Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION

J649

B482/01

APPLIED SCIENCE: DOUBLE AWARD

Unit 2: Science for the needs of society (Foundation Tier)

WEDNESDAY 9 JUNE 2010: 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 (mm/cm)

READ INSTRUCTIONS OVERLEAF

DC (NF/DJ) MEP60404 30578

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.**
- **The total number of marks for this paper is 60.**
- **The marks allocated and the spaces provided are a good indication of the length of answers required.**

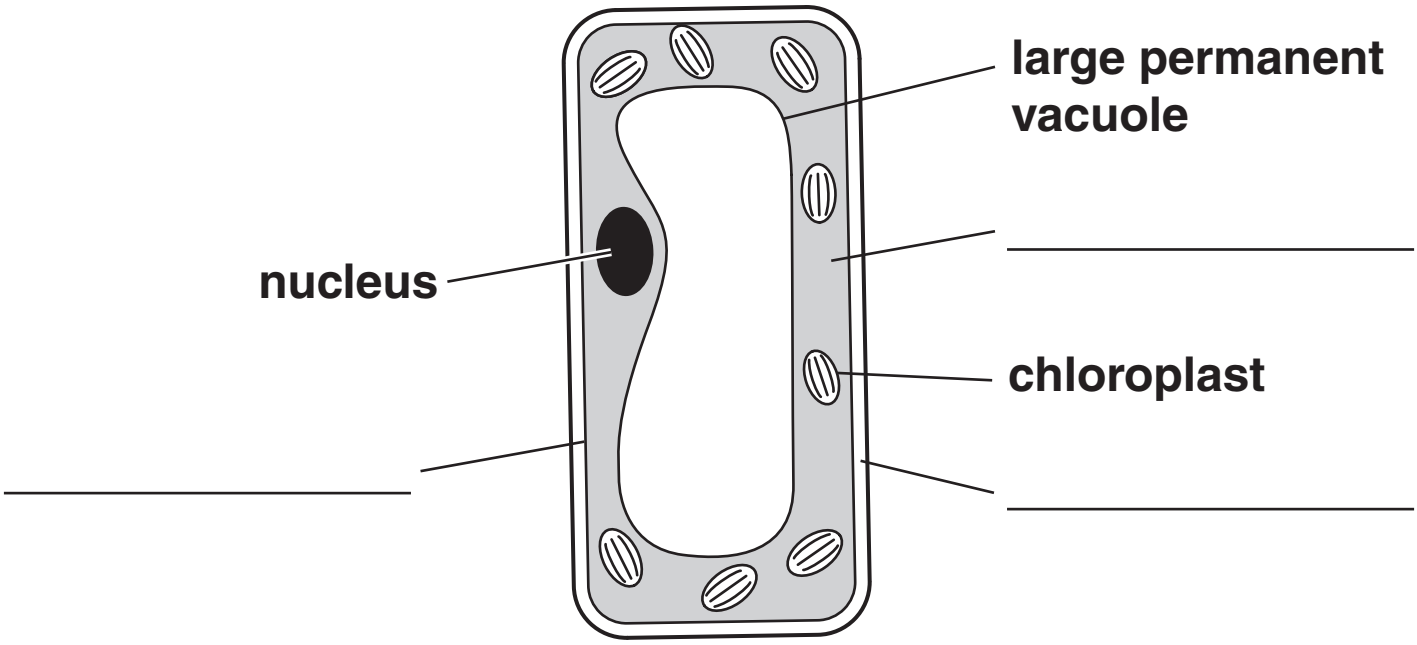
BLANK PAGE

Answer ALL the questions.

1 Kiara is a biologist. She works with plants.

(a) Kiara looks at a plant cell using a microscope.

(i) Complete the labels on the diagram of the plant cell.



[3]

(ii) Write down TWO parts of the plant cell that are NOT found in an animal cell.

_____

_____ **[2]**

(iii) Which part of the cell contains the genetic information?

_____ **[1]**

(iv) Which part of the cell absorbs light energy for photosynthesis?

_____ **[1]**

(b) Kiara selectively breeds the plants to improve them.

Complete the sentences that describe how Kiara selectively breeds the plants.

Choose from the words below.

