Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION

B622/01

GATEWAY SCIENCE

SCIENCE B

Unit 2 Modules B2 C2 P2 (Foundation Tier)

WEDNESDAY 16 JUNE 2010: Morning
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 (LEO/DJ) MEP60595 33312

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. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).**

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

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

wave speed = frequency × wavelength

power = voltage × current

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

Answer ALL the questions.

SECTION A – MODULE B2

1 Landfill sites are filled with household waste.

(a) Britain needs more landfill sites than it did one hundred years ago.

Suggest ONE reason why.

_____

_____ **[1]**

(b) Old quarries are often used for landfill sites.

The minerals taken from the quarries were used in buildings.

Minerals are an example of which type of resource?

Choose from the list.

FINITE **FOSSIL FUEL** **RENEWABLE**

answer _____ **[1]**

(c) Old landfill sites can be turned into nature reserves.

This can help animals close to extinction.

What name do we use to describe animals close to extinction?

_____ **[1]**

[Total: 3]

2 David and Linda investigate the animals in four different ponds.

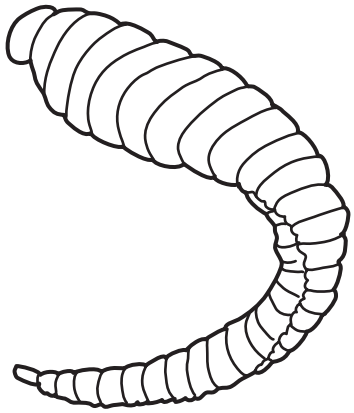
(a) They want to find which animals are swimming in the ponds.

Put a (ring) around the best piece of equipment to use to collect swimming animals.

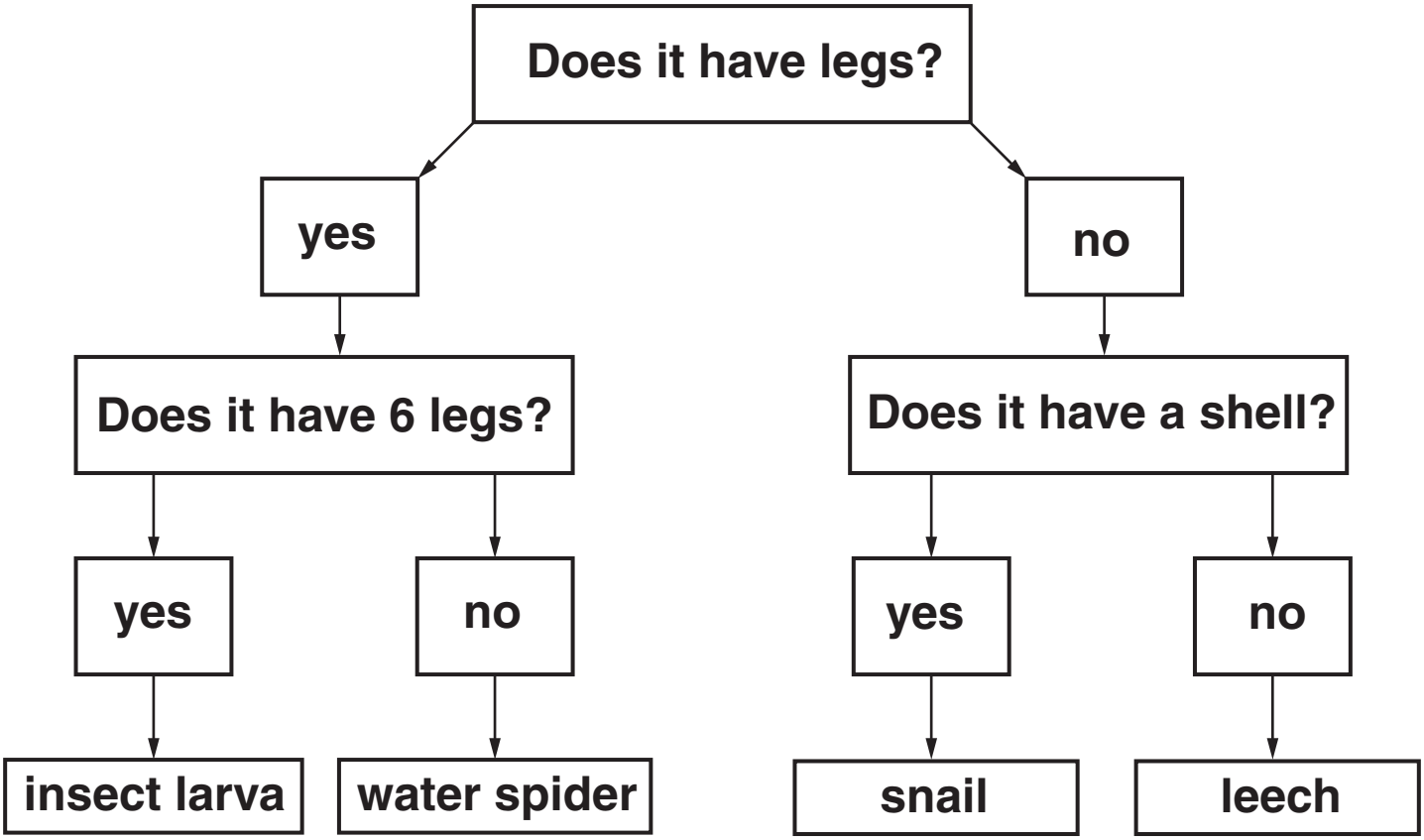
NET PIT-FALL TRAP POOTER QUADRAT

[1]

(b) Look at one of the animals they catch.



