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Centre number						Candidate number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GCSE**

B622/01

GATEWAY SCIENCE

SCIENCE B

Unit 2 Modules B2 C2 P2 (Foundation Tier)

MONDAY 30 JANUARY 2012: 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, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. HB pencil may be used for graphs and diagrams only.**
- **Answer ALL the questions.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**
- **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

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

$$\text{wave speed} = \text{frequency} \times \text{wavelength}$$

$$\text{power} = \text{voltage} \times \text{current}$$

$$\text{energy (kilowatt hours)} = \text{power (kW)} \times \text{time (h)}$$

Answer ALL the questions.

SECTION A – MODULE B2

1 Mosquitoes are insects that develop from larvae that live in water.

Sue is investigating how many mosquito larvae live in her local pond.

She puts a quadrat on the surface of the pond and counts the number of mosquito larvae inside the quadrat.

She does this in three different places on the pond's surface.

The table shows her results.

QUADRAT	NUMBER OF MOSQUITO LARVAE
1st	4
2nd	1
3rd	7

(a) The area of each quadrat is 0.25 m^2 .

The area of the pond is 8 m^2 .

Use this information and Sue's results to estimate the total number of mosquito larvae in the pond.

Show your working.

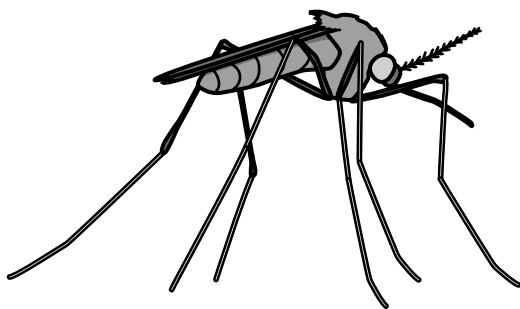
answer _____

[2]

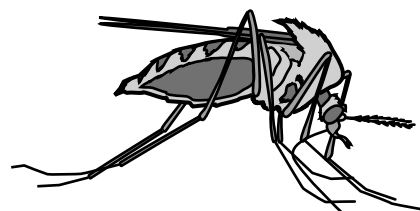
(b) The larvae develop into adult mosquitoes.

Look at the pictures.

They show two types of mosquito that live near the pond.



type A



type B

- (i) Sue thinks the two types might be the same species because they look very similar.

Describe how Sue could show whether the two types are the same species.

[2]

- (ii) What type of animal is a mosquito?

Put a **ring** around the correct answer.

AMPHIBIAN

FISH

INVERTEBRATE

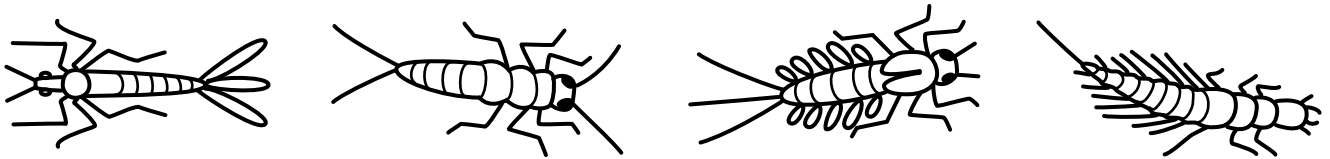
MAMMAL

REPTILE

[1]

(c) Sue also finds the larvae of some other insects living in the pond.

The diagram shows four of the larvae she finds.



