OCR
RECOGNISING ACHIEVEMENT

F

GENERAL CERTIFICATE OF SECONDARY EDUCATION

GATEWAY SCIENCE

B621/01

SCIENCE B

Unit 1 Modules B1 C1 P1
(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)

Monday 12 January 2009
Morning

Duration: 1 hour

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

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 **24** pages. Any blank pages are indicated.

FOR EXAMINER'S USE		
Section	**Max**	**Mark**
A	**20**	
B	**20**	
C	**20**	
TOTAL	**60**	

EQUATIONS

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

wave speed = frequency × wavelength

power = voltage × current

energy (kilowatt hours) = power (kW) × time (h)

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Question 1 begins on page 4.

PLEASE DO NOT WRITE ON THIS PAGE

Answer **all** the questions.

Section A – Module B1

1 Mark is on holiday in Africa.

He is worried about getting too hot.

(a) Write down Mark's normal body temperature.

..... °C **[1]**

(b) Mark's body temperature is controlled in many ways.

Some of the ways are listed.

exercise

more blood near skin surface

respiration

shivering

sweating

Write **all** the ways from the list in the correct column in the table.

One has been done for you.

ways Mark gains heat	ways Mark loses heat
	more blood near skin surface

[2]

(c) Before his holiday Mark was immunised to protect him from typhoid.

Typhoid is a disease caused by bacteria.

(i) Put a tick (✓) in the box to show **another** disease caused by bacteria.

athlete's foot	☐
flu	☐
cholera	☐
dysentery	☐

[1]

(ii) White blood cells help protect the body from bacteria.

Write down **two** ways they protect the body.

1 .....

.....

2 .....

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

[Total: 6]

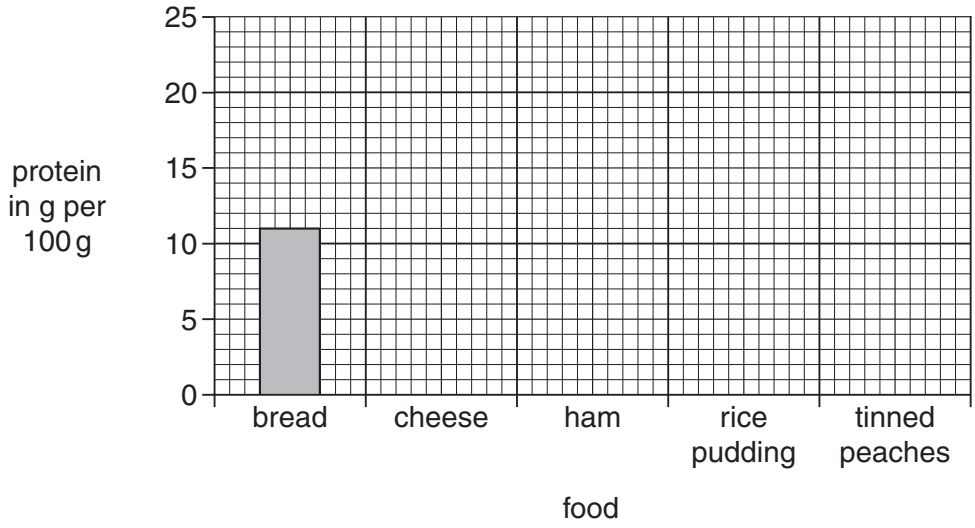
2 Deb is on a high protein diet.

The table shows the amount of protein in some foods.

food	protein in g per 100 g
bread	11.0
cheese	15.0
ham	22.0
rice pudding	3.0
tinned peaches	0.5

(a) Use the information to finish the bar chart.

The first one has been done for you.



[2]

(b) Deb has a mass of 80 kg.

(i) Calculate her recommended daily average protein intake (RDA) in grams.

Use the formula

$$\text{RDA in g} = 0.75 \times \text{body mass in kg}$$

You are advised to show your working.

RDA of protein = ... g **[1]**

(ii) Proteins are made from smaller molecules.

Write down the name of these smaller molecules.

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

(c) Deb is overweight. She decides to exercise to help her lose weight.

Finish the following sentences about Deb's exercise.

Use words from this list.

carbon dioxide

nitrogen

oxygen

protein

vitamins

When Deb exercises her breathing rate gets faster.

This means her muscles can receive ..... more quickly.

