

Candidate Forename						Candidate Surname					
Centre Number						Candidate Number					

**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?

_____ [1]

- (ii) What process takes place inside green chloroplasts?

_____ [1]

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

_____ [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.

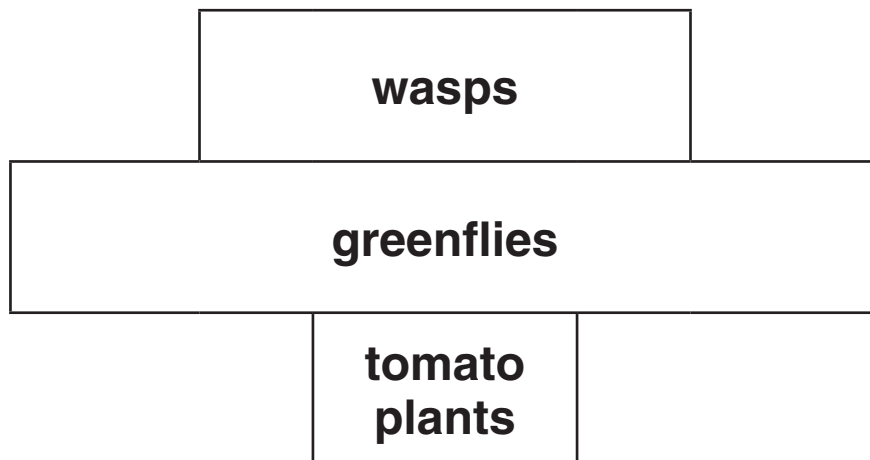
_____ [1]

(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 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?

_____ [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

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.

_____ [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) 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

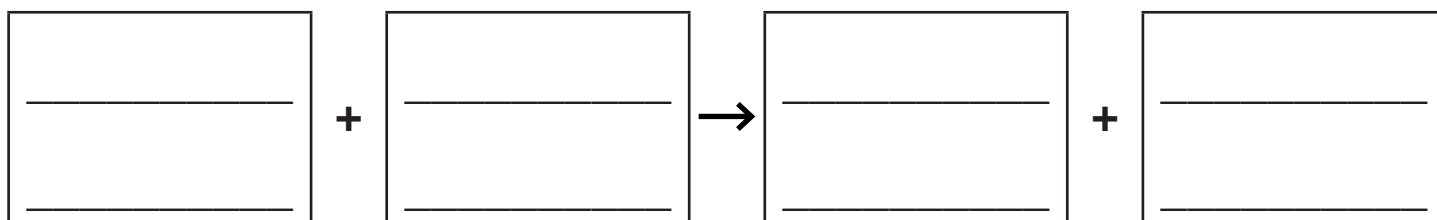
answer _____

[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, 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.

_____ [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

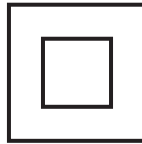
YELLOW

[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 3 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	Key relative atomic mass atomic symbol name atomic (proton) number					4 He helium 2
23 Na sodium 11	24 Mg magnesium 12	11 B boron 5	12 C carbon 6	14 N nitrogen 7	16 O oxygen 8	19 F fluorine 9	20 Ne neon 10
39 K potassium 19	40 Ca calcium 20	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
85 Rb rubidium 37	88 Sr strontium 38	65 Zn zinc 30	73 Ge germanium 32	75 As arsenic 33	79 Se selenium 34	80 Br bromine 35	84 Kr krypton 36
133 Cs caesium 55	137 Ba barium 56	112 Cd cadmium 48	119 Sn tin 50	122 Sb antimony 51	128 Te tellurium 52	127 I iodine 53	131 Xe xenon 54
[223] Fr francium 87	[226] Ra radium 88	201 Hg mercury 80	204 Tl thallium 81	207 Pb lead 82	[209] Po polonium 84	[210] At astatine 85	[222] Rn radon 86
Elements with atomic numbers 112-116 have been reported but not fully authenticated							
[272] Rg roentgenium 111							
[271] Ds darmstadtium 110							
[268] Mt meitnerium 109							
[277] Hs hassium 108							
[264] Bh bohrium 107							
[266] Sg seaborgium 106							
[262] Db dubnium 105							
[261] Rf rutherfordium 104							
[227] Ac* actinium 89							
[227] 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							
108 Ag silver 47							
106 Pd palladium 46							
103 Rh rhodium 45							
101 Ru ruthenium 44							
[98] Tc technetium 43							
56 Fe iron 26							
59 Co cobalt 27							
59 Ni nickel 28							
63.5 Cu copper 29							
70 Ga gallium 31							
73 Ge germanium 32							
75 As arsenic 33							
79 Se selenium 34							
80 Br bromine 35							
112 Cd cadmium 48							
119 Sn tin 50							
122 Sb antimony 51							
128 Te tellurium 52							
127 I iodine 53							
131 Xe xenon 54							
[222] Rn radon 86							

* 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.