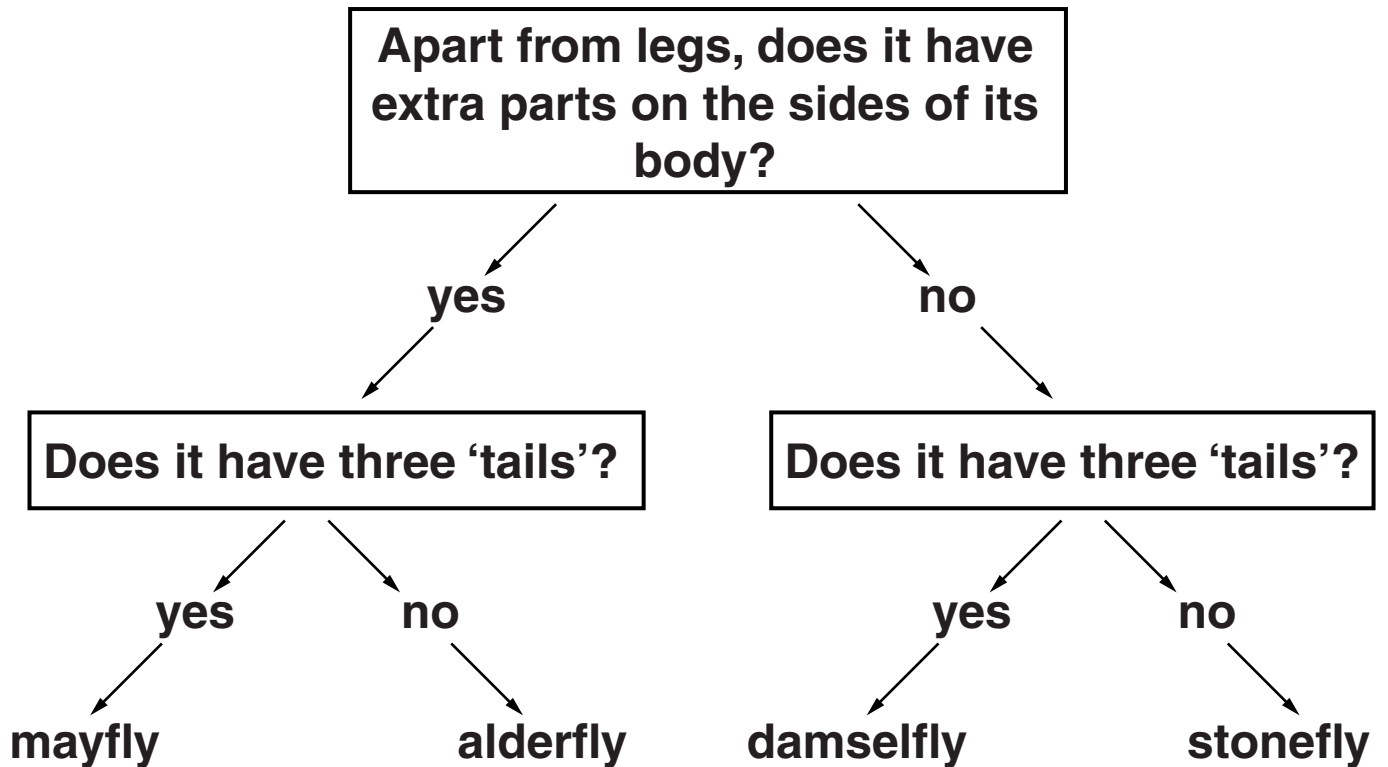
A

B

C

D

Use the key to identify A and C.



A is _____

C is _____ [2]

[Total: 7]

2 The pictures opposite show two types of fox.

The Arctic fox lives in the Arctic.

The red fox lives in many parts of the world, including Britain.

(a) Both types of fox are predators.

Write down TWO ways in which both types of fox are adapted to be predators.

1 _____

2 _____

_____ **[2]**

(b) The Arctic fox is adapted to living in cold Arctic conditions.

Look at the picture of the Arctic fox.

Explain TWO ways that the Arctic fox is adapted to living in the Arctic.

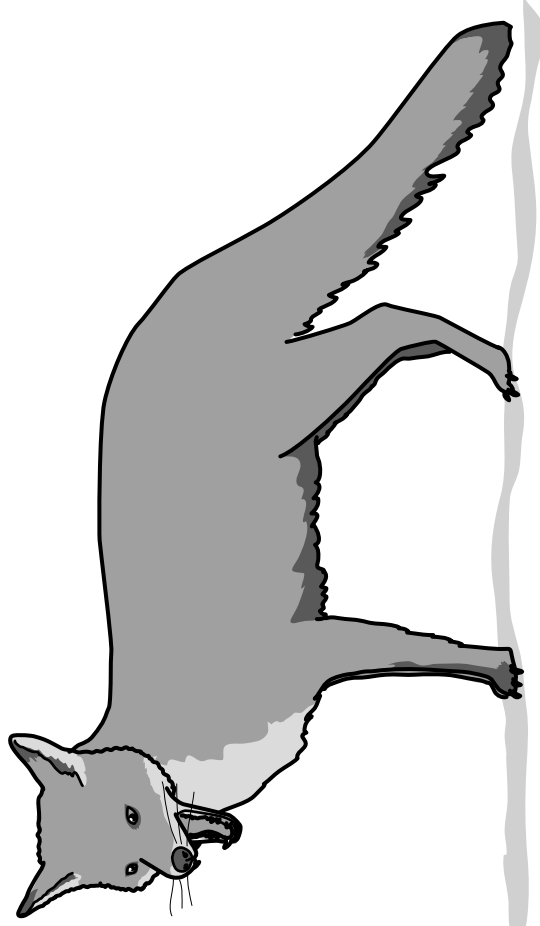
1 _____

2 _____

_____ **[2]**



Arctic fox



red fox

- (c) There are fewer Arctic foxes per km² living in the Arctic than there are red foxes per km² living in Britain.**

Suggest ONE reason why there are fewer Arctic foxes per km².

_____ [1]

- (d) In some parts of the world, red foxes are moving into the places where Arctic foxes live.**

As a result of this, in some places Arctic foxes are becoming endangered.

What does ENDANGERED mean?

_____ [1]

[Total: 6]

3 Coal was formed from the remains of plants that lived millions of years ago.

(a) When coal is burned, carbon dioxide is released.

This is because coal contains a lot of carbon.