CHARACTERISTICS **CHROMOSOMES**

CROSS BREED **GROW** **OFFSPRING**

To breed a better plant, Kiara starts by selecting

plants with the best _____

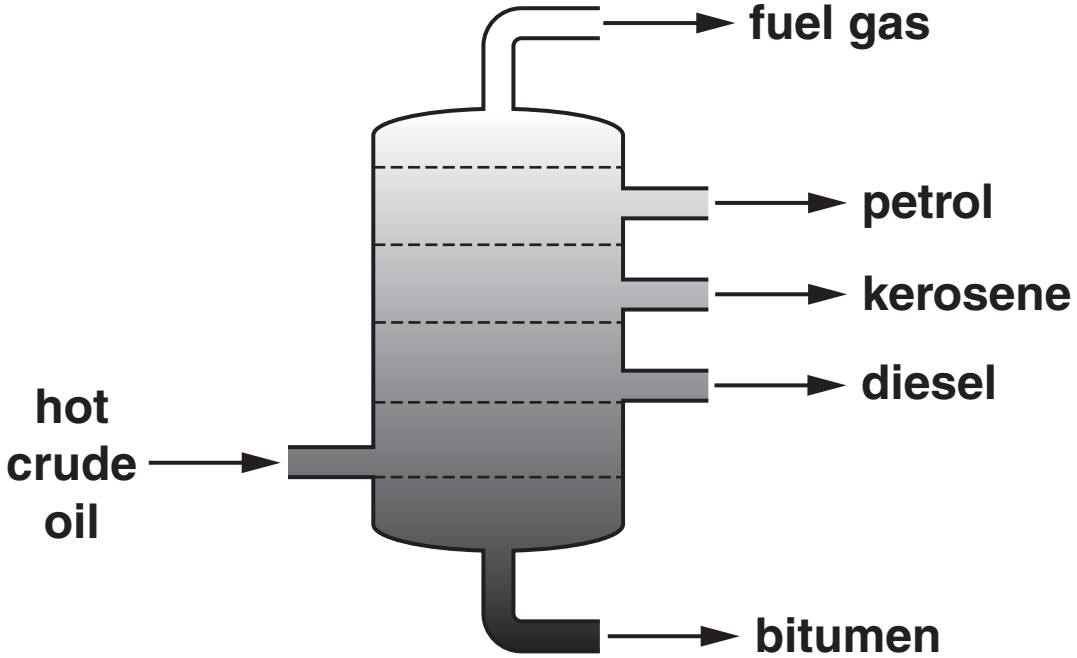
She can then _____ the plants.

Kiara repeats the process after the plants have

produced _____ **[3]**

[Total: 10]

2 The diagram shows how crude oil is separated into useful chemicals.



(a) (i) What is the name for this process?

Put a (ring) around the correct answer.

COMBUSTION **FILTRATION**

FRACTIONAL DISTILLATION **OXIDATION** **[1]**

(ii) Which of the following statements about this process are TRUE and which are FALSE?

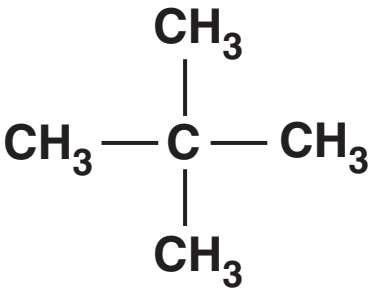
Put a tick (✔) in one box in each row.

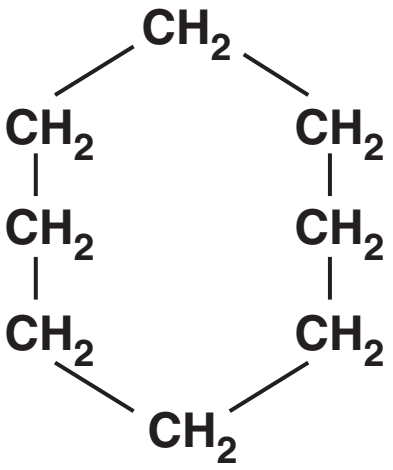
	TRUE	FALSE
All of the products shown on the diagram are used as fuels.	☐	☐
The chemicals produced are fine, speciality chemicals.	☐	☐
The main raw material is non-renewable.	☐	☐
All the boiling points of the chemicals are the same.	☐	☐
The compounds named on the diagram are organic chemicals.	☐	☐

[3]

(b) Some of the products of this process are used to make petrol.