Use the key to identify the animal.



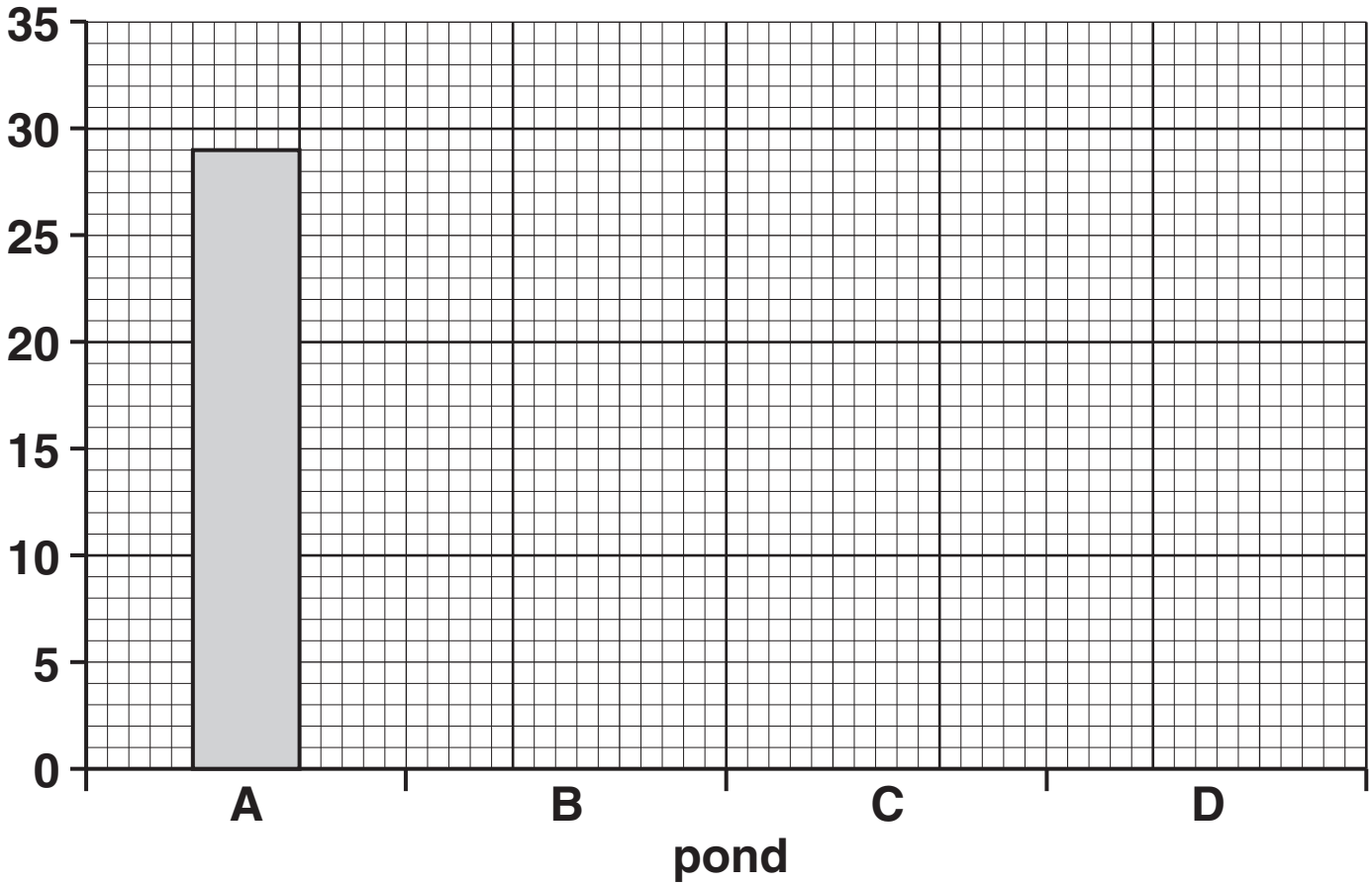
What did David and Linda catch? _____ . [1]

(c) David and Linda count up the number of different species they collect.

The table shows their results.

POND	NUMBER OF DIFFERENT SPECIES
A	
B	26
C	3
D	10

(i) Use the data in the table to finish the bar chart. [1]



(ii) The result for pond A is missing from the table.

Look at the bar chart.

How many different species did they find in pond A? _____ [1]

(iii) Which pond is likely to be the MOST polluted?

Choose from A, B, C or D. _____

Explain the reason for your answer. _____

_____ [1]

(d) All of the animals collected were invertebrates.