(i) The plants that formed coal also contained carbon.

Explain how carbon got into those plants millions of years ago.

[2]

(ii) The amount of carbon dioxide in the atmosphere is increasing.

One reason is because humans are burning more fossil fuels, like coal, every year.

Write down ONE reason why humans are burning more fossil fuels.

[1]

(iii) Write down ONE OTHER gas that is produced when coal is burned.

[1]

(iv) Is coal a sustainable resource?

Explain your answer.

[1]

(b) Coal sometimes contains fossilised plants.

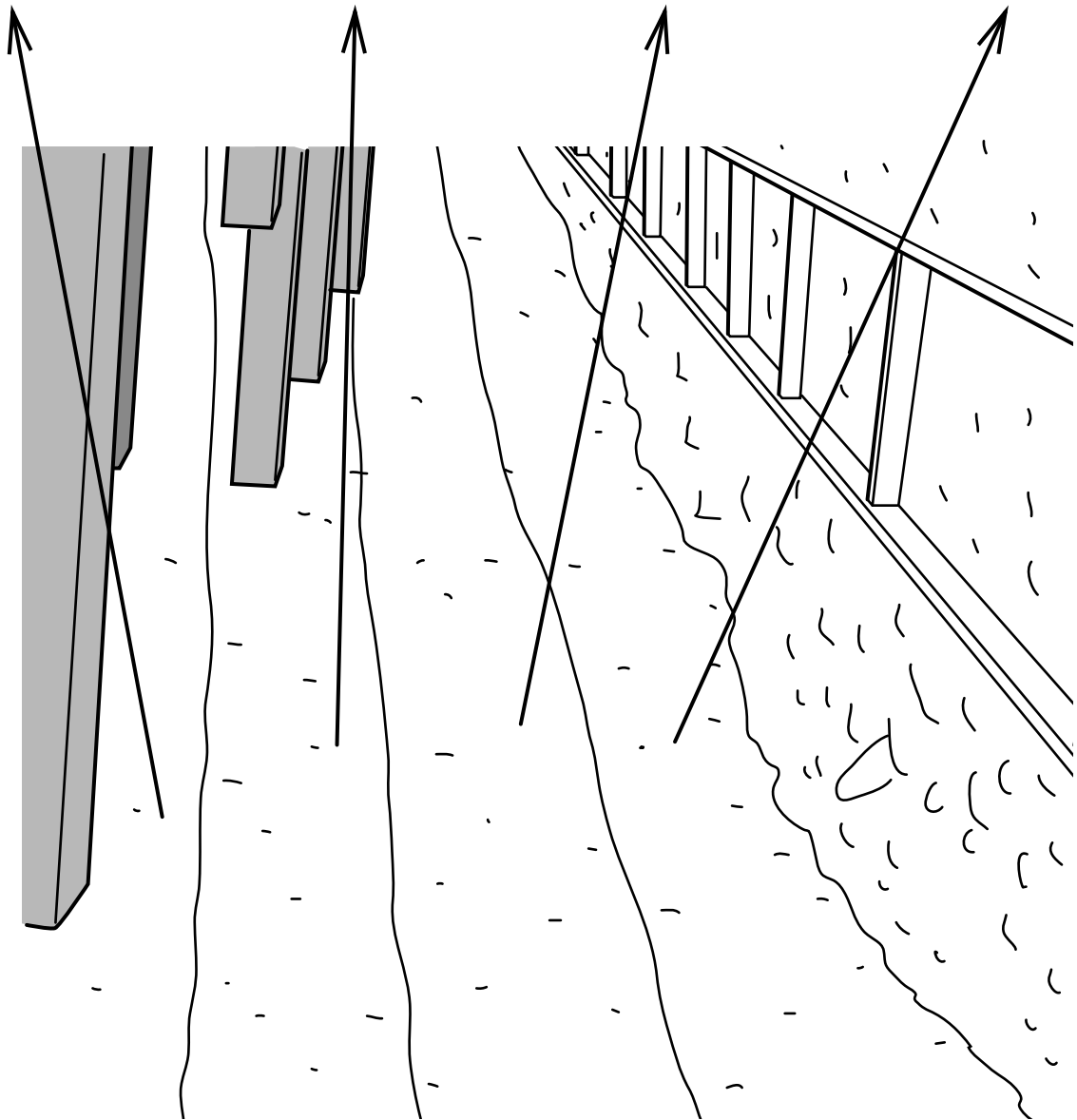
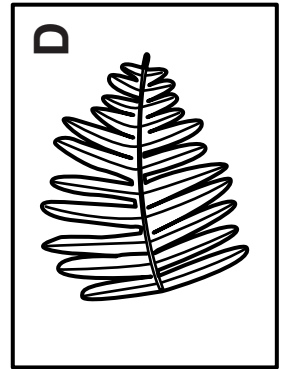
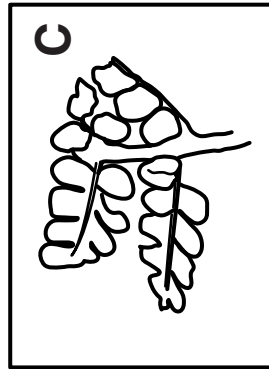
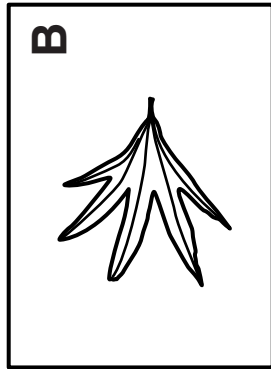
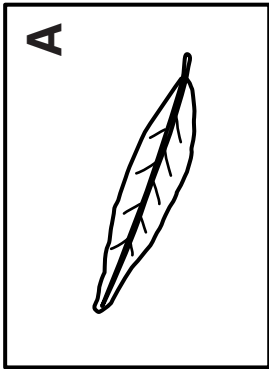
The drawing opposite shows some fossilised plants found on the coal face in a coal mine.