The diagram shows the structure of two of the molecules in petrol.





(i) Give the <u>NAMES</u> of the two <u>ELEMENTS</u> that the molecules contain.

_____ and

_____ [2]

(ii) Which of the following is the best description of petrol?

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

a pure compound	☐
a pure element	☐
a mixture of elements	☐
a mixture of compounds	☐

[1]

(c) Some of the chemicals from crude oil are used to make new materials.

Which materials are made from chemicals in crude oil?

Put a (ring) around the two correct answers.

CHLORINE	**COTTON**	**DYES**
PLASTIC PACKAGING	**SALTS**	

[2]

(d) Crude oil is mined off the British coast near Aberdeen.

Some local people like having large mining operations near where they live.

Some local people do not.

Give one advantage and one disadvantage of living near a large mining operation.

advantage _____

disadvantage _____ **[2]**

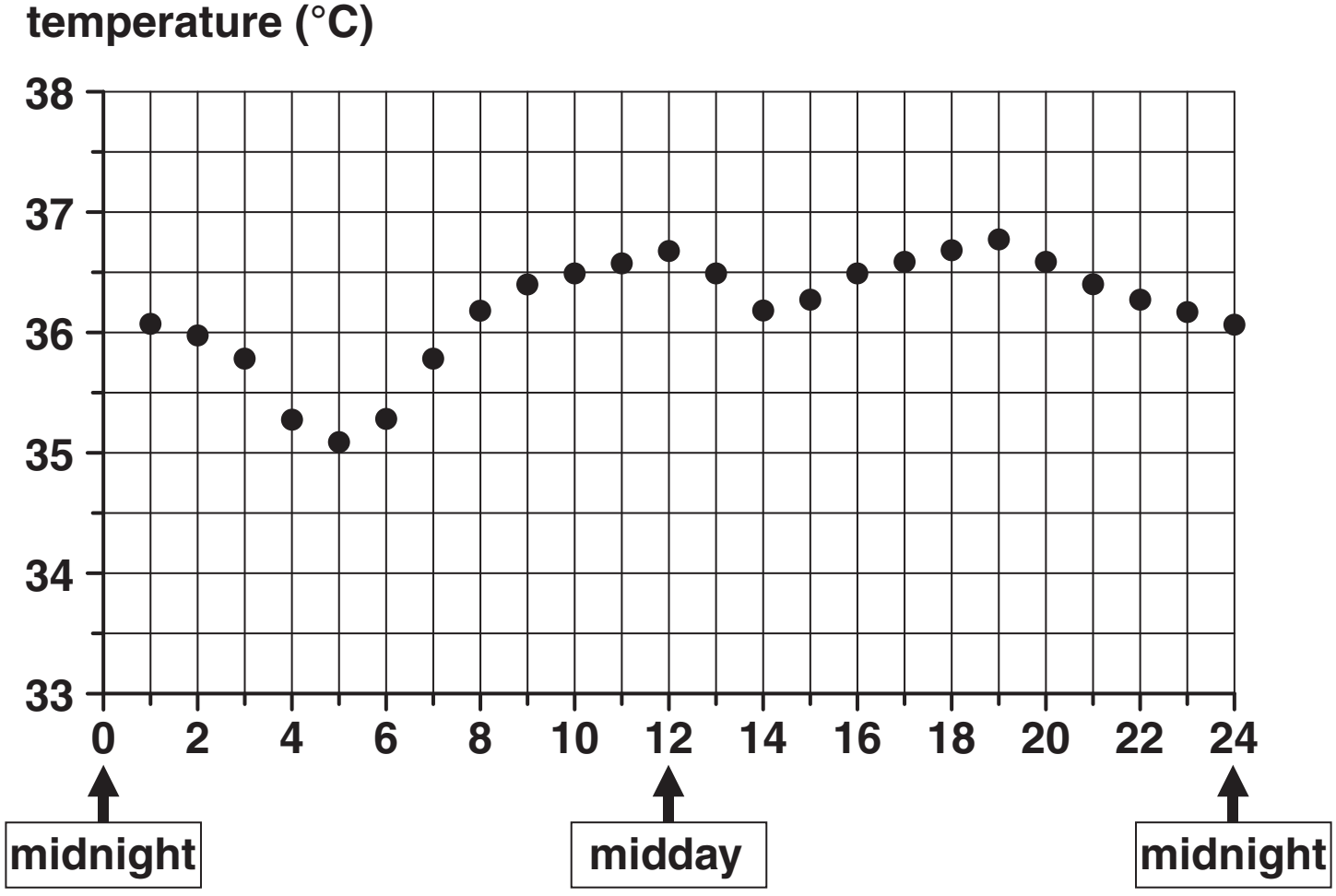
[Total: 11]