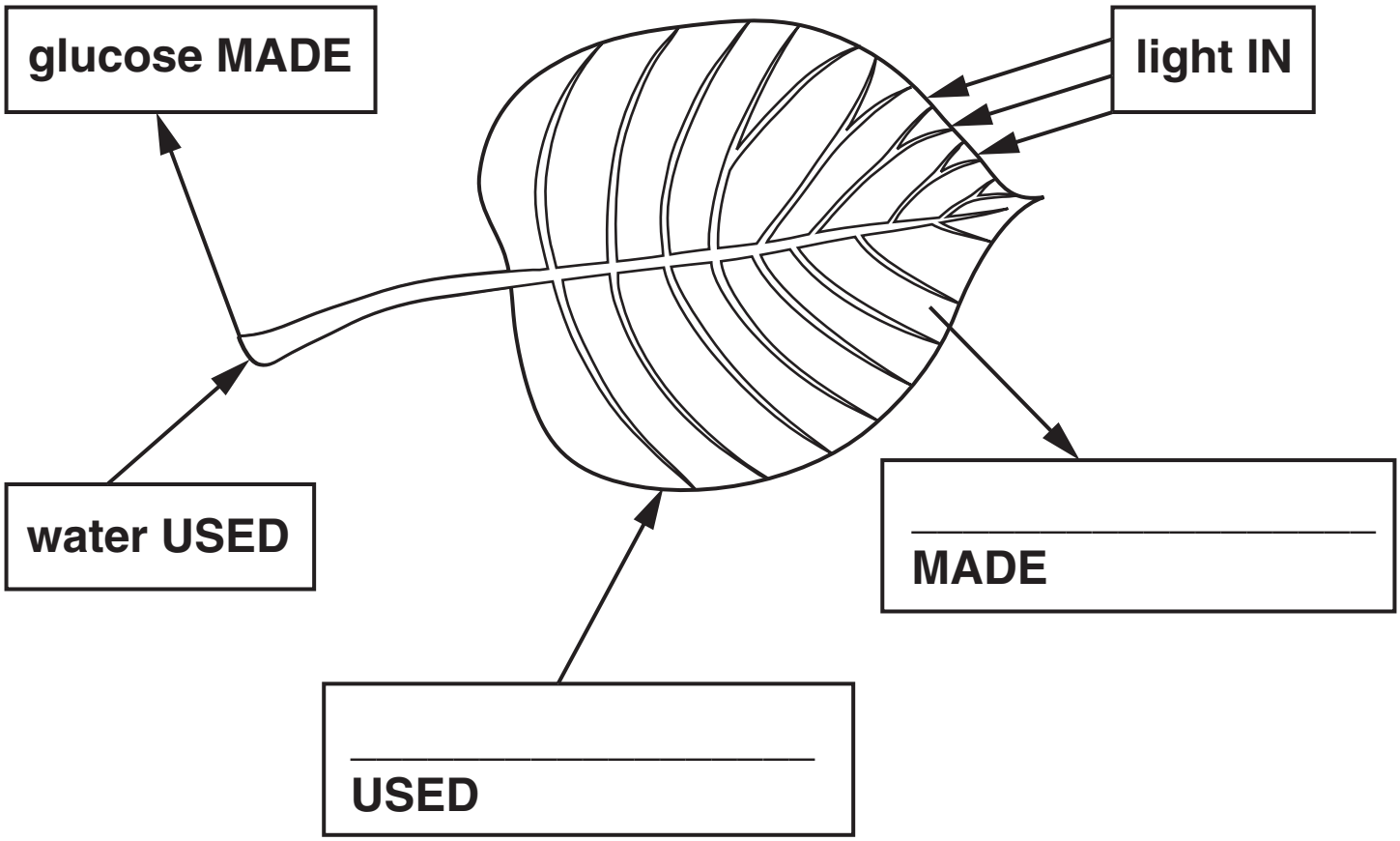
How are invertebrates different from vertebrates?

_____ [1]

[Total: 6]

3 Look at the diagram of a leaf.

It shows the substances involved in photosynthesis.



(a) Finish the diagram to name:

(i) The gas that is <u>USED</u> in photosynthesis. [1]

(ii) The gas that is <u>MADE</u> in photosynthesis. [1]

(b) Giving the plant more light can increase the rate of photosynthesis.

Write down <u>ONE OTHER</u> way the rate of photosynthesis can be increased.

_____ **[1]**

(c) Some of the glucose made by the plant can be used for energy.

The rest is changed into other substances for different uses.

Describe another use for glucose.

The substance it is changed into

_____ .

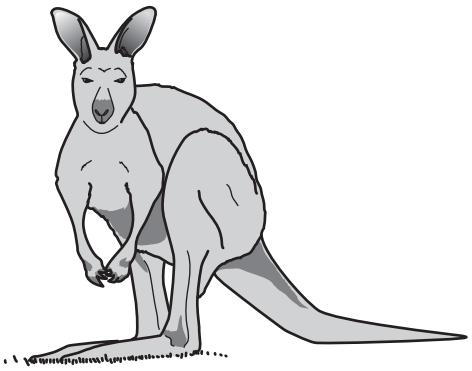
What the new substance is used for

_____

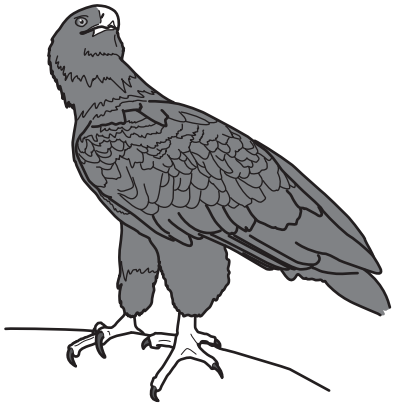
_____ . **[2]**

[Total: 5]

4 Look at the pictures of a kangaroo and a wedge-tailed eagle.



kangaroo



wedge-tailed eagle

(a) The wedge-tailed eagles hunt kangaroos for food.

(i) What term is used to describe animals that hunt prey for food?

