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Centre number						Candidate number				
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**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 15 June 2011: 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

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. Pencil may be used for graphs and diagrams only.**
- **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).**
- **Answer ALL the questions.**

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 Marty works installing kitchen worktops.

He tells a customer about the worktop.

‘The worktop is a composite material. It looks like stone because there is a photograph of stone glued on top of a thick layer of wood chips. The surface is a hard, see-through polymer called melamine.’

(a) Marty says that the worktop is a composite material.

Which two statements are true for this composite material?

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

The composite material ...

... contains more than one material.

... contains only synthetic materials.

... contains layers that are stuck together.

... is made from stone.

... contains only natural materials.

[2]

(b) Worktops can also be made from pottery tiles or stainless steel.

Draw straight lines to join the WORKTOP to the correct TYPE OF MATERIAL.

TYPE OF WORKTOP

TYPE OF MATERIAL

pottery tiles

stainless steel

ceramic

composite

polymer

metal

[2]

(c) Marty's customer thinks that a polymer worktop will not last in the heat of the kitchen.

Marty tells his customer not to worry.

'Melamine is different to most polymers. You can safely put very hot pans on it and even if your kitchen catches fire the melamine will just turn black.'

Write down TWO things that happen to most polymers when they get very hot.

[2]

(d) Marty advises his customer how to clean the new worktop.

‘You should use an aerosol spray cleaner. You can buy bleach cleaners for kitchen worktops, but be careful when you use them because the bleach is harmful to skin.’

(i) The diagram shows the contents of an aerosol spray.

Label the diagram.

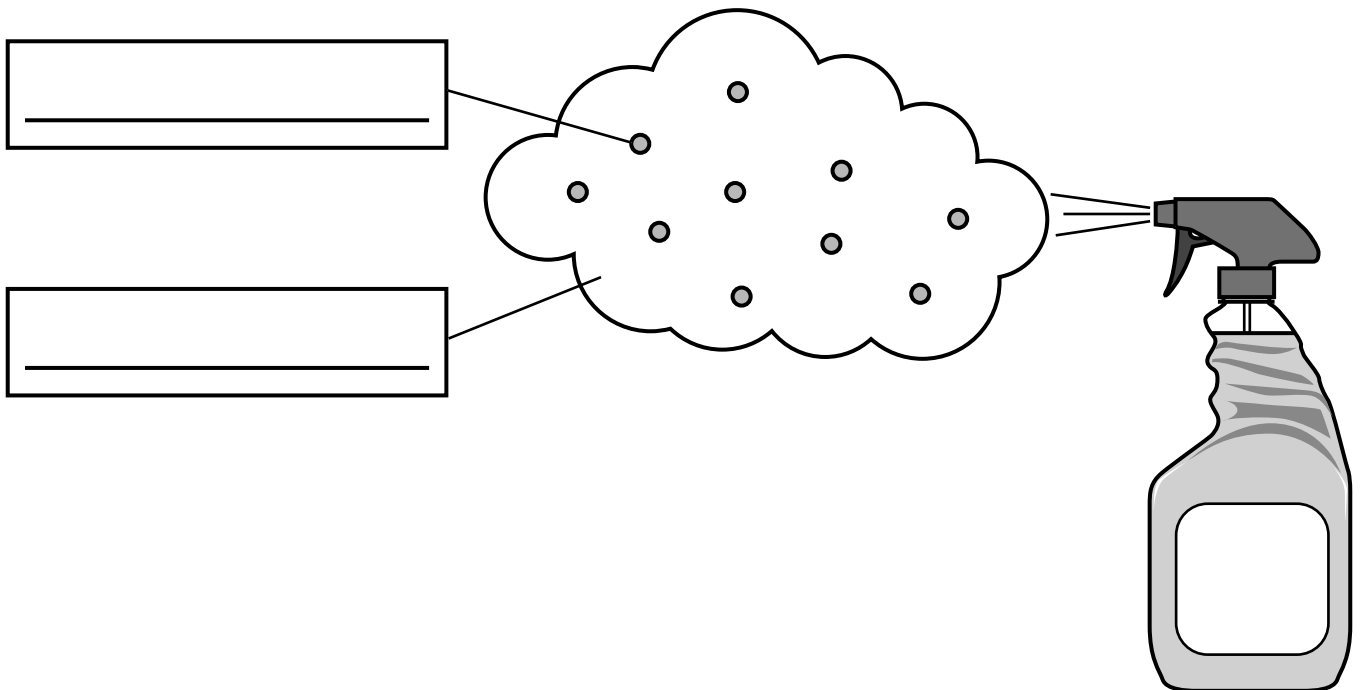
Choose words from the list.

