OCR
RECOGNISING ACHIEVEMENT

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B624/01

GENERAL CERTIFICATE OF SECONDARY EDUCATION
GATEWAY SCIENCE
ADDITIONAL SCIENCE B
Unit 2 Modules B4 C4 P4 (Foundation Tier)

WEDNESDAY 23 JANUARY 2008

Afternoon
Time: 1 hour

Candidates answer on the question paper.
Additional materials (enclosed):
None

Calculators may be used.
Additional materials: Pencil
Ruler (cm/mm)

CUP/T42452

Candidate Forename | Candidate Surname

Centre Number | Candidate Number

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or 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.
- Do **not** write outside the box bordering each page.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- A list of physics equations is printed on page two.
- The Periodic Table is printed on the back page.

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

This document consists of **22** printed pages and **2** blank pages.

EQUATIONS

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

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

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

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

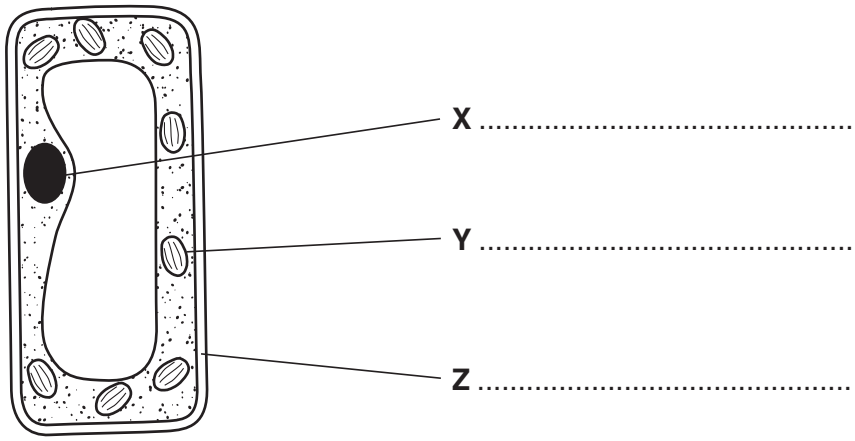
$$\text{power} = \frac{\text{work done}}{\text{time}}$$

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

Answer **all** the questions.

Section A – Module B4

1 The diagram shows a plant cell.



What are the names of parts **X**, **Y** and **Z**?

Write your answers on the diagram.

Choose your answers from the list below.

cell membrane

cell wall

chloroplast

cytoplasm

nucleus

vacuole

[3]

[Total: 3]

2 Dale grows tomatoes.

Greenflies sometimes damage his tomato plants.

(a) One way to control the greenflies is to use chemicals.

What type of chemical should Dale use to control greenflies?

Put a (ring) around the chemical that he should use.

fungicide **herbicide** **insecticide**

[1]

(b) Another way of controlling greenflies is to use **biological control**.

What is biological control?

.....

..... [1]

(c) Dale does **not** grow his tomatoes in soil.

Instead he uses water to supply them with minerals.

What is this called?

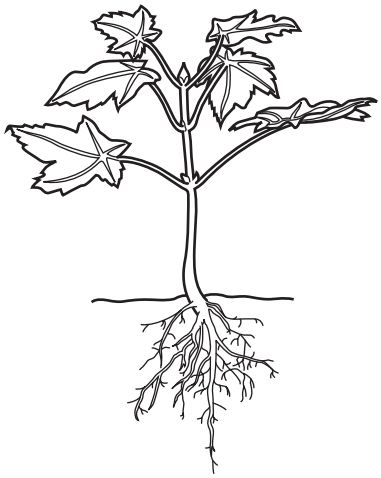
..... [1]

(d) Which part of Dale's tomato plants takes in the minerals?

..... [1]

[Total: 4]

3 The diagram shows a plant.



(a) Write about how **water** moves through a plant.

In your answer include

- where water enters a plant
- where water leaves a plant
- the processes involved.

.....

.....

.....

.....