The muscles also need to remove more ..... . **[2]**

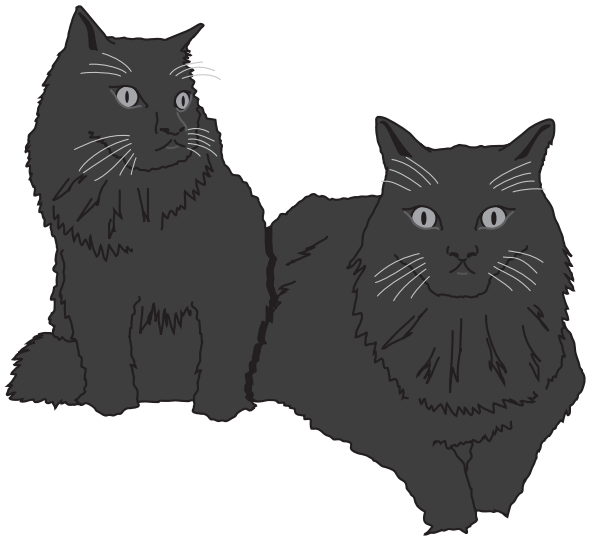
[Total: 6]

3 This question is about genes and chromosomes.

(a) Write down the name of the chemical genes are made from.

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

(b) Look at the picture of cats.



The cats were produced by sexual reproduction. They both have the same parents.

(i) A cat's body cell has 38 chromosomes.

How many chromosomes are in a **sperm** cell of a cat?

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

(ii) The cats in the picture have black fur. Their mother has white fur and their father has black fur.

Use ideas about genes to explain why the cats in the picture have black fur.

.....

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

(iii) The cats in the picture are different sizes.

Suggest **one** reason for their different sizes.

.....

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

[Total: 5]

4 Brad is a helicopter pilot.

He knows that he should **not** drink alcohol before he flies.

(a) Describe **two** short term effects of alcohol on the nervous system.

1 .....

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

(b) Long term abuse of alcohol damages the liver cells.

Write down the name given to this damage.

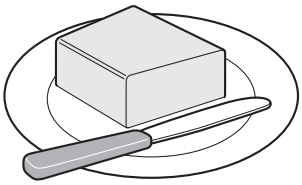
..... **[1]**

[Total: 3]

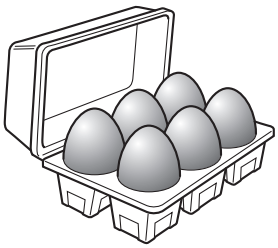
Section B – Module C1

5 This question is about foods.

(a) Look at the list of foods.

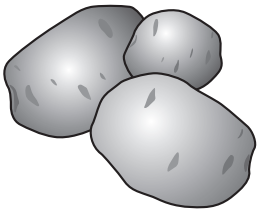


butter

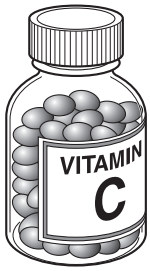


eggs

margarine



potatoes



vitamin C

(i) Which food contains a lot of **protein**?

Choose from the list.

answer ..... **[1]**

(ii) Which food contains a lot of **carbohydrate**?

Choose from the list.

answer ..... **[1]**

(b) Some foods, like apples, can be eaten raw.

Other foods, like chicken, should be cooked before they are eaten.

Write down **one other** food that should be cooked before it can be eaten.

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

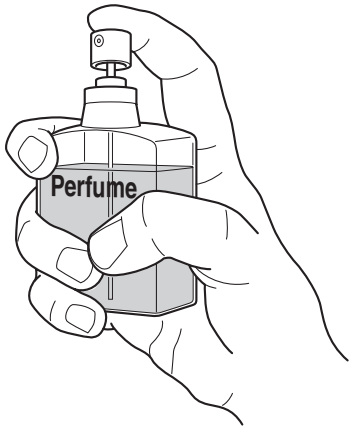
(c) Cooking chicken is a **chemical** change.

Explain why.

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

[Total: 4]

6 This question is about perfumes.



(a) One property of perfumes is that they evaporate easily.

This means that perfumes change from a liquid to a gas easily.

Why do perfumes need to evaporate easily?

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

(b) Write about **other** properties that perfumes have.

.....

.....

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

(c) Perfumes must be tested before they can be used by humans.

Explain why perfumes must be tested.

.....

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

[Total: 4]

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7 This question is about polymers.

A polymer called PET has these properties.

- it has a low density
- it has a low melting point
- it won't shatter when it is dropped
- it resists attack by water and acids
- it is flexible

(a) Which use is PET **most** suited to?

Choose from the list.

a cup for hot drinks

making a CD

fizzy pop bottles

a paperweight

answer .....

Write down a reason for your answer.

.....

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

(b) Most polymers are **non-biodegradable**.

What is meant by non-biodegradable?

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

(c) Write about how you can get rid of waste polymers.

.....