Which fossil is most likely to be the oldest?

Explain your answer.

[2]

[Total: 7]



SECTION B – MODULE C2

4 This question is about volcanoes.

(a) What type of rock is formed when molten magma cools down?

Choose from this list.

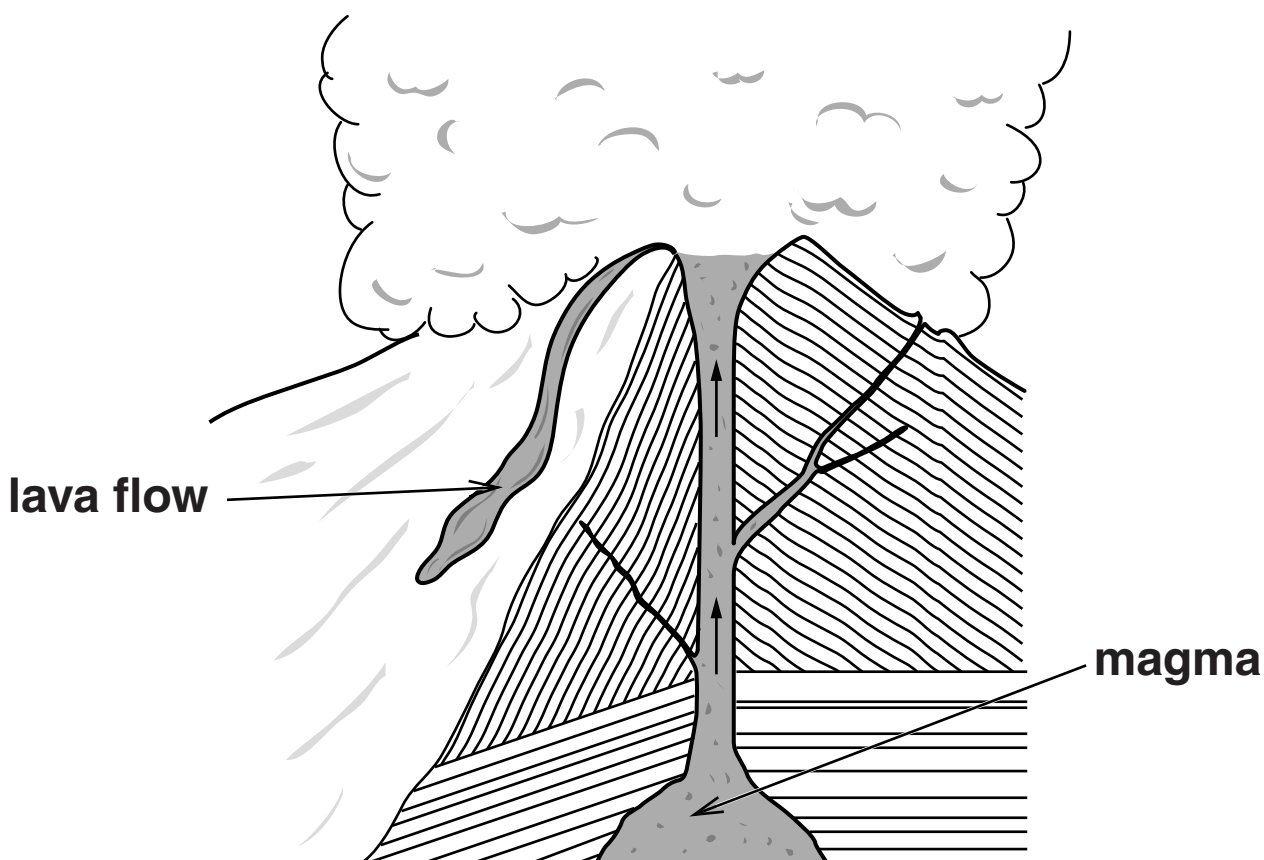
IGNEOUS

METAMORPHIC

SEDIMENTARY

answer _____ [1]

(b) Look at the diagram of a volcano.