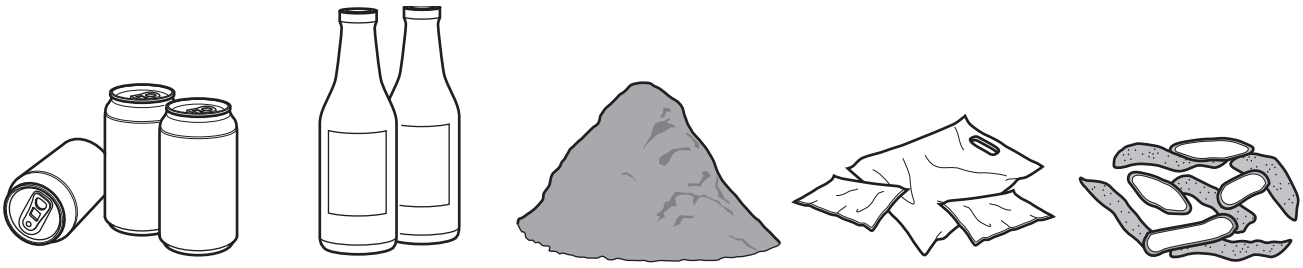
..... [3]

(b) In which part of a plant does most photosynthesis occur?

..... [1]

[Total: 4]

4 Look at the diagram. It shows some different types of household waste.



aluminium cans **glass bottles** **grass cuttings** **plastic bags** **potato peelings**

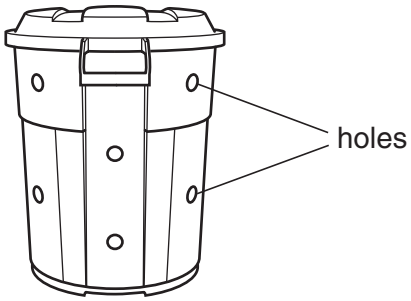
(a) Grass cuttings can **decay**.

Write down **one other** type of household waste that can decay.

Choose your answer from the diagram above.

..... [1]

(b) Bob puts his grass cuttings into a compost bin.



(i) The holes help the grass cuttings to decay.

Suggest how.

..... [1]

(ii) Grass cuttings decay faster in the summer than in the winter.

Suggest why.

..... [1]

(c) When grass cuttings decay, carbon dioxide is made.

What makes this carbon dioxide?

..... [1]

[Total: 4]

5 Look at the information about a farmland food chain.

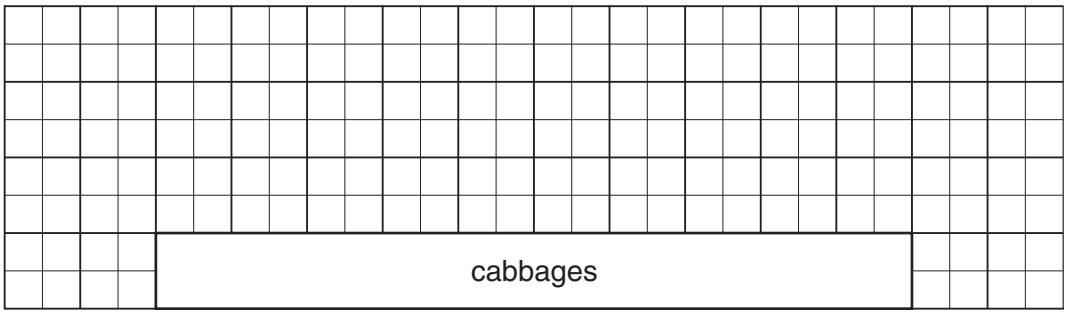
	number of individuals	mass of an individual in g	total biomass in g
cabbages	8	250	……
caterpillars	400	2	800
thrushes	5	80	400
hawks	……	200	200

(a) **(i)** Complete the table. [2]

(ii) Use the data in the table to complete the pyramid of **biomass**.

- Use 1 cm square = 200 g.
- Label the pyramid.

The bar for cabbages has been done for you.



[2]

(b) Some plant biomass can be used for fuel.

