of animals and plants usually decay when they die.

This is done by decomposers such as **bacteria**.

Write down **one other** group of decomposer organisms.

..... [1]

(ii) The decomposers can **not** decay the dead animals and plants at the bottom of the hole.

Write down **one** reason why.

..... [1]

(b) The scientist says that the plants still have green chloroplasts.

(i) Which part of a plant usually contains most chloroplasts?

..... [1]

(ii) What process takes place inside green chloroplasts?

..... [1]

(iii) Where does the energy for this process come from?

..... [1]

[Total: 5]
Turn over

- 2 (a) Different parts of a plant do different jobs.

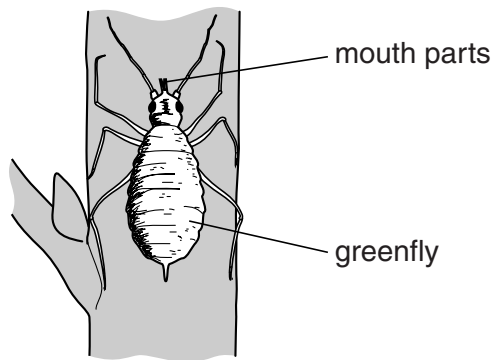
Draw lines to join each **part** of the plant with the **job** that it does.

Draw **three** lines.

part	job
flower	support and transport
stem	reproduction
root	absorbing minerals

[2]

- (b) The diagram shows a greenfly feeding from the stem of a tomato plant.



The greenfly pushes a hollow tube into one of the tissues in the plant stem.

It can then take sugar from this tissue.

Suggest which tissue the greenfly is most likely to pierce to get the sugar solution.

Put a **ring** around the answer in this list.

epidermis palisade phloem xylem

[1]

(c) Tomato plants are often grown in glasshouses.

Suggest **one** reason why tomatoes usually grow better in glasshouses.

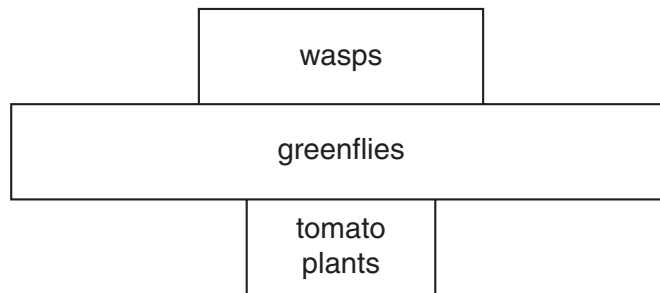
..... [1]

(d) The plants produce fewer tomatoes when greenflies feed on them.

A gardener releases some wasps into his glasshouse.

The wasps eat the greenflies.

(i) The following diagram gives information about the food chain in the glasshouse.



Write down the name of this type of diagram.

..... [1]

(ii) The greenflies are pests.

The wasps eat the greenflies.

Put a tick (✓) in the box next to the term which describes this.

- biological control
- chemical control
- intensive control
- pesticide control

[1]

[Total: 6]

3 Plants need minerals to grow.

They usually get these minerals from the soil.

Some soils however do **not** contain enough minerals.

(a) Farmers can add a type of substance to the soil to give plants more minerals.

Put a ring around the type of substance that they use.

fertiliser herbicide pesticide sugar

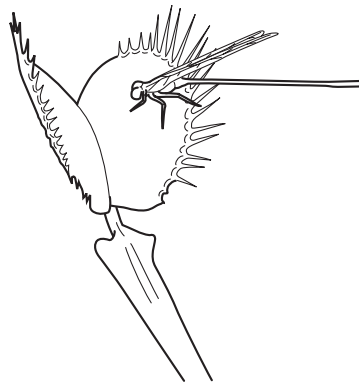
[1]

(b) Some plants can **not** get enough minerals from the soil.

Their leaves are adapted to trap insects.

They digest the insects to get the minerals they need.

One plant that does this is the venus fly trap.



The venus fly trap does not get enough nitrates from the soil.

Instead it gets nitrogen compounds from the insects.

(i) Write down **one other** mineral that plants need.

..... [1]

(ii) What do plants look like if they do not get enough nitrates?

..... [1]

(iii) Most plant leaves are **not** adapted to catch insects.

The leaves are adapted for photosynthesis by being broad and thin.

Explain how these adaptations help with photosynthesis.

Leaves are broad because

Leaves are thin because

[2]

[Total: 5]

4 Anil is growing some lettuce plants in his garden.

Normally they look like the plants in the first diagram.



Anil goes outside on a hot day to look at the lettuce plants.

They look different.



(a) The plants look different because they have lost water.

What term describes how plants look when they have lost water?

..... [1]

(b) Anil then waters the ground around his lettuce plants.