_____ **[1]**

(ii) Describe how the kangaroo is adapted to avoid being caught as prey.

Use the picture to help you.

_____

_____

_____ **[2]**

(b) The population of kangaroos in an area goes up and down.

Explain why the population of eagles will also go up and down.

_____

_____

_____ **[2]**

(c) The eagle has to compete with other eagles for food.

Apart from food, write down <u>ONE OTHER</u> thing that eagles compete for.

_____ **[1]**

[Total: 6]

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SECTION B – MODULE C2

5 A football clubhouse has barriers between it and the pitch.

(a) Write down the names of TWO construction materials used in making buildings.

1 _____

2 _____ **[2]**

(b) The clubhouse has been painted.

Write down TWO reasons why the clubhouse has been painted.

1 _____

2 _____ **[2]**

(c) The barriers have been painted with PHOSPHORESCENT paint.

Describe one advantage of painting the barriers with phosphorescent paint.

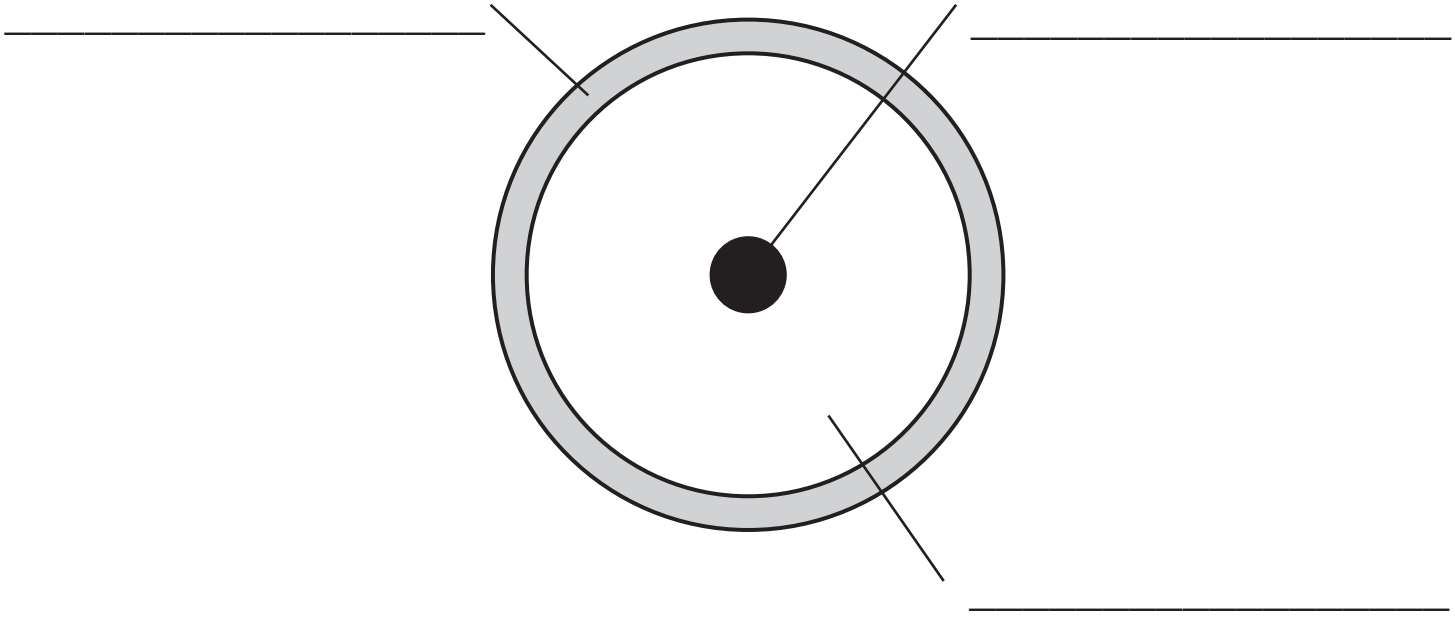
_____

_____ **[1]**

[Total: 5]

6 This question is about the structure of the Earth.

(a) Look at the diagram of the Earth.



Complete the labels on the diagram.

Choose from the list.

CORE

CRUST

MANTLE

[2]

(b) The outer layer of the Earth is made up of two types of tectonic plates.

One type of plate is oceanic.

Write down the name of the other TYPE of plate.

_____ **[1]**

(c) The tectonic plates float <u>ON TOP</u> of the mantle.

Explain why.

_____

_____ **[1]**

[Total: 4]

7 Clean air is a mixture of gases.

(a) Look at this list. It shows some of the gases found in clean air.

