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

DC (CW/SW) OV90660 10402/1

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.

PART	JOB
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 <u>ONE</u> reason why tomatoes usually grow better in glasshouses.

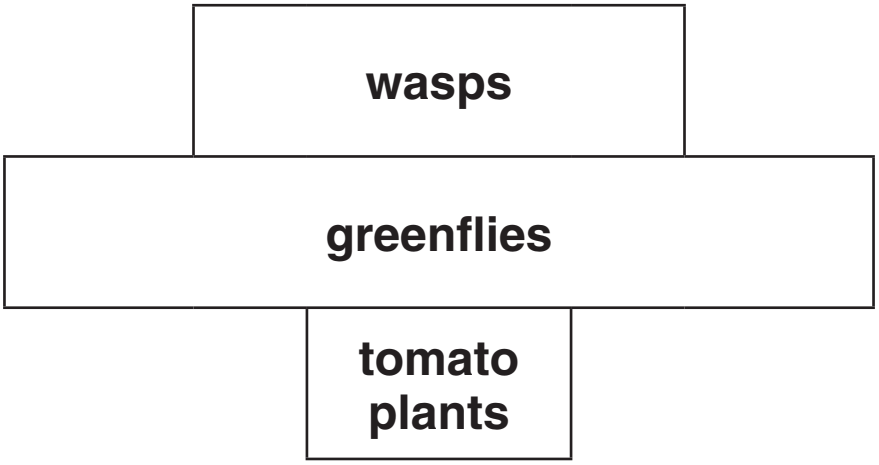
_____ **[1]**

(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 <u>NAMES</u> of the other <u>TWO</u> elements.

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

<u>P</u> is _____

<u>K</u> 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 <u>NAME</u> 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
	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.

_____

_____ **[1]**

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

What is meant by <u>DRY</u> 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.

_____ + _____ → _____ + _____

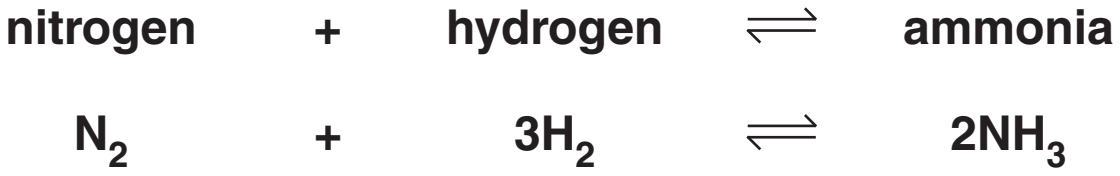
_____ _____ _____ _____

[1]

[Total: 5]

8 Look at the equation.

It shows the reaction to make ammonia.



(a) (i) Write down the name of a <u>COMPOUND</u> in the equation.

_____ **[1]**

(ii) Write down the <u>TOTAL</u> number of atoms in one molecule of ammonia, NH_3.

_____ **[1]**

(iii) What does the symbol ⇌ 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 <u>NUCLEAR FUEL</u> used in these power stations.

_____ **[1]**

(b) The nuclear reaction in these power stations is called a <u>CHAIN REACTION</u>.

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 <u>RESTART</u> a patient's <u>HEART</u>.

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

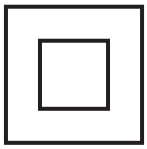
YELLOW

[1]

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

_____ **[1]**

(c) The hair dryer is <u>DOUBLE INSULATED</u>.



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 <u>RESISTANCE</u> of the hair dryer.

The equations on page 3 may help you.

_____

_____

answer _____ ohms **[2]**

[Total: 6]

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.