FOAM

GAS

LIQUID

SOLID



[2]

(ii) Suggest two SAFETY PRECAUTIONS you should take when using bleach kitchen cleaner.

1. _____

2. _____ [2]

[Total: 10]

2 Rose works for a chemical company. She researches chemicals that are used for intensive farming.

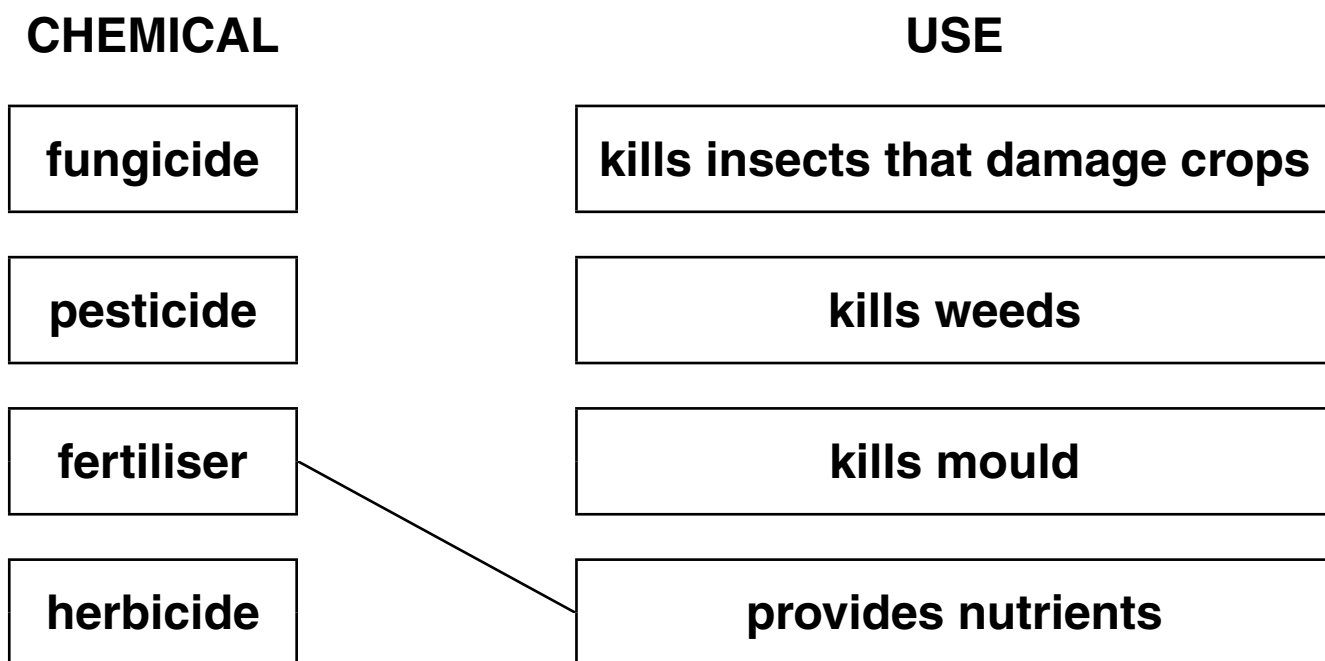
Rose is studying the effects of using herbicides, pesticides and fertilisers.

She tests the effects of chemicals on crops grown in a small field.

(a) The chemicals have different uses.

Draw straight lines to show the USE of each CHEMICAL.

One has been done for you.



[2]

(b) When it rains, the water runs off the field and collects in a ditch.

Rose notices that a lot of water weed grows in the ditch.

She thinks this is caused by one of the chemicals she is testing.

Which chemical is most likely to increase the growth of water weed?

Put a ring around the correct answer.

FUNGICIDE

HERBICIDE

PESTICIDE

FERTILISER

[1]

(c) Rose collects some of the water weed from the ditch.

She looks at the cells of the water weed under a microscope.

The diagram shows a cell that Rose sees.

Add labels to the diagram to show the parts of the cell.

Choose from these words.