The magma in the mantle can rise up through the Earth's crust.

Explain why.

Use ideas about density.

_____ [1]

(c) It can be very dangerous when a volcano erupts.

Some people still choose to live near volcanoes.

Suggest why.

_____ [1]

[Total: 3]

5 This question is about the gases in the air.

(a) Complete the sentence.

The two main gases in CLEAN air are oxygen and

_____ .

[1]

(b) The percentage of oxygen and carbon dioxide in the air do not vary much.

This is because of

COMBUSTION,

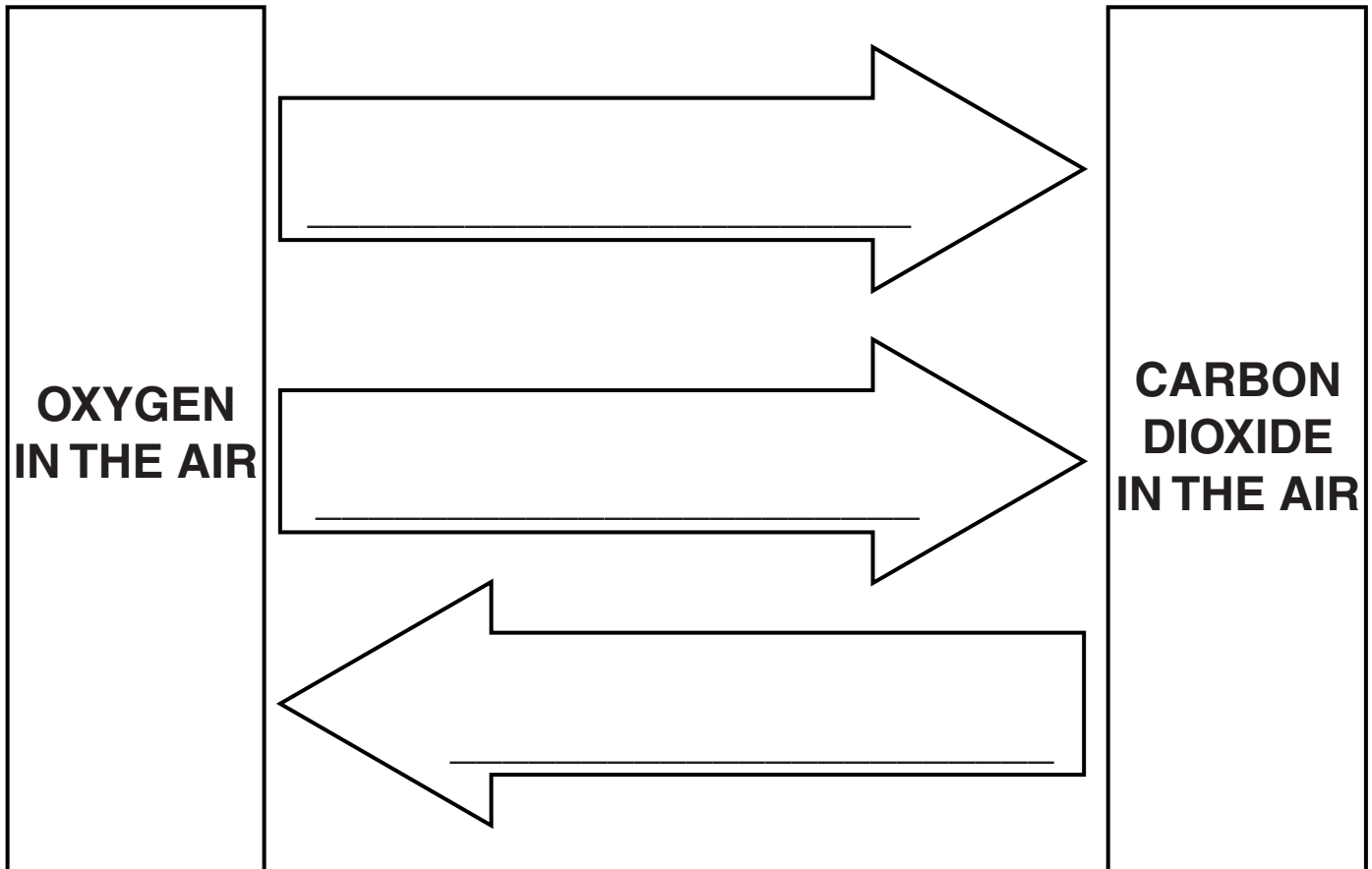
PHOTOSYNTHESIS

and

RESPIRATION.

The diagram shows how these processes keep the percentages about the same.

Complete the diagram by writing the name of each process in the correct arrow.



[1]

(c) Air contains pollutants.

This can cause problems.

(i) Oxides of nitrogen cause photochemical smog.

Complete the table.