3 Joe is in hospital.

A nurse attaches a sensor to Joe that automatically records his body temperature every hour.

The graph shows his temperature over 24 hours.

BODY TEMPERATURE



(a) Give one advantage of using a machine to measure Joe's temperature rather than using a normal thermometer.

_____ **[1]**

(b) Joe sleeps from midnight until 5 o'clock.

(i) What happens to Joe's temperature while he sleeps?

_____ **[1]**

(ii) Joe has a short sleep at midday.

Suggest what time Joe wakes up.

Explain your reasoning.

time _____

reason _____

_____ **[2]**

(c) The nurse tells Joe that the average body temperature is usually 37 °C.

(i) <u>DRAW A LINE</u> across the graph to show this temperature. [1]

(ii) How does Joe's temperature compare to the average?

_____ **[1]**

(d) Joe notices that his body temperature increases when he moves around.

(i) What process in Joe's body produces most heat?

Put a (ring) around the correct answer.

CIRCULATION **RESPIRATION**

DIGESTION **SWEATING** **[1]**

(ii) The nurse tells Joe that other changes happen in his body when he moves around.

Which of the following will INCREASE when Joe moves around?

Put a tick (✔) in the boxes next to the TWO correct answers.

number of blood cells	☐
breathing rate	☐
pulse rate	☐
total volume of the blood	☐
levels of salt in the blood	☐

[2]

(e) The nurse tells Joe that he has an infection.

The infection is caused by a virus.

Suggest <u>TWO</u> ways that Joe could have caught the infection from another person.

1. _____

2. _____ **[2]**

[Total: 11]

4 A new type of electric car became available in the UK in 2005.

Read the information about the electric car.

NEW 'PLUG AND GO' ELECTRIC CAR

New 2 seater electric cars could solve air pollution problems in cities. The cars can be charged at home or at pay-as-you-charge charging points. Typically, it can take from 30 minutes to a couple of hours to fully charge the car. In 2008 there were 60 garage charging points in the UK compared to thousands of garages selling petrol and diesel.

Car manufacturers have been working hard to find a replacement for petrol and diesel cars. One manufacturer is claiming 90% energy efficiency for one model of electric car.

The table shows how the cars compare to small petrol and diesel cars.

	cost to run (per mile)	top speed (miles per hour)	maximum distance before charging or filling (miles)
electric car	2p	50	48
petrol car	14p	130	630
diesel car	12p	100	800

(a) The article says that the electric cars could 'solve air pollution in cities'.

Which of the statements about air pollution from cars are TRUE and which are FALSE?

Put a tick (✔) in one box in each row.

	TRUE	FALSE
Petrol and diesel engines give off harmful gases.	☐	☐
No fuel is burnt in an electric car.	☐	☐
Air pollution from cars is worse in the countryside than in cities.	☐	☐
Electricity generation produces no harmful gases.	☐	☐

[2]

(b) Eve works in a town. She has a petrol car but is thinking of changing to an electric car.

Use information from the article to give one advantage to Eve of changing to an electric car.

_____ **[1]**

(c) Liz works with Eve but drives long distances around the country as part of her work.

Explain why an electric car would <u>NOT</u> be suitable for Liz.