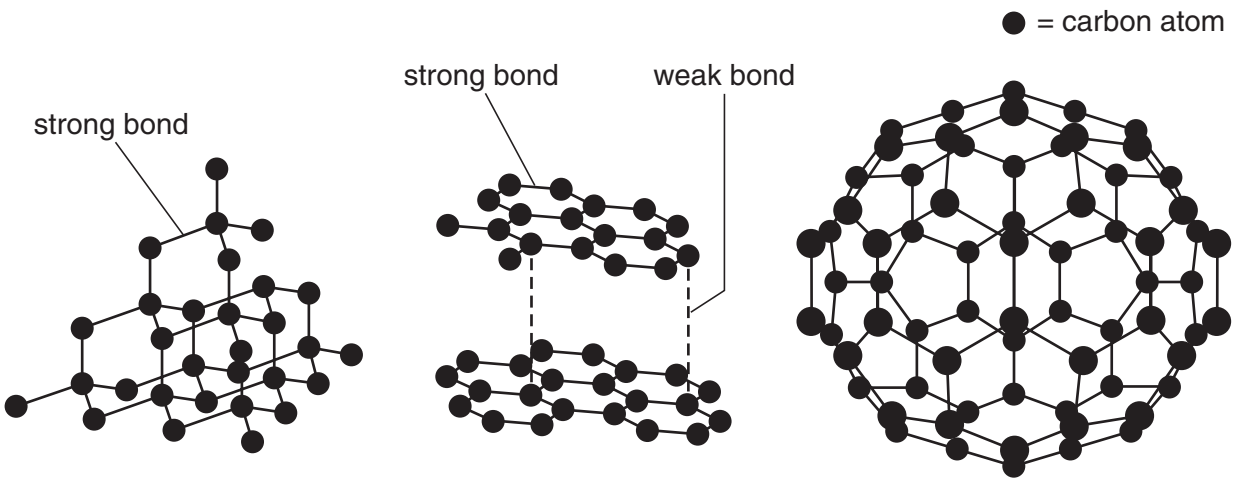
Write down **one** example of a fuel from plant biomass.

..... [1]

[Total: 5]

Section B – Module C4

6 Look at the diagrams. They show the different forms of carbon.



diamond **graphite** **type C**

(a) What is the name of type **C**?

..... [1]

(b) What does diamond look like?

Your answer should include

- the appearance of diamond
- its colour.

.....

.....

..... [2]

(c) Write down **one** use of diamond.

..... [1]

[Total: 4]

7 This question is about detergents.

Look at the label from a packet of washing powder.

Active ingredients

detergent
water softener
bleach
optical brighteners
enzymes

(a) One ingredient is the main cleaning agent.

Which one?

Choose from the list of ingredients.

..... [1]

(b) One ingredient gives the 'whiter than white' appearance to the clothes.

Which one?

Choose from the list of ingredients.

..... [1]

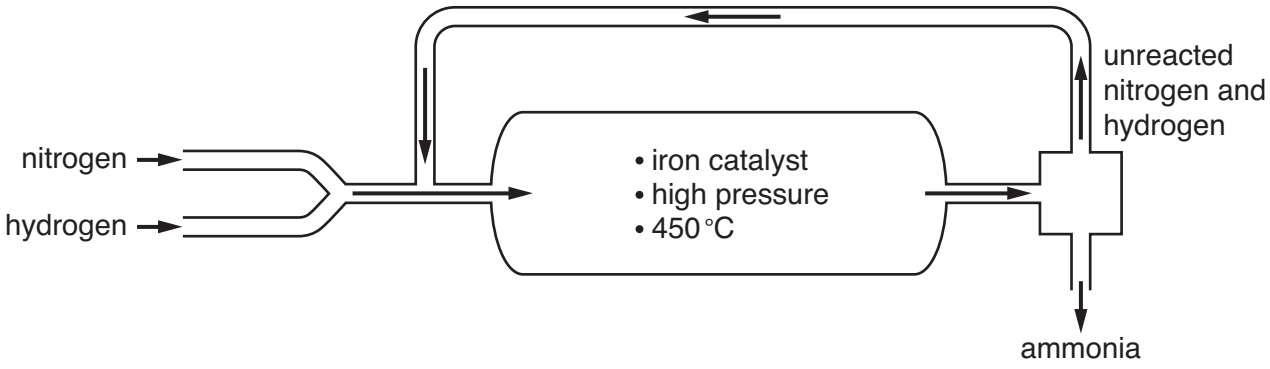
(c) Some washing powders are designed to work at low temperatures.

