

<b>Candidate Forename</b>						<b>Candidate Surname</b>				
<b>Centre Number</b>						<b>Candidate Number</b>				

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**B624/01**

**GATEWAY SCIENCE  
ADDITIONAL SCIENCE B**

**UNIT 2 Modules B4 C4 P4  
(Foundation Tier)**

**WEDNESDAY 10 JUNE 2009: Afternoon  
DURATION: 1 hour**

**SUITABLE FOR VISUALLY IMPAIRED CANDIDATES**

**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)**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

- **Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.**
- **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.**
- **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 three.**
- **The Periodic Table is printed on the back page.**
- **The total number of marks for this paper is 60.**

## 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.**

**At the surface the water is pure. Deeper into the hole, it becomes more and more salty and contains less oxygen.**

**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) When animals and plants die, their bodies usually decay.**

**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?

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[1]

(ii) What process takes place inside green chloroplasts?

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[1]

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

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[1]

[Total: 5]

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.

<u>PART</u>	<u>JOB</u>
flower	support and transport
stem	reproduction
root	absorbing minerals

[2]

(b) A greenfly feeds 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.

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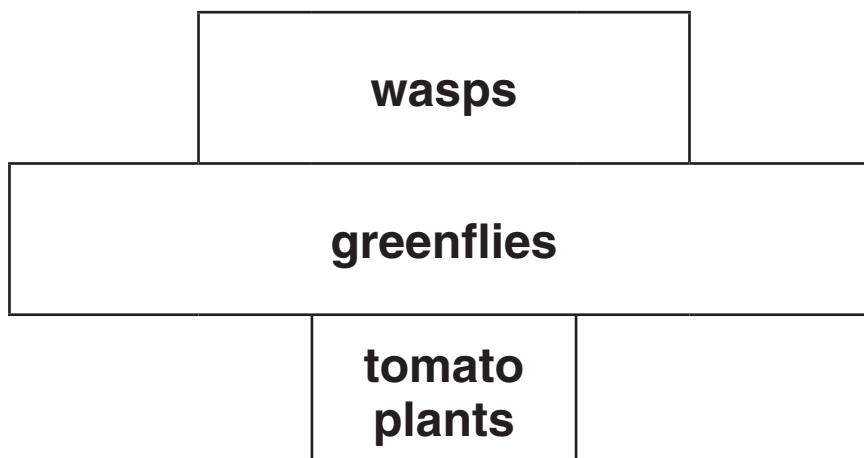
[1]

(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?

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[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

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Leaves are thin because

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[2]

[Total: 5]

**4 Anil is growing some lettuce plants in his garden.**

**Normally they grow with the leaves held upright.**

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

**He sees that the plants look different. The leaves on the plants have drooped downwards.**

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

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

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**[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.**

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**[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,  $\text{NH}_4\text{NO}_3$ , 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,  $\text{NH}_4\text{NO}_3$ ?

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

lifts dirt to clean clothes

bleach

makes clothes look 'whiter than white'

brightener

removes coloured stains

detergent

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.

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[1]

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

What is meant by DRY cleaning?

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[1]

[Total: 5]

7 This question is about water.

(a) 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**

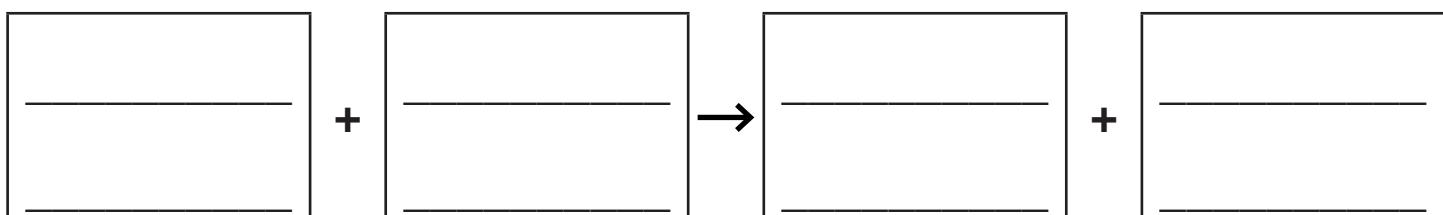
**answer \_\_\_\_\_**

**[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]**

## 8 Look at the equation.

It shows the reaction to make ammonia.

nitrogen + hydrogen  $\rightleftharpoons$  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,  $\text{NH}_3$ .

\_\_\_\_\_ [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) One of the costs of making ammonia is the cost of the energy used.**

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

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**[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.

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[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?

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[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?**

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**[1]**

**(b) Charlotte uses gamma radiation on patients.**

**What is gamma radiation used for in hospitals?**

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**[1]**

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

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

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**[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.

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[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]

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(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

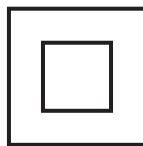
[1]

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

[1]

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(c) The hair dryer is DOUBLE INSULATED.



It is not earthed.

Explain why the hair dryer is not earthed.

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[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 3 may help you.

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answer \_\_\_\_\_ ohms

[2]

[Total: 6]

**END OF QUESTION PAPER**



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# The Periodic Table of the Elements

1	2	Key									
7	9	relative atomic mass atomic symbol name atomic (proton) number									
Li lithium 3	Be beryllium 4	45 Sc scandium 21									
Na sodium 11	Mg magnesium 12	48 Ti titanium 22									
K potassium 19	Ca calcium 20	40	51	52	55	56	59	63.5	70	73	84
Rb rubidium 37	Sr strontium 38	45	48	51	Cr chromium 24	Fe iron 26	Ni nickel 28	Zn zinc 30	Ga gallium 31	Ge germanium 32	Kr krypton 36
Cs cesium 55	Fr francium 87	40	89	91	Nb niobium 41	93	96	[98]	Ru ruthenium 44	101	103
[226]	[227]	40	89	91	Zr zirconium 40	41	Mo molybdenum 42	Tc technetium 43	Rh rhodium 45	Pd palladium 46	Ag silver 47
Ra radium 88	Ac* actinium 89	45	Y yttrium 39	178	Ta tantalum 73	181	184	190	192	195	119
133	137	40	La* lanthanum 57	Hf hafnium 72	Ta tantalum 73	74	W tungsten 74	Os osmium 76	Ir iridium 77	Pt platinum 78	Sn tin 50
[223]	[226]	40	[227]	[261]	[262]	[266]	[264]	[277]	[268]	[271]	[272]
Fr francium 87	Ra radium 88	40	Ac* actinium 89	Rf rutherfordium 104	Db dubnium 105	Sg seaborgium 106	Bh bohrium 107	Hs hassium 108	Mt meitnerium 109	Ds darmstadtium 110	Rg 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.