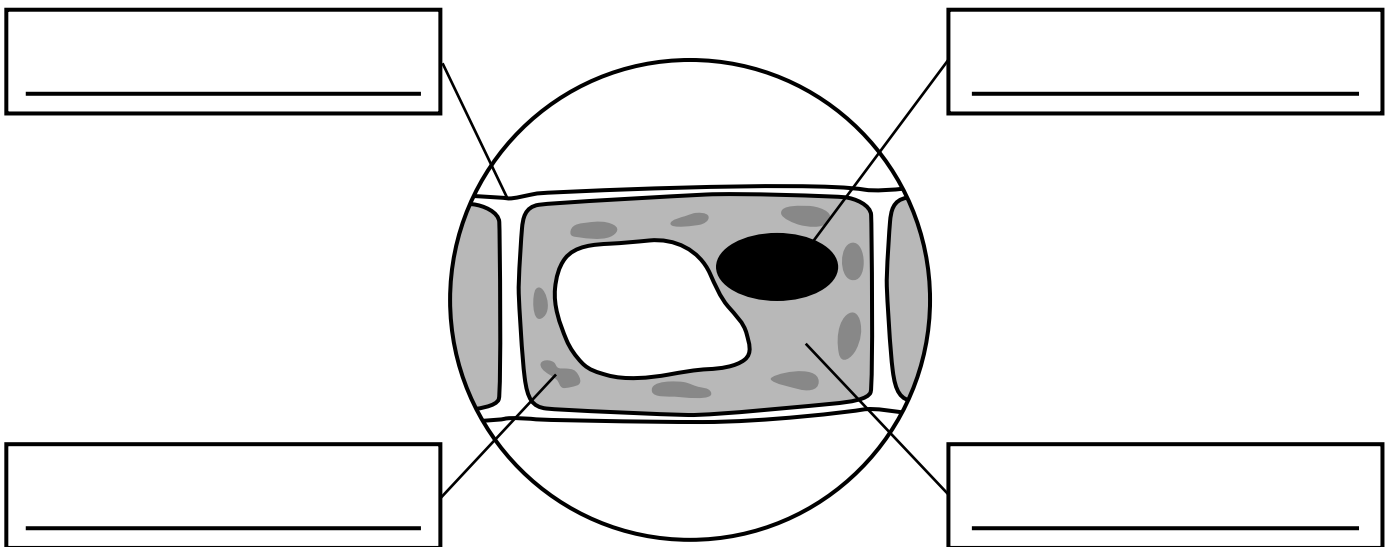
CELL WALL

CHLOROPLAST

NUCLEUS

CYTOPLASM

VACUOLE



[3]

(d) Draw straight lines to link each CELL PART with its FUNCTION.

CELL PART	FUNCTION
chloroplast	supports the cell
cell wall	contains genetic information
nucleus	absorbs light for photosynthesis

[2]

(e) The chemicals that Rose tests are all used when crops are grown using intensive farming.

Which of the following statements are true for intensive farms?

Put ticks (✓) in the boxes next to the TWO true statements for intensive farming.

only animal manure is used as a fertiliser

fields are usually very big

most weeds are dug up by hand

predators are always used to kill pests

more food is grown per acre than for organic farming

[2]

[Total: 10]

3 Troy wants to be a scientist. He finds out what different scientists do.

(a) Meteorologists study the atmosphere.

(i) The gases in the atmosphere are present in different amounts.

Draw a straight line to connect each GAS to its correct PERCENTAGE in the atmosphere.

GAS	PERCENTAGE
carbon dioxide	100%
oxygen	78%
nitrogen	21%
	0.03%

[3]

(ii) Which gas increases the temperature of the Earth?

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

CARBON DIOXIDE

OXYGEN

NITROGEN

[1]

(b) Geologists study the Earth's surface.

(i) The movement of tectonic plates cause changes to the Earth's surface.

Which of the following are NOT the result of plate movements?

Put ticks (✓) in the boxes next to the TWO correct answers.

continental drift

volcanoes

hurricanes

forest fires

earthquakes

[2]

(ii) Some changes to the Earth's surface can happen QUICKLY and lead to natural disasters.

Write down TWO examples of these quick changes.

1. _____

2. _____

[2]

(c) Astronomers study the Universe.

Which of the following have astronomers discovered?

Put ticks (✓) in the boxes next to the TWO correct answers.

The Universe is expanding.

The Universe is only made up of the Sun and planets.

The Universe will fit inside the Milky Way galaxy.

The Universe started with a big bang.

[2]

[Total: 10]

4 In 2009, there were concerns about the spread of swine flu.

Read the information about swine flu.

FACE MASKS USELESS TO STOP SWINE FLU SPREADING

Government health officers have warned that wearing face masks will not stop the spread of the swine flu virus. Some doctors and nurses wear masks when they are in contact with patients who have the virus. However, there are problems when the masks get wet and if the holes in the material are too large. People wearing the masks have a false sense of security and may not follow the advice to stop swine flu spreading.