Write down an **advantage** of washing clothes at lower temperatures.

..... [1]

[Total: 3]

8 Ammonia is made from nitrogen and hydrogen in the Haber process.



The equation for the reaction is

$$\text{nitrogen} + \text{hydrogen} \rightleftharpoons \text{ammonia}$$

(a) Hydrogen is needed for the process.

Where does the hydrogen come from?

Choose from the list.

air

carbon dioxide

natural gas

answer ..... [1]

(b) What does the symbol $\rightleftharpoons$ mean?

..... [1]

(c) Some of the nitrogen and hydrogen does not react.

What happens to the unreacted nitrogen and hydrogen?

..... [1]

(d) There are lots of costs in making ammonia. One is the cost of the equipment used.

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

.....

.....

..... [2]

(e) Factories which make ammonia run for 24 hours a day for 7 days a week.

What is the name given to this type of process?

Choose from the list.

batch

continuous

purification

neutralisation

answer ..... [1]

[Total: 6]

9 This question is about fertilisers.

(a) Many fertilisers contain three essential elements.

Complete these statements. One has been done for you.

You should use the Periodic Table on the back page to help you.

N is nitrogen.

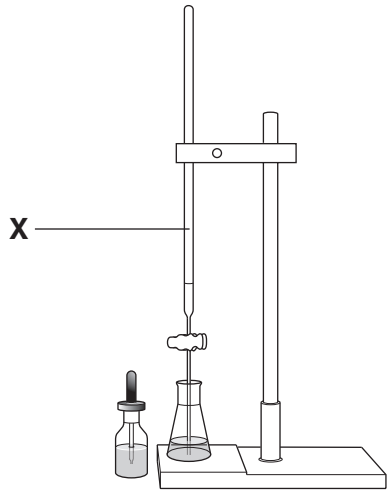
P is ..... .

K is ..... . [2]

(b) Why do farmers use fertilisers?

..... [1]

(c) Fertilisers can be made by adding an alkali to an acid.



Look at the apparatus that is used.

Write down the name of the piece of apparatus labelled **X**.

Choose from the list.

burette

filter funnel

measuring cylinder

pipette

answer ..... [1]

(d) Ammonium nitrate is a fertiliser. The formula for ammonium nitrate is NH_4NO_3.

Calculate the relative formula mass (M_r) of ammonium nitrate.

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

.....

.....

.....

answer ..... [1]

[Turn over for the remainder of question 9

(e) Ryan makes some ammonium nitrate.

He predicts that he will make 25 g. His actual yield is 20 g.

Calculate his percentage yield.

.....

.....

.....

percentage yield = ... % [2]

[Total: 7]

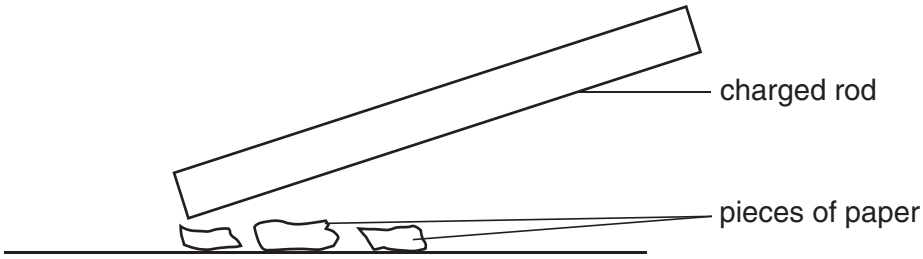
Section C – Module P4

10 **(a)** Yvonne rubs a plastic rod with a duster.

It becomes charged.

She puts it near some small pieces of paper.

Look at the diagram.



(i) What will happen to the small pieces of paper?

..... [1]

(ii) There are two sorts of charge.

Write down the names of the two sorts of charge.

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

(iii) We can get an electric shock from electrostatic charges.

Describe how.

.....

..... [2]

(b) Static electricity can be useful.