ARGON

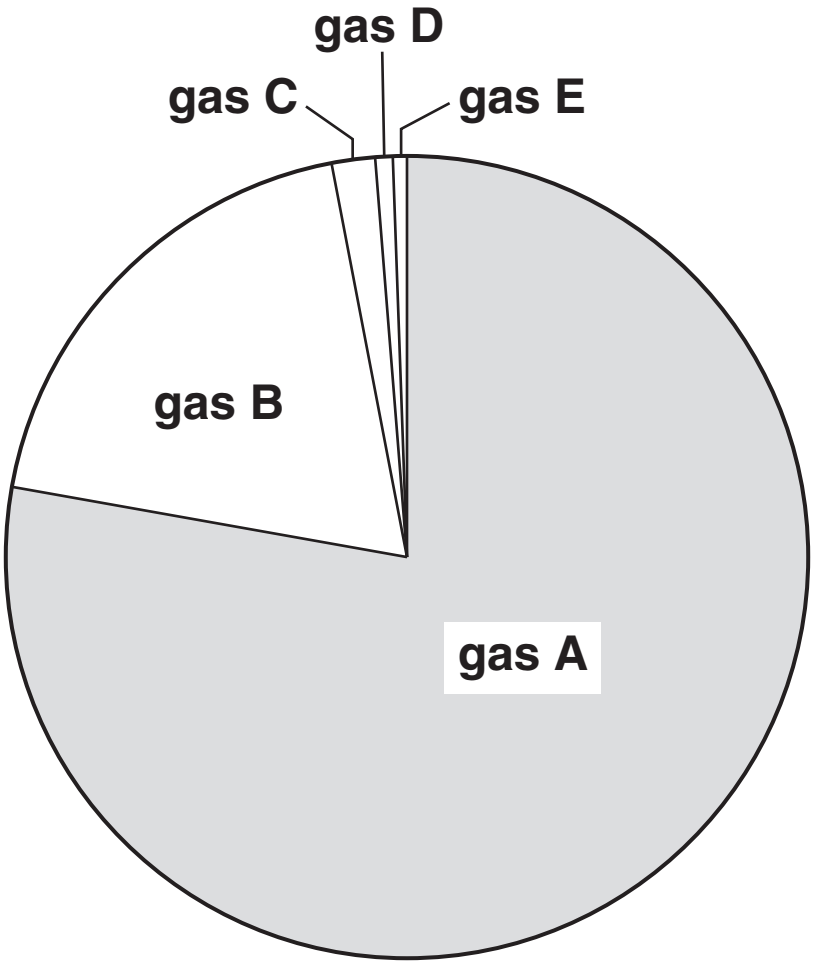
CARBON DIOXIDE

NITROGEN

OXYGEN

WATER VAPOUR

Look at this pie-chart. It gives information about the percentage of different gases in clean air.



What is the name of gas A?

Choose from the list.

answer _____ **[1]**

(b) Sulfur dioxide and oxides of nitrogen are common pollutants found in dirty air.

These gases cause acid rain.

Write about the problems caused by acid rain.

_____

_____

_____ **[2]**

(c) Carbon monoxide and oxides of nitrogen are found in the exhaust gases of cars.

These gases pollute the air.

Cars are fitted with catalytic converters.

Look at the word equation. It shows a reaction in a catalytic converter.

CARBON MONOXIDE + NITROGEN MONOXIDE → NITROGEN + CARBON DIOXIDE

How does a catalytic converter reduce air pollution?

The word equation may help you.

_____

_____ **[1]**

[Total: 4]

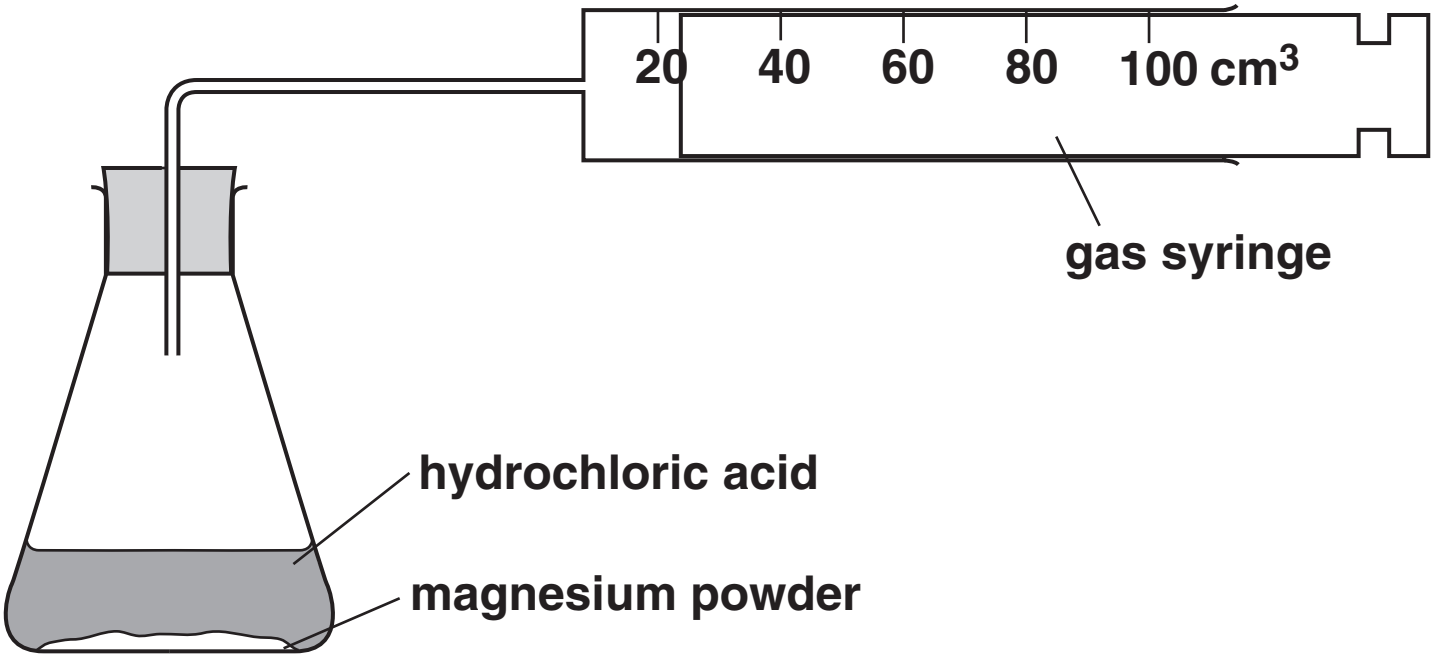
8 Ryan and Naomi investigate the reaction between magnesium and hydrochloric acid.