In twenty minutes the leaves of the lettuce plants have returned to normal.

Explain how watering the soil can have this effect on the leaves.

.....
.....
.....
..... [3]

[Total: 4]

Section B – Module C4

5 This question is about fertilisers.

(a) Look at the diagram. It shows the label on a bag of fertiliser.

It shows there are three elements in this fertiliser.

One of these elements is nitrogen.

Write down the **names** of the other **two** elements.

Use the Periodic Table on the back page to help you.

P is

K is

[2]



(b) Ammonium nitrate, NH_4NO_3 , is a fertiliser.

(i) Anna makes some ammonium nitrate crystals.

She uses ammonia solution and an acid.

Write down the **name** of the acid.

..... [1]

(ii) What is the relative formula mass (M_r) of ammonium nitrate, NH_4NO_3 ?

The relative atomic mass (A_r) of H is 1, of N is 14 and of O is 16.

.....

.....

relative formula mass is [1]

[Total: 4]

6 This question is about washing powders.

(a) Link each **ingredient** to the **job it does**.

Draw **three** straight lines.

ingredient	job it does
bleach	lifts dirt to clean clothes
brightener	makes clothes look 'whiter than white'
detergent	removes coloured stains
	softens the water

[3]

(b) Suggest a reason, other than cost, why it is good to wash clothes at **40 °C** rather than at **50 °C**.

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

(c) Another way of cleaning clothes is to use a dry cleaning solvent.

What is meant by **dry** cleaning?

..... [1]

[Total: 5]

7 This question is about water.

(a) Look at the picture.

It shows a river flowing over land.

A river is a water resource.



Write down **two** other water resources.

1

2 [2]

(b) River water may contain many substances before it is purified.

The water may contain **pesticides**.

The pesticides get into the river from the land.

Suggest how pesticides get into the river.

..... [1]

(c) Water may contain chloride ions.

Silver nitrate solution is used to test for chloride ions.

A coloured solid is formed.

What colour solid is made when silver nitrate solution is added to chloride ions?

Choose from the list.

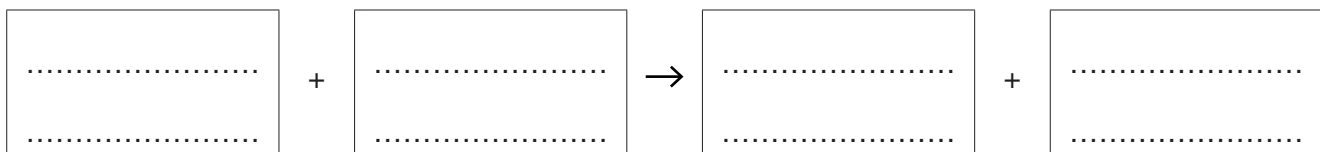
- black**
- cream**
- yellow**
- red**
- white**

answer [1]

(d) Sodium chloride reacts with silver nitrate.

Sodium nitrate and silver chloride are made.

Write a **word** equation for this reaction.



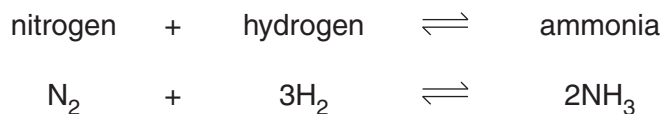
[1]

[Total: 5]

Turn over

8 Look at the equation.

It shows the reaction to make ammonia.



(a) (i) Write down the name of a **compound** in the equation.

..... [1]

(ii) Write down the **total** number of atoms in one molecule of ammonia, NH₃.

..... [1]

(iii) What does the symbol \rightleftharpoons mean?

..... [1]

(b) Ammonia is made by the Haber process.

The Haber process runs 24/7 and so does not stop.

What is the name of a process that runs 24/7?

Choose from the list.

batch

chromatography

continuous

pharmaceutical

answer [1]

(c) The cost of the energy used is one of the costs of making ammonia.

Write about other costs of **making** ammonia.

.....

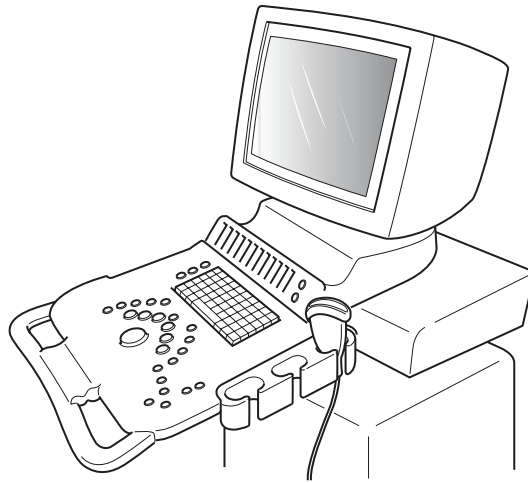
.....