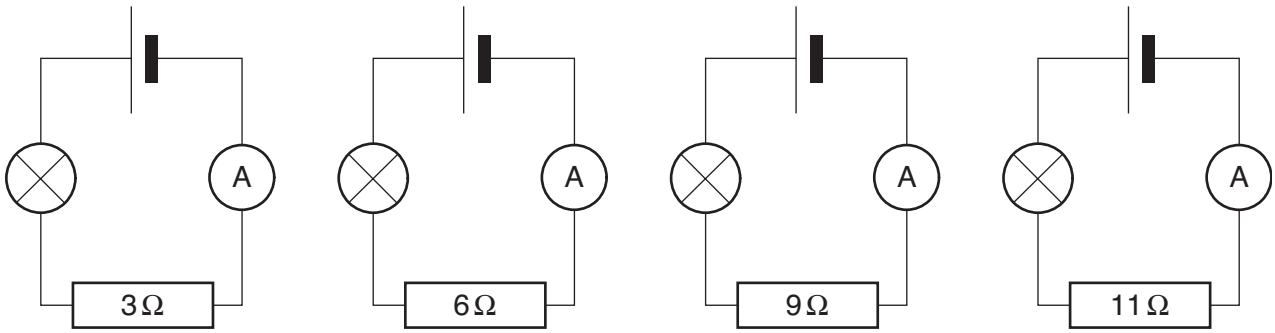
Write down **one** use of static electricity.

..... [1]

[Total: 5]

11 **(a)** This question is about electric circuits.

Look at the electric circuits.



A **B** **C** **D**

The lamp and battery are the same in all the circuits.

(i) Which circuit has the smallest current?

Choose from: **A** **B** **C** **D**

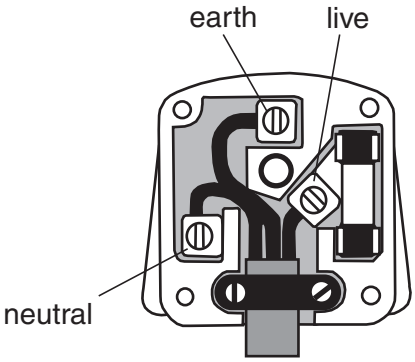
answer ..... [1]

(ii) Which circuit has the largest current?

Choose from: **A** **B** **C** **D**

answer ..... [1]

(b) Look at the diagram of a mains plug.



The columns below list the three terminals of a plug and the colours of the wires.

(i) Draw a straight line from **each** terminal to its correct wire colour.

terminal	**colour**
earth	blue
live	brown
neutral	green/yellow

[2]

(ii) Some appliances are **double insulated**.

They only have two wires connected to the plug.

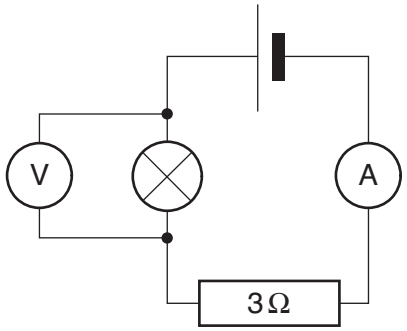
Which wire is **not** needed for a double insulated appliance?

..... [1]

[Turn over for the remainder of question 11

(c) Yvonne puts a voltmeter across a lamp.

Look at the diagram.



The reading on the voltmeter is 5 V.

The reading on the ammeter is 2 A.

Calculate the resistance of the lamp.

Use the equations on page 2 to help you.

.....

.....

answer .....ohms [2]

[Total: 7]

12 There are three types of nuclear radiation.

Alpha and gamma are two of the types.

(a) Write down the name of the third type of nuclear radiation.

..... [1]

(b) Gamma radiation is an electromagnetic wave.

Another type of electromagnetic wave has a similar wavelength.

It is used in medicine.

What is it called?

..... [1]

(c) Write down **one** other use of gamma radiation.

..... [1]

[Total: 3]

13 **(a)** Nuclear radiation is always present in the environment.

(i) What do we call this nuclear radiation?

..... [1]

(ii) Some of this radiation comes from atoms in rocks.

Which part of the atom gives out the radiation?

..... [1]

(b) Electricity is generated in a nuclear power station.

(i) Write down the **name** of the fuel used in a nuclear power station.

..... [1]

(ii) There are three main stages in the production of electricity in a power station.

Complete the diagram.

[2]

[Total: 5]

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.