.....

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

[Total: 5]

8 Energy is transferred when chemical reactions happen.

Energy can be transferred as

electricity

heat

light

sound

(a) Complete the sentences. Use words from the list.

(i) When coal burns, **most** energy is transferred as ..... **[1]**

(ii) A starting pistol is used to start a race.

The **useful** energy is transferred as ..... **[1]**

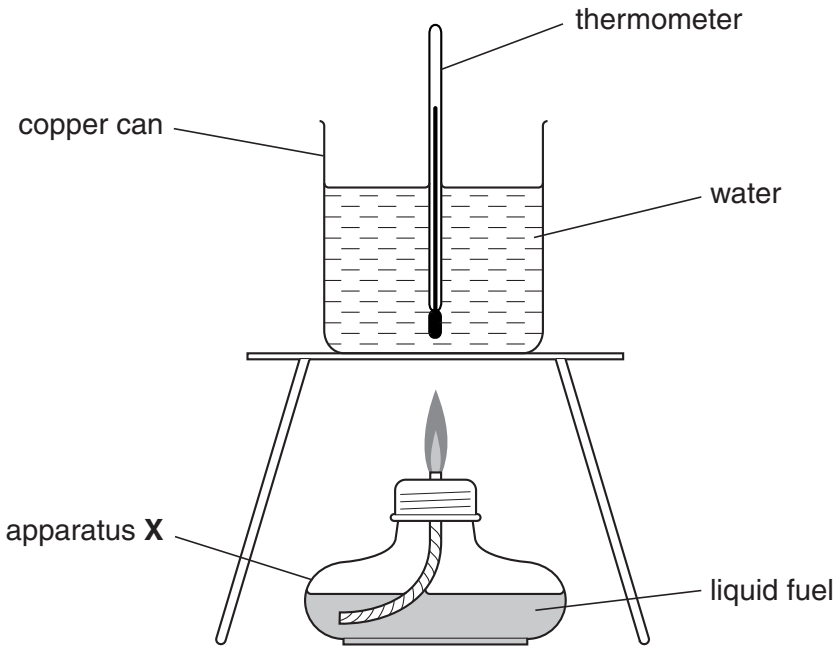
(b) Energy is given out during the combustion (burning) of fuels.

What is the name of the **type** of reaction which gives out heat?

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

(c) Look at the diagram.

It shows the apparatus used to measure the energy given out by a fuel.

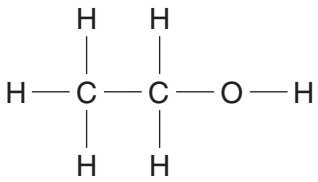


What is the name of apparatus **X**?

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

(d) Ethanol is a fuel used in apparatus **X**.

The displayed formula of ethanol is



Complete the table to show the number of each type of atom in ethanol.

Oxygen has been done for you.

atom	number
C	.....
H	.....
O	1

[2]

(e) A gas from the air is used up when fuels burn.

Write down the name of this gas.

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

[Total: 7]

Section C – Module P1

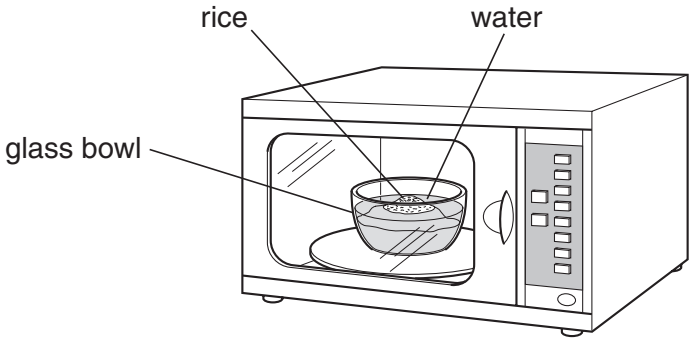
9 This question is about microwaves.

(a) Abbie uses microwaves to cook some rice.

She puts the rice into a **glass** bowl.

She adds cold **water** to the rice.

She puts the bowl in the microwave oven.



The oven has **metal** walls on the inside.

(i) Why are the oven walls made of **metal**?

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

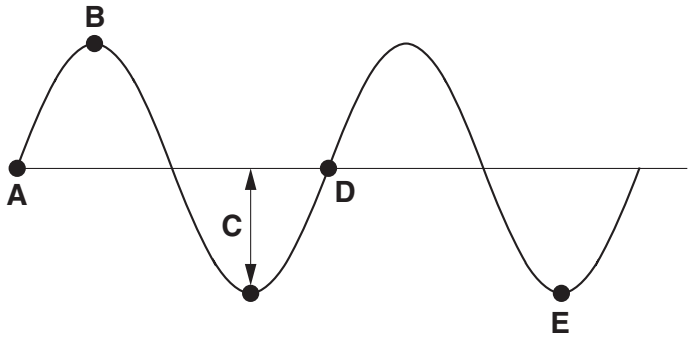
(ii) Why does she use a **glass** bowl?