..... [2]

[Total: 6]

Section C – Module P4

9 **Ultrasound** is used in hospitals.



(a) Ultrasound is a high frequency sound wave.

What **type** of wave is ultrasound?

..... [1]

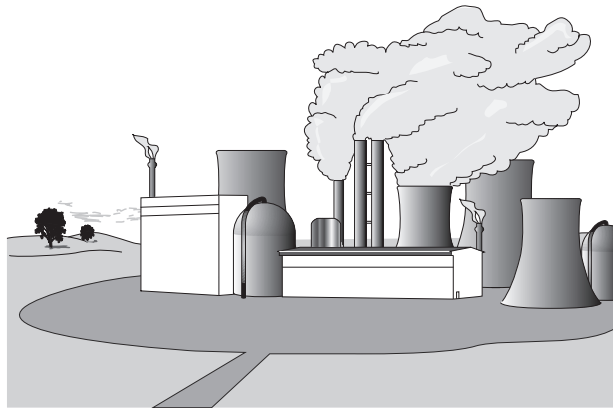
(b) Write down **two uses** of ultrasound in hospitals.

1

2 [2]

[Total: 3]

10 Nuclear power stations produce electricity.



(a) Write down the name of the **nuclear fuel** used in these power stations.

..... [1]

(b) The nuclear reaction in these power stations is called a **chain reaction**.

When a nuclear bomb explodes a chain reaction also takes place.

How is the reaction different in a nuclear bomb?

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

[Total: 2]

11 Electromagnetic radiation is used in hospitals.

(a) Paul works in a hospital. He X-rays patients.

What is Paul's job called?

..... [1]

(b) Charlotte uses gamma radiation on patients.

What is gamma radiation used for in hospitals?

..... [1]

(c) Nuclear radiation comes from the **centre** of the atom.

Write down the scientific **name** for the centre of the atom.

..... [1]

[Total: 3]

12 This question is about static electricity.

(a) Complete the sentences.

Choose your answers from the list.

conductors

direct

insulators

magnetic

metals

negative

positive

When two are rubbed together they become charged.

The two types of static charge are and [3]

(b) Static electricity can be dangerous when refuelling an aircraft.

Suggest why.

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

(c) Static electricity can also be useful.

It is used in hospitals.



A doctor can **restart** a patient's **heart**.

He puts the paddles on the patient's chest.

The paddles are charged.

Describe what happens next.

In your answer write about

- how the heart restarts
- the precautions taken.

.....

.....

.....

..... [2]

[Total: 6]

13 A hair dryer is an electrical appliance.

(a) The hair dryer has a fuse in the plug.

Why does it need a fuse?

..... [1]

(b) The plug has two wires.

(i) What is the colour of the insulation on the **live** wire?

Put a **ring** around the correct answer.

black

brown

green

green and yellow

yellow

[1]

(ii) What is the name of the wire with **blue** insulation?

..... [1]

(c) The hair dryer is **double insulated**.



It is not earthed.

Explain why the hair dryer is not earthed.

.....

..... [1]

(d) The hair dryer is connected to a 230V mains supply.

The current through the hair dryer is 5 A.

Calculate the **resistance** of the hair dryer.

The equations on page 2 may help you.

.....
.....

answer ohms [2]

[Total: 6]

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 O oxygen 8	16 F fluorine 9	17 Ne neon 10
19 K potassium 19	20 Ca calcium 20	23 Sc scandium 21	24 Ti titanium 22	25 V vanadium 23	26 Cr chromium 24	27 Mn manganese 25	28 Fe iron 26	29 Co cobalt 27
37 Rb rubidium 37	38 Sr strontium 38	39 Y yttrium 39	40 Zr zirconium 40	41 Nb niobium 41	42 Mo molybdenum 42	43 Tc technetium [98]	44 Ru ruthenium 44	45 Rh rhodium 45
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
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
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
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
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 Bi bismuth 83	131 Po polonium 84	135 At astatine 85
84 Kr krypton 36	80 Br bromine 35	79 Se selenium 34	73 Ge germanium 32	75 As arsenic 33	78 Sr strontium 38	80 Zn zinc 30	84 Kr krypton 36	86 Rn radon 86
<p>Key</p> <p>relative atomic mass atomic symbol name atomic (proton) number</p>								<p>1 H hydrogen 1</p>
<p>Elements with atomic numbers 112-116 have been reported but not fully authenticated</p>								<p>201 Hg mercury 80</p> <p>207 Pb lead 82</p> <p>209 Bi bismuth 83</p> <p>[209] Po polonium 84</p> <p>[210] At astatine 85</p> <p>[222] Rn radon 86</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.