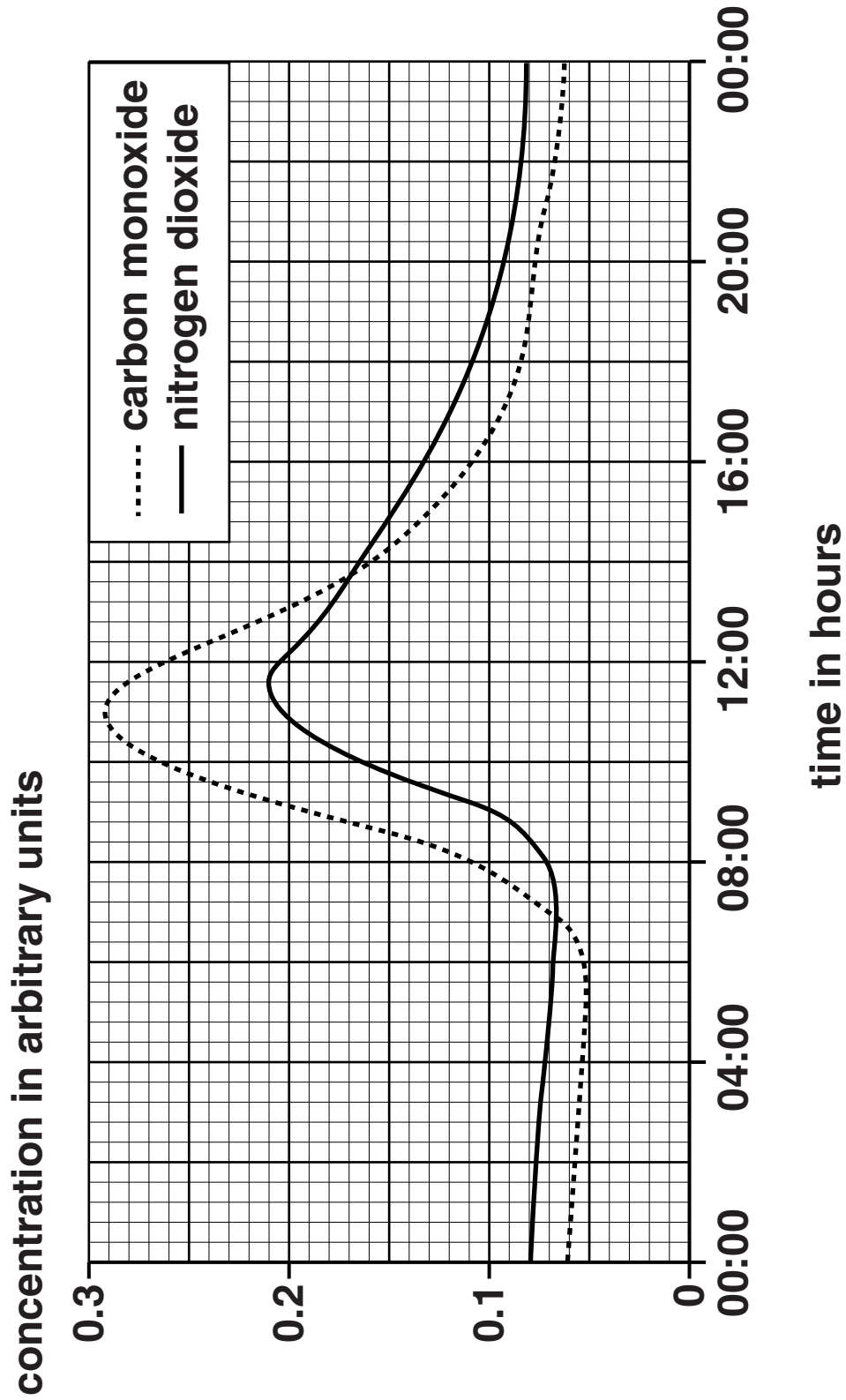
POLLUTANT	PROBLEM CAUSED
carbon monoxide	_____
oxides of nitrogen	photochemical smog
sulfur dioxide	_____

[2]

BLANK PAGE

(ii) Look at the graph.

It shows how the concentrations of some pollutants in the air change over 24 hours.



**At what time of day is the concentration of
NITROGEN DIOXIDE the highest?**

_____ [1]

[Total: 5]

6 Julie and Trevor investigate the reaction between zinc and sulfuric acid.

Zinc sulfate and hydrogen are made.