_____

_____ **[2]**

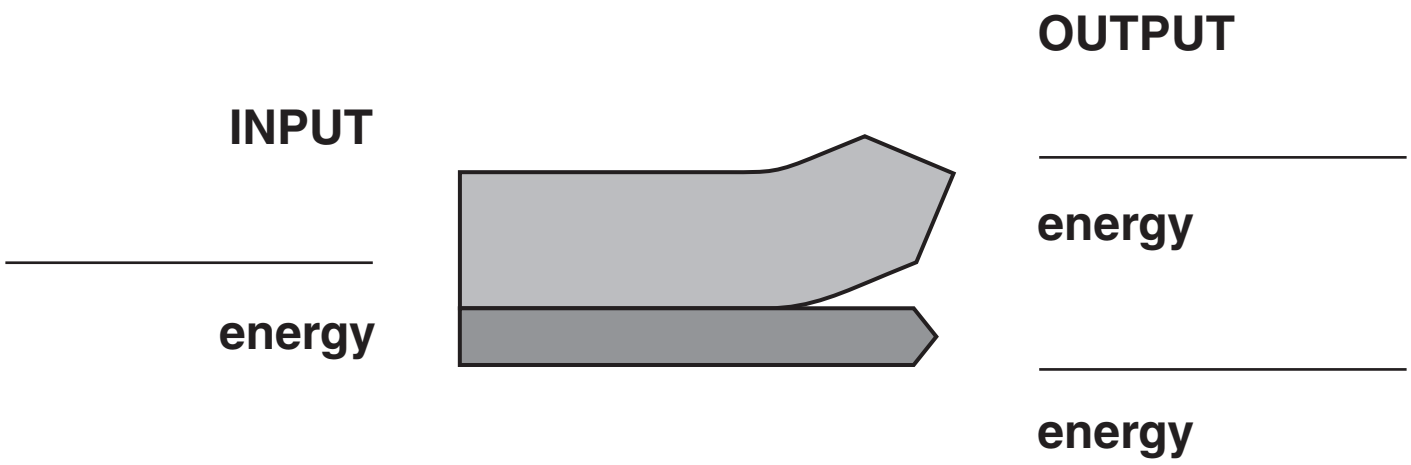
(d) The manufacturers of one electric car claim that its energy efficiency is 90%.

Complete the Sankey diagram to show this information.

Choose from these words.