Magnesium chloride and hydrogen are made.

(a) Write the <u>WORD</u> equation for this reaction.

_____ **[1]**

(b) The diagram shows the apparatus they use.



Look at the table.

It shows their results when 0.1 g of magnesium reacts with hydrochloric acid.

TIME IN SECONDS	TOTAL VOLUME OF GAS IN SYRINGE IN CM^3
0	0
20	50
40	80
60	90
80	100
100	100

(i) At what time does the reaction finish?

answer _____ seconds [1]

(ii) Complete the sentence.

The reaction is fastest between _____

seconds and _____ seconds. [1]

[Total: 3]

9 This question is about the properties of metals.

The table lists data for properties of some metals.

METAL	DENSITY IN g/cm^3	RELATIVE STRENGTH	RELATIVE ELECTRICAL CONDUCTIVITY
ALUMINIUM	2.7	70	40
COPPER	8.9	220	64
IRON	7.9	210	11
TIN	7.3	10	7
ZINC	7.3	140	18

(a) Write down the name of the metal with the HIGHEST electrical conductivity.

Choose from the table.

_____ **[1]**

(b) Some of the properties of aluminium and iron are different.

Write down TWO ways in which they are different.

You may use the data in the table to help you.

1 _____

2 _____ **[2]**

(c) Copper and zinc make the alloy brass.

Write down <u>ONE USE</u> for brass.

_____ **[1]**

[Total: 4]

SECTION C – MODULE P2

10 A wind turbine provides energy for a field studies centre on Exmoor.

(a) (i) Finish this sentence by choosing the BEST word from this list.

CONDUCTION

CONVECTION

RADIATION

The Sun causes _____ currents in the air. This produces a wind. [1]

(ii) Finish these sentences by choosing the BEST words from this list.

CHEMICAL

ELECTRICAL

KINETIC

THERMAL

The wind has _____ energy.

The wind turbine transfers this into _____ energy. [2]

(b) (i) The Sun is a renewable energy source.

Other renewable energy sources are burned to produce energy.

Write down the name of one of these <u>RENEWABLE</u> energy sources.

_____ **[1]**

(ii) Fossil fuels are non-renewable energy sources.

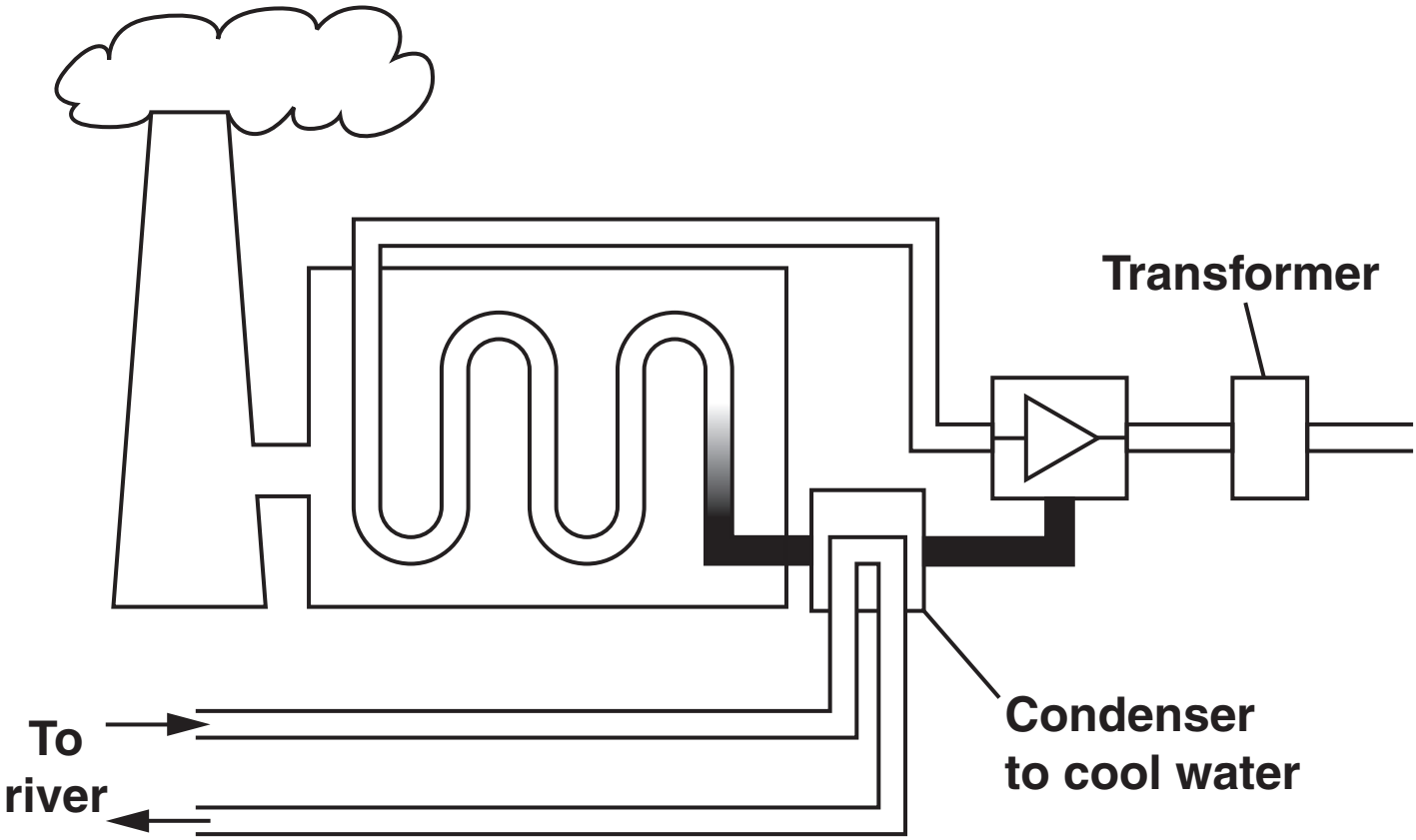
Write down the name of one <u>FOSSIL FUEL</u>.