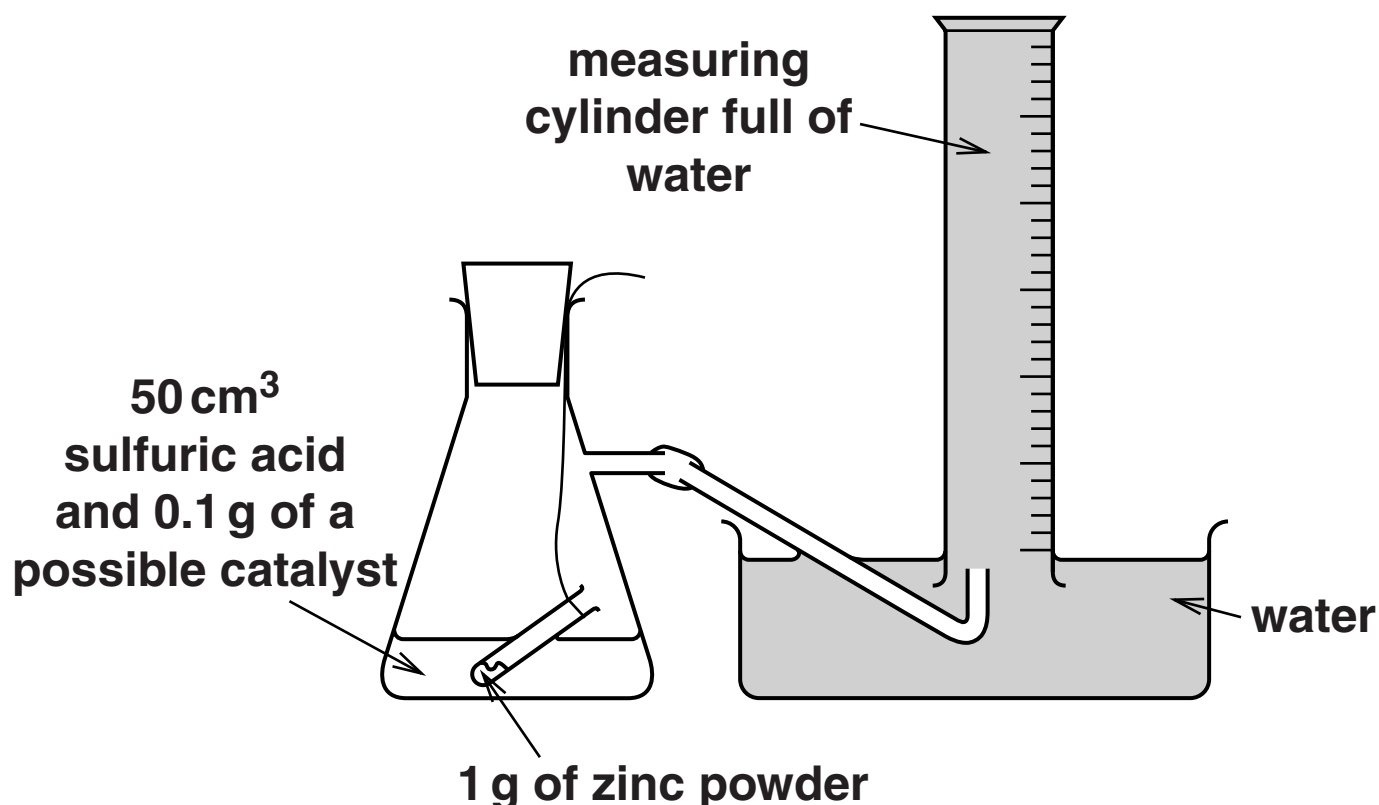
(a) Write a WORD equation for this reaction.

_____ [1]

(b) Julie and Trevor do several experiments.

They want to find a substance that is a CATALYST for the reaction.

The diagram shows the apparatus they use.



The flask is shaken to start the reaction.

They record the time taken to collect 50 cm³ of gas.

Look at the table. It shows Julie and Trevor's results.

POSSIBLE CATALYST USED	APPEARANCE OF CATALYST	TIME TO COLLECT 50 cm³ OF GAS IN SECONDS	OTHER OBSERVATIONS
no catalyst added	–	65	colourless solution made
copper sulfate	blue solid	10	colourless solution made and zinc powder coated with a pink solid
copper powder	red-brown powder	19	red-brown powder remains
copper lumps	red-brown lumps	56	red-brown lumps left behind
sodium chloride	white solid	65	colourless solution made

- (i) Copper powder and copper lumps are both catalysts for the reaction.

How can you tell?

Use information from the table.

[2]

- (ii) The reaction goes faster if copper POWDER is used instead of copper LUMPS.

Write about two OTHER ways to make the reaction go faster.

[2]

- (iii) Copper sulfate has the formula CuSO_4 .

What is the total number of ATOMS in the formula?

[1]

[Total: 6]

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7 James has just fitted a new kitchen in his house.

(a) James painted the walls of the kitchen.

Write down ONE reason why James painted the walls.

_____ [1]

(b) The table in James' kitchen is made of granite.

Why did James choose granite, instead of marble, for his table?

Use ideas about the hardness of the rocks.

_____ [1]

(c) The granite for the table was dug out of the ground by QUARRYING.

Write about TWO environmental problems caused by quarrying.

_____ [2]

(d) The electrical wiring in the kitchen is made of copper.

Copper has to be purified before it can be used for electrical wiring.

Write down the name of the process used to purify copper.

Choose from this list.