<u>LIGHT</u> **<u>ELECTRICAL</u>** **<u>HEAT</u>**

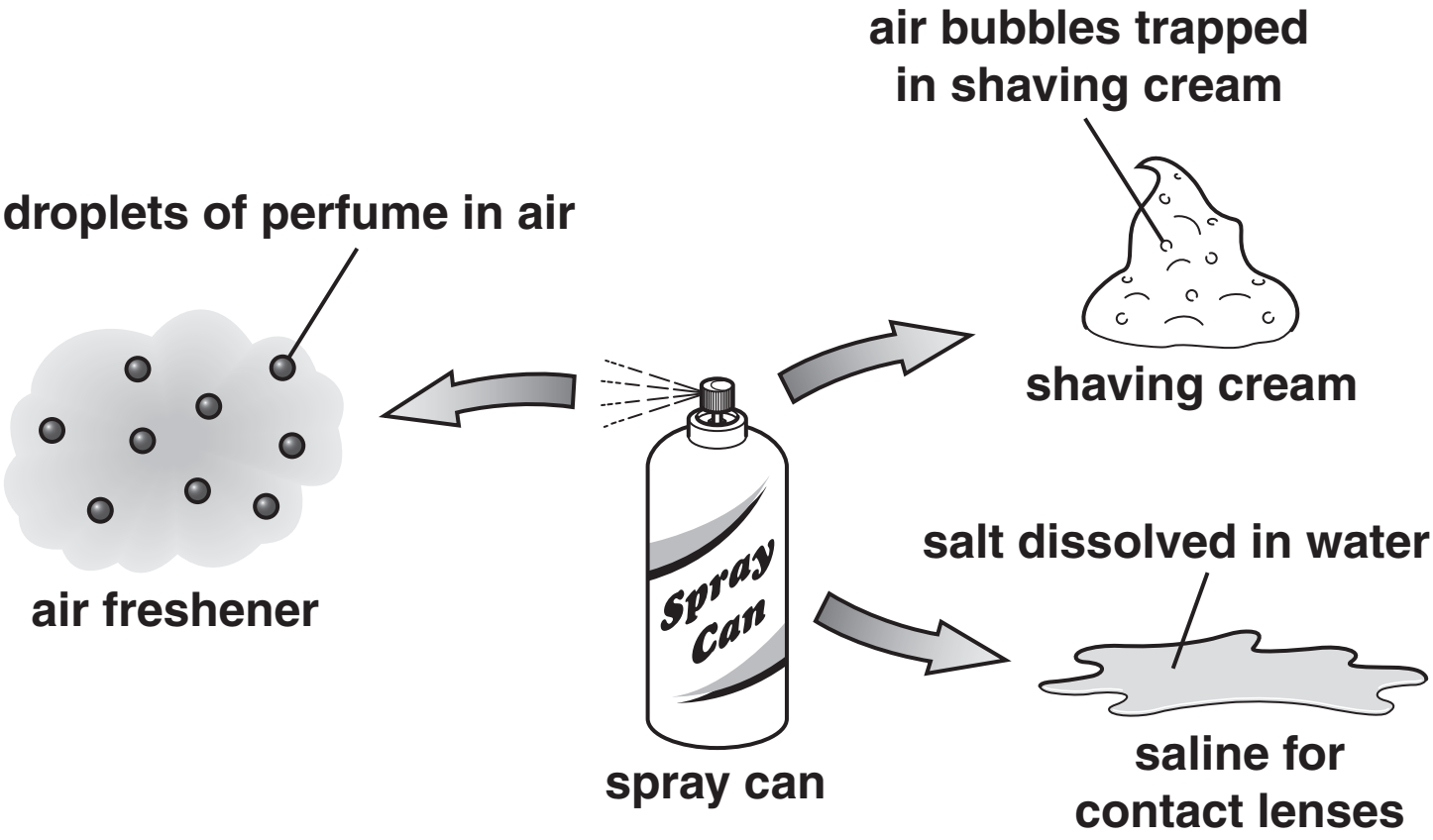
<u>MOVEMENT</u> **<u>CHEMICAL</u>**



[3]

[Total: 8]

5 Some bathroom products are sold in spray cans.



(a) What type of mixture is saline?

Put a (ring) around the correct answer.