_____ **[1]**

[Total: 5]

11 Most of our electricity is generated in power stations.

Look at the diagram of a power station.



(a) Describe how electricity is <u>GENERATED</u> in the power station.

_____

_____

_____

_____ **[3]**

(b) The transformer increases the voltage of the electricity.

It is then transmitted around the country.

Why is electricity transmitted at high voltages?

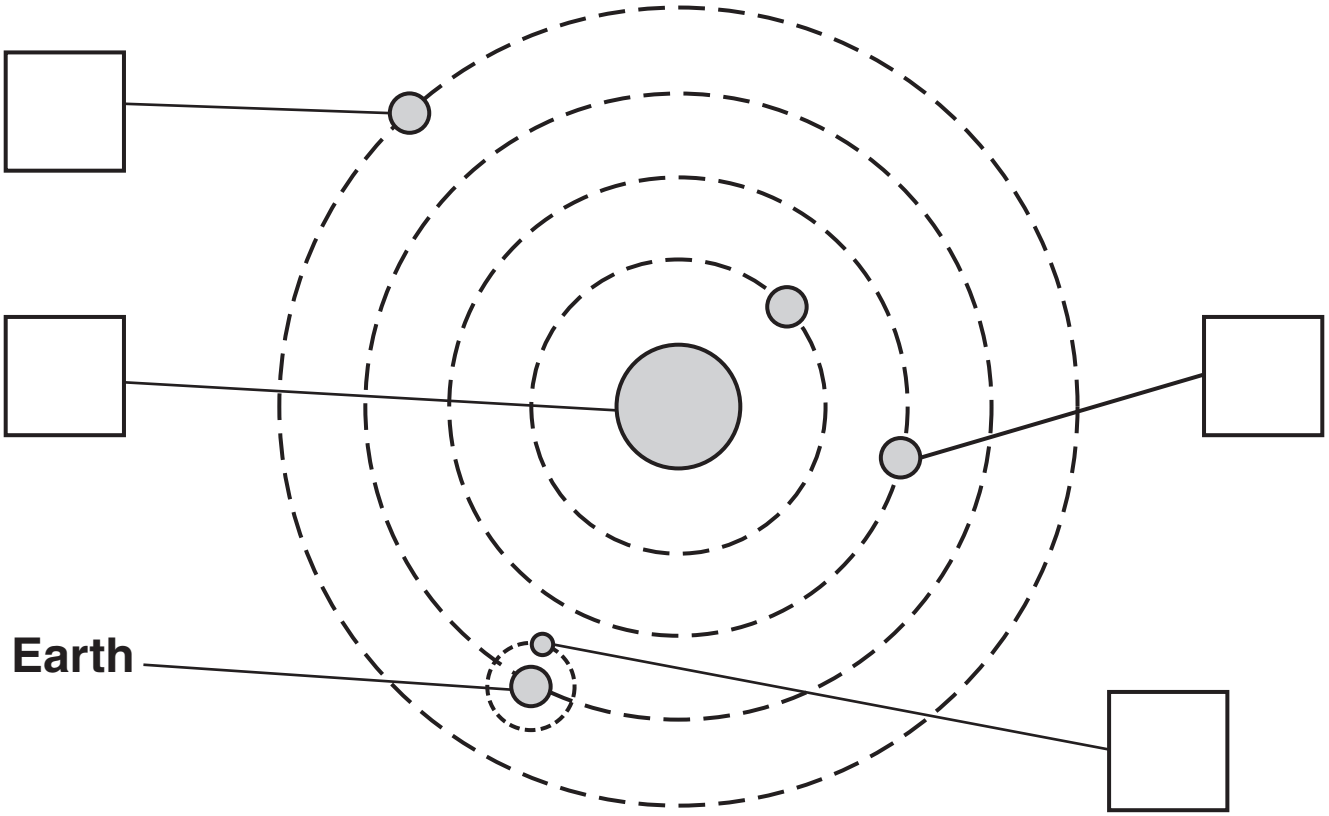
_____

_____ **[1]**

[Total: 4]

12 Look at the diagram.

It represents part of our Solar System.



(a) Write the letter S in one box that shows the Sun.

[1]

(b) Write the letter P in one box that shows a planet.

[1]

(c) Write the letter M in one box that shows the Moon.