ALLOYING

CATALYSIS

COMBUSTION

ELECTROLYSIS

answer _____ [1]

(e) The taps in the kitchen are made of stainless steel.

Stainless steel is an ALLOY.

What is meant by an alloy?

_____ [1]

[Total: 6]

SECTION C – MODULE P2

8 This question is about energy from the Sun.

(a) The Earth receives energy from the Sun.

Write down the two MAIN forms of energy that the Earth receives from the Sun.

and _____ [1]

(b) (i) Photocells use energy from the Sun.

Look at the statements about photocells.

Some are true and some are false.

Put ticks (✓) in the boxes to show if each statement is true or false.

The first one has been done for you.

	TRUE	FALSE
Photocells convert energy from the Sun into electricity.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Photocells produce alternating current (AC).	<input type="checkbox"/>	<input type="checkbox"/>
More power is produced if the surface area facing the Sun is increased.	<input type="checkbox"/>	<input type="checkbox"/>

[1]

- (ii) Photocells have advantages and disadvantages as a source of electricity.**

Write down ONE ADVANTAGE of using photocells.

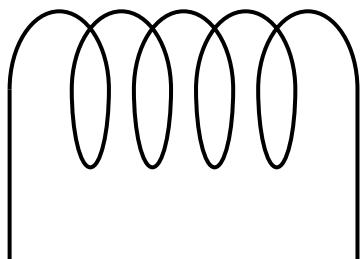
[1]

[Total: 3]

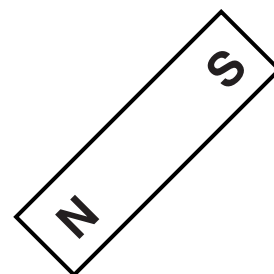
9 This question is about generating electricity.

(a) Molly builds a generator to produce electricity.

She uses a magnet and a coil of wire.



coil of wire



magnet

Describe how Molly uses this equipment to generate a current.

In your answer you should

- **draw a diagram to show how she uses the equipment**
- **describe how a current is produced**
- **describe how she could increase the current produced.**

[3]

(b) Power stations generate electricity on a large scale.

Some power stations use a FOSSIL FUEL such as coal.

Other power stations burn RENEWABLE fuels.

(i) Write down the name of one OTHER FOSSIL FUEL used in power stations.

_____ [1]

(ii) Write down the name of one RENEWABLE fuel burned in power stations.

_____ [1]

[Total: 5]

10 This question is about nuclear radiation.

(a) There are three types of nuclear radiation.

One type is ALPHA radiation.

Write down the names of the OTHER two types of radiation.

1 _____

2 _____ [1]

(b) Nuclear radiation can harm people.

Workers who use radioactive materials need to be safe.

Write down TWO things they can do to be safe when handling radioactive materials.

_____ [2]

[Total: 3]

11 This question is about the cost of using electricity.

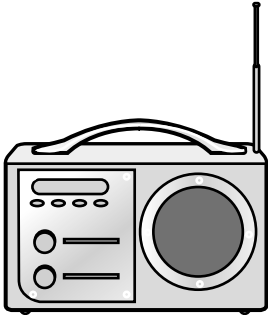
(a) Look at the pictures of some appliances and their power ratings.



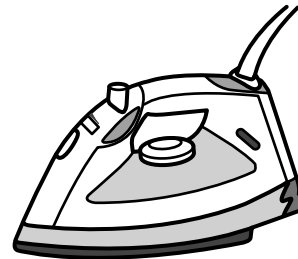
lamp 60 W



kettle 2500 W



radio 15 W



iron 1200 W

Each appliance is switched on for 5 minutes.

Which appliance costs the LEAST to run?

_____ [1]

(b) Nasim cooks a meal in a conventional oven.

It takes 3 hours to cook.

The oven has an average power of 3.5 kW.

(i) Calculate the number of kilowatt hours used to cook the meal.

answer _____ kWh [1]

(ii) Electricity costs 16 pence per unit (kWh).

Calculate the cost of cooking the meal.

answer _____ pence [1]

[Total: 3]

12 Look at the statements about the Earth.

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

The Earth is a star that orbits the Sun.

The Earth is a planet that orbits the Moon.

The Earth is a planet that orbits the Sun.

The Sun is a star that orbits the Earth.

[1]

(b) Complete the sentence using words from this list.

BLACK HOLES

COMETS

GALAXIES

PLANETS

STARS

Large groups of _____

are called _____ . [1]

(c) Asteroids are part of our Solar System.

They orbit between Mars and Jupiter.

What are asteroids made of?

_____ [1]

[Total: 3]

13 This question is about how the Universe was formed.

(a) Complete the sentence.

The Universe started with

_____ . [1]

(b) Stars are part of the Universe. They only last for a finite time and can end as a black hole.

How do stars START their life?

_____ [1]

(c) Black holes cannot be seen.

Why can black holes not be seen?

_____ [1]

[Total: 3]

END OF QUESTION PAPER

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