SUSPENSION SOLUTION SOLVENT

SOLVATION EMULSION [1]

(b) Complete the table to show the continuous and dispersed phases in shaving cream and air freshener.

Use these words.

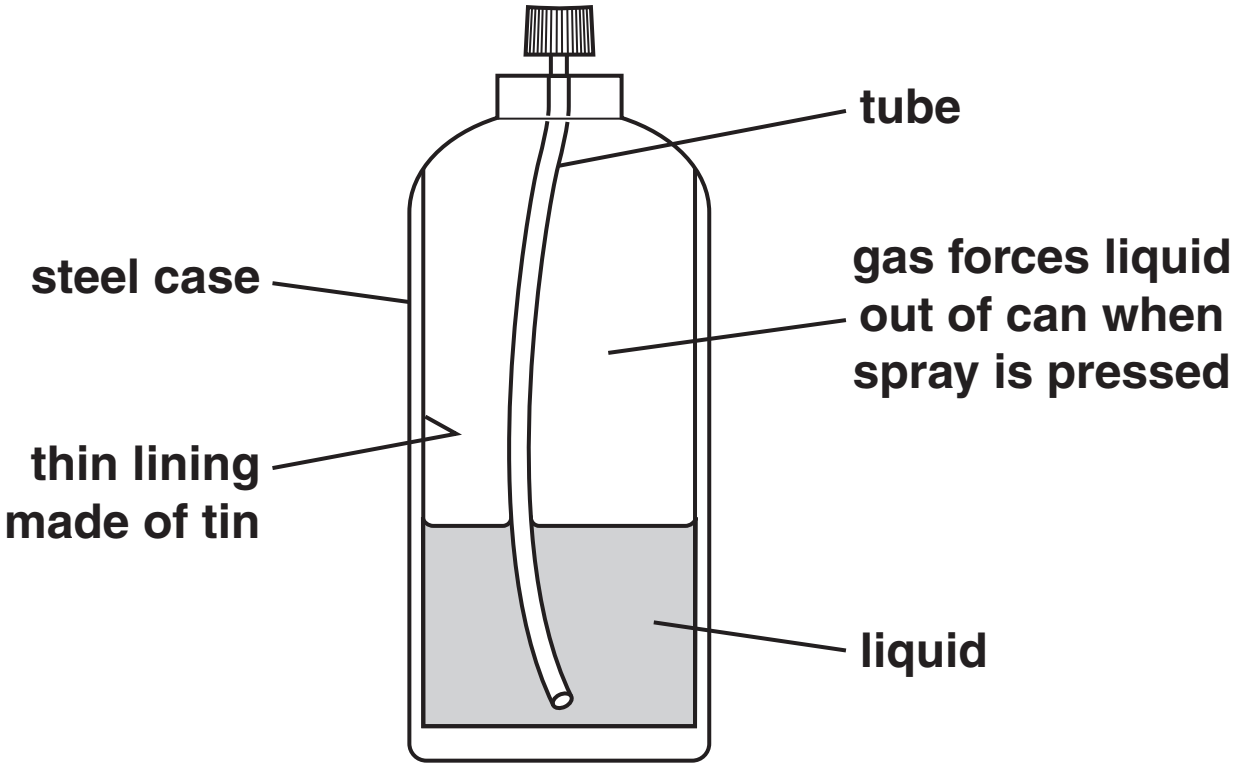
You may use each word once, more than once or not at all.