[1]

(d) Some spacecraft are sent into space unmanned.

Some spacecraft carry astronauts.

Write down two things that astronauts <u>MUST</u> have in a spacecraft.

1 _____

2 _____ **[2]**

[Total: 5]

13 Scientists think that the Universe started with an explosion.

(a) What is this explosion known as?

_____ **[1]**

(b) What is happening to the size of the Universe?

_____ **[1]**

(c) At night, we can see a large number of stars.

(i) Why can we <u>SEE</u> stars?

Put a tick (✓) in the box next to the correct answer.

Stars are closer to us than the Sun.	☐
Stars give off their own light.	☐
Stars reflect light from the Moon.	☐
Stars reflect light from the Sun.	☐

[1]

(ii) Stars have a finite life and will eventually die.

How do stars <u>START</u> their life?

_____

_____ **[1]**

[Total: 4]

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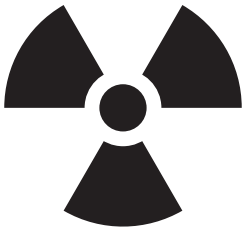
14 This symbol is used to warn about dangerous radioactivity.



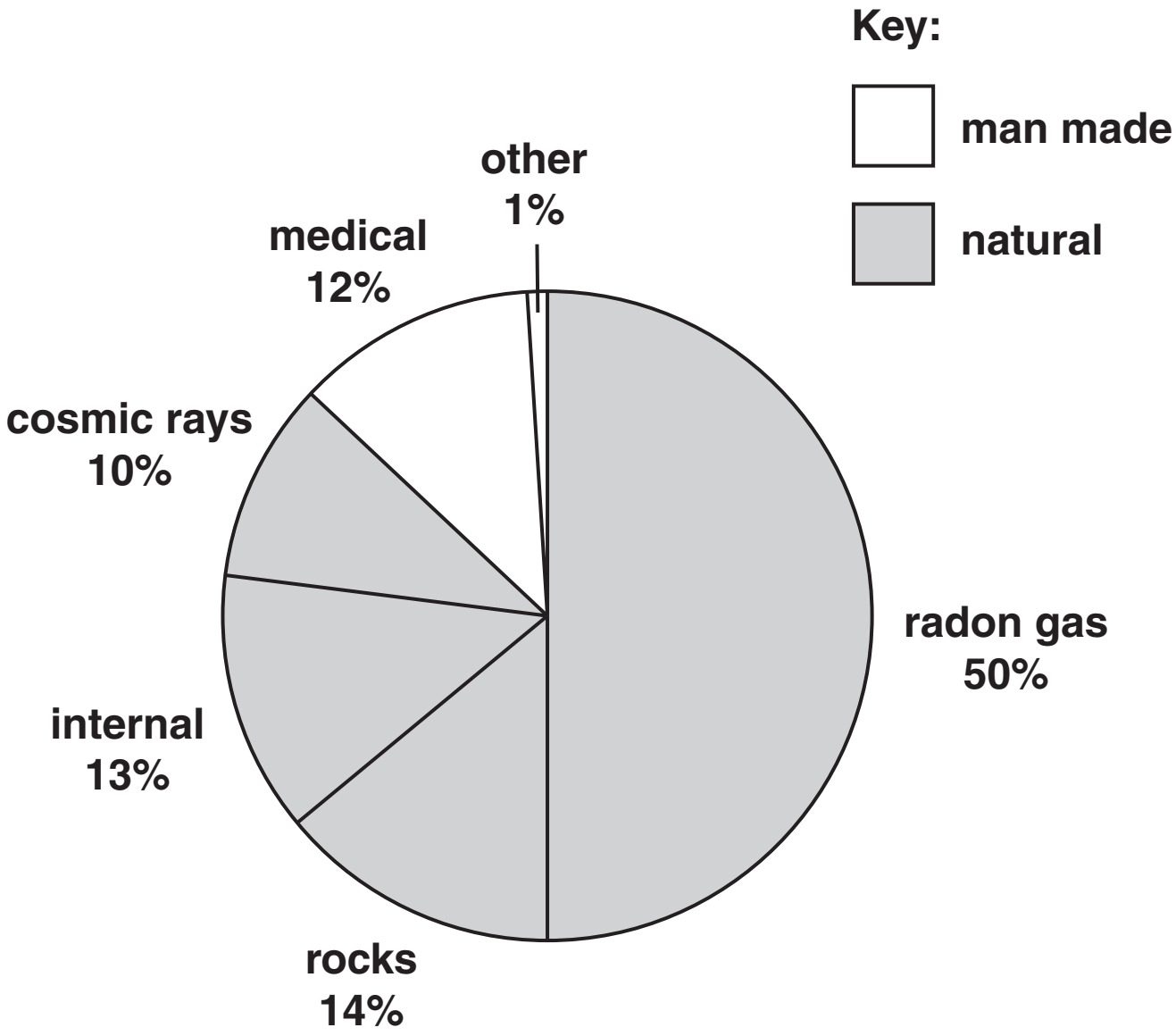
(a) Nuclear radiation can also be <u>USEFUL</u>.

Write down one example of how nuclear radiation is <u>USEFUL</u>.

_____ **[1]**

(b) Background radiation is always around us.

The pie chart shows the sources of background radiation and their percentages.



What percentage of background radiation is natural?

answer _____ % **[1]**

[Total: 2]

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.