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

(iii) Why is **water** important in microwave cooking?

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

(b) Look at the diagram of a microwave. It is a transverse wave.



Complete the sentences. The first one has been done for you.

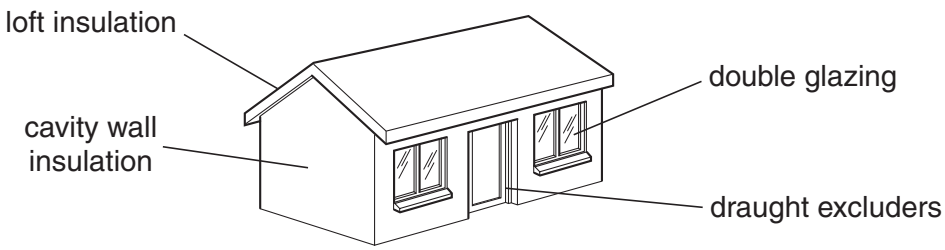
The **crest** is shown by letter **B**.

The **amplitude** is shown by letter ..... .

The distance between letters **A** and **D** is called the ..... . **[2]**

[Total: 5]

10 (a) Emma's house costs a lot to heat. She decides to buy some insulation.



She chooses loft insulation and double glazing.

Look at the table.

insulation	cost to fit	money saved each year in fuel bills	payback time
loft insulation	£200		2 years
double glazing	£5000	£250	

(i) She fits **loft insulation**. This saves her money on her fuel bills.

Calculate how much money this saves her in one year.

.....

answer £..... **[1]**

(ii) Calculate the **payback time** for double glazing.

.....

answer ..... years **[1]**

(iii) Loft insulation and double glazing contain **air**.

Why is air important in double glazing and loft insulation?

.....

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

(iv) Suggest one **other** type of insulation Emma could use in her house.

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

(b) Emma takes some measurements in her house.

Complete the missing units in the table.

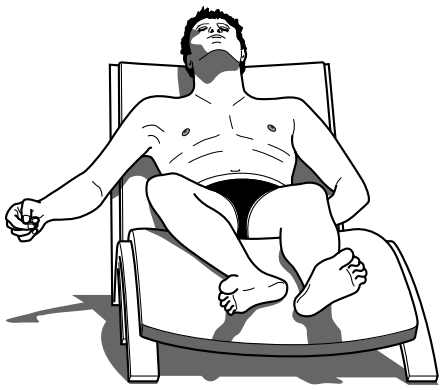
measurement	unit
length	metres (m)
temperature	
energy	

[2]

[Total: 7]

11 Mike wants to sunbathe. He lies in the sunshine.

The ultraviolet radiation will give him a suntan.

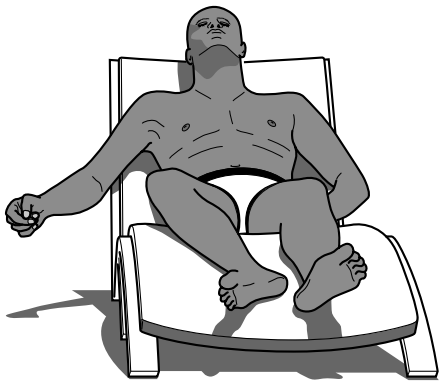


(a) Ultraviolet radiation can be dangerous.

What **damage** can ultraviolet radiation do to Mike?

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

(b) Rico sunbathes too.



Rico has **darker** skin than Mike. He is less at risk from sunbathing.

Write down two ways that dark skin **reduces** the risk.

1 .....

.....

2 .....

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

(c) Mike rubs sun cream onto his body.

He uses **high factor** sun cream.

Why is high factor better than a low factor sun cream?

.....

.....

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

[Total: 5]

12 Infrared waves are used for communication.

Complete the sentences. Two sentences have been done for you.

Choose your answers from the list.

Each answer can be used **once**, **more than once** or **not at all**.

analogue

burglar alarms

calculators

diffraction

digital

reflection

refraction

TV remote controls use infrared waves.

They can send waves as ..... or digital signals.

Infrared sensors are used in ..... .

Infrared waves are sent through optical fibres.

These waves pass along the fibre by total internal ..... . **[3]**

[Total: 3]

END OF QUESTION PAPER

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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.