SOLID LIQUID GAS

	continuous phase	dispersed phase
shaving cream		
air freshener		

[3]

(c) The diagram shows the structure of a spray can.



The metals from the spray can can be recycled.

(i) Give <u>TWO</u> advantages of recycling the metals from spray cans.

_____

_____ [2]

(ii) Give one reason why it is difficult to recycle the metals from spray cans.

_____ [1]

(d) The spray can contains a gas to force the contents of the can to spray out.

The table shows some information about gases that were used in spray cans.

formula of gas	boiling point °C
CF_3CH_2F	16
CH_3OCH_3	19
CH_3CHF_2	19

(i) What elements do <u>ALL</u> these gases contain?

_____ [1]

(ii) Spray cans that use these gases do not work as well if they are stored at 5°C.

Explain why.

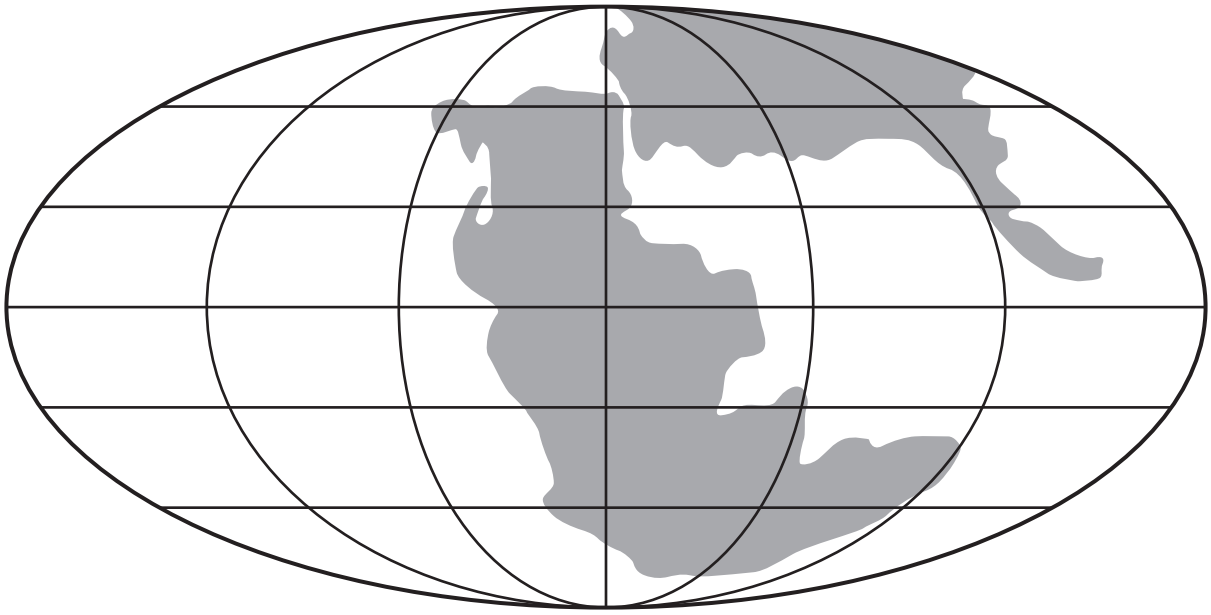
_____

_____ [2]

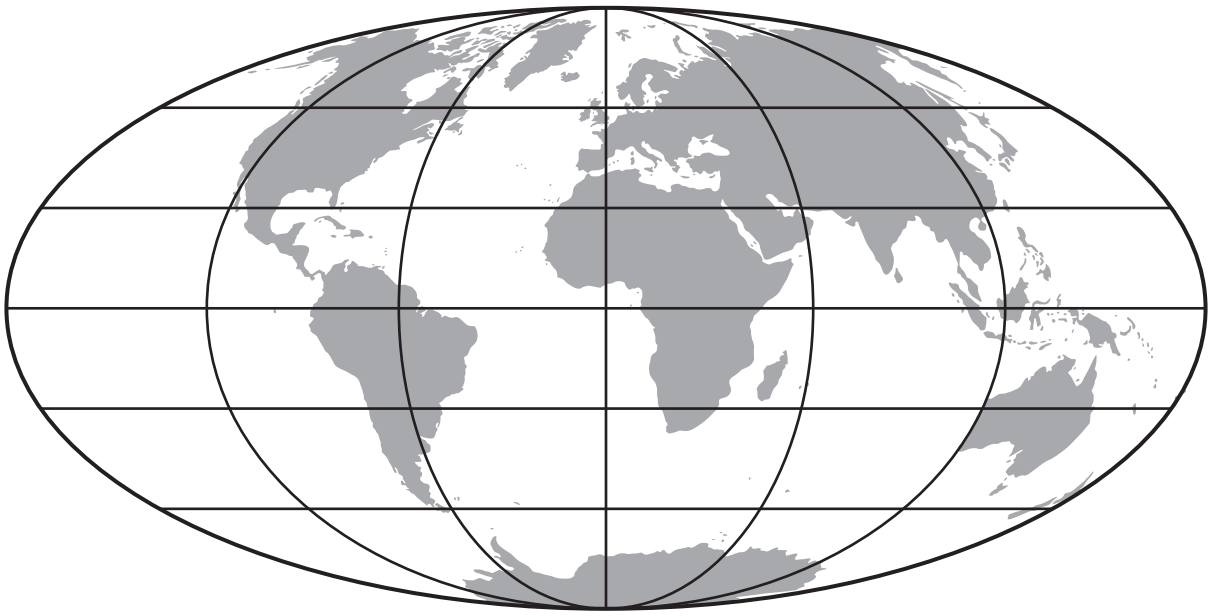
[Total: 10]

6 Scientists think the Earth was very different in the past.

The diagrams show the Earth 190 million years ago and today.



190 million years ago



today

(a) (i) The arrangement of the continents has changed.

Explain how the change has happened.

_____

_____ **[2]**

(ii) The change in the continents is very slow.

Other changes to the Earth's surface are caused by the same process.

Write down one other change caused by this process that is also very slow.

_____ **[1]**

(b) When life first developed on Earth the atmosphere was mostly carbon dioxide with very little oxygen.

Now there is very little carbon dioxide and about 20% oxygen.

What process carried out by living things could have brought about this change?

_____ **[1]**

(c) We could not survive without both oxygen and carbon dioxide in the atmosphere.

(i) Explain why oxygen is necessary.

_____ **[1]**

(ii) Without carbon dioxide in the atmosphere, the climate of the Earth would not be suitable for life.

Explain why.

_____

_____

_____ **[2]**

(d) The Earth was formed about 5 000 million years ago.

The Earth is part of the Solar System.

(i) What does the Solar System contain?

_____

_____ **[2]**

(ii) The Solar System is part of the Universe.

How do scientists think the Universe started?

_____

_____ **[1]**

[Total: 10]

END OF QUESTION PAPER