The best advice to stop spreading the swine flu virus is to ...

- **COVER YOUR NOSE AND MOUTH WHEN COUGHING OR SNEEZING,**
- **WASH YOUR HANDS,**
- **BURN ANY USED TISSUES.**

(a) Explain how people can still get swine flu when they are wearing face masks.

[1]

- (b) The article contains some UNDERLINED advice about how to stop the spread of the swine flu virus.

Explain how following the advice would slow down the spread of swine flu.

[2]

- (c) Swine flu is caused by a virus.

A virus is a type of microorganism.

Other types of microorganisms also cause health problems.

- (i) Which of the following are MICROORGANISMS that can cause health problems?

Put a ring around the TWO correct answers.

BACTERIA FUNGI HORMONES
PLATELETS TOXINS

[2]

- (ii) Which of the following health problems are caused by microorganisms?

Put a ring around the TWO correct answers.

CYSTIC FIBROSIS DIABETES MEASLES
OBESITY POLIO

[2]

(iii) Microorganisms are also used to make some useful products.

Which of the following products are made using microorganisms?

Put ticks (✓) in the boxes next to the TWO correct answers.

ceramics

antibiotics

artificial fertilisers

beer

[2]

[Total: 9]

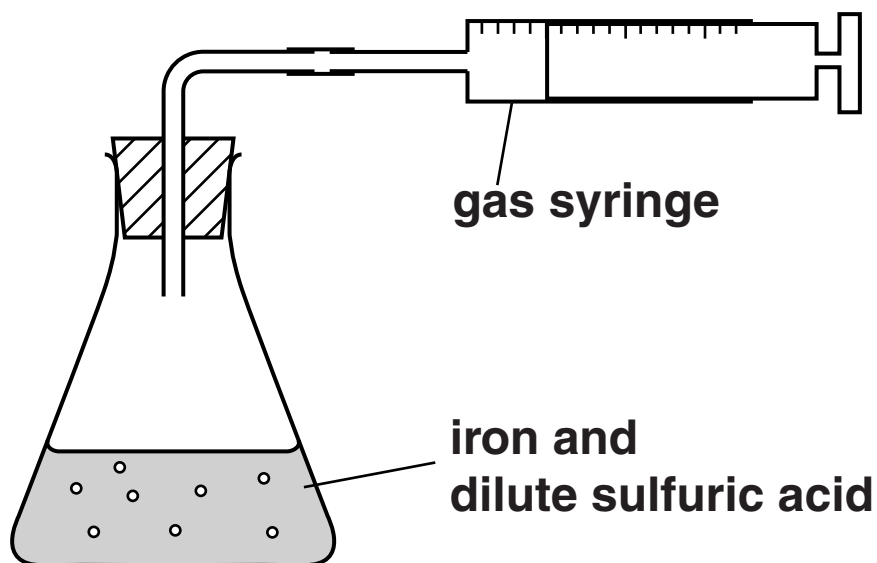
5 Joe looks at the label on a bottle containing iron tablets.

Iron tablets can be taken as a medicine.



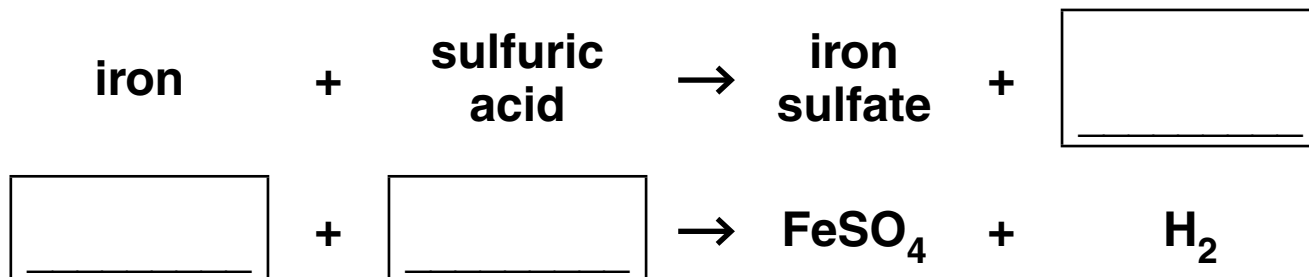
Joe makes some iron sulfate in a school laboratory.

He adds iron to dilute sulfuric acid and collects the gas that is given off.



(a) The reaction also produces a solution of iron sulfate.

(i) Complete the word and symbol equations for the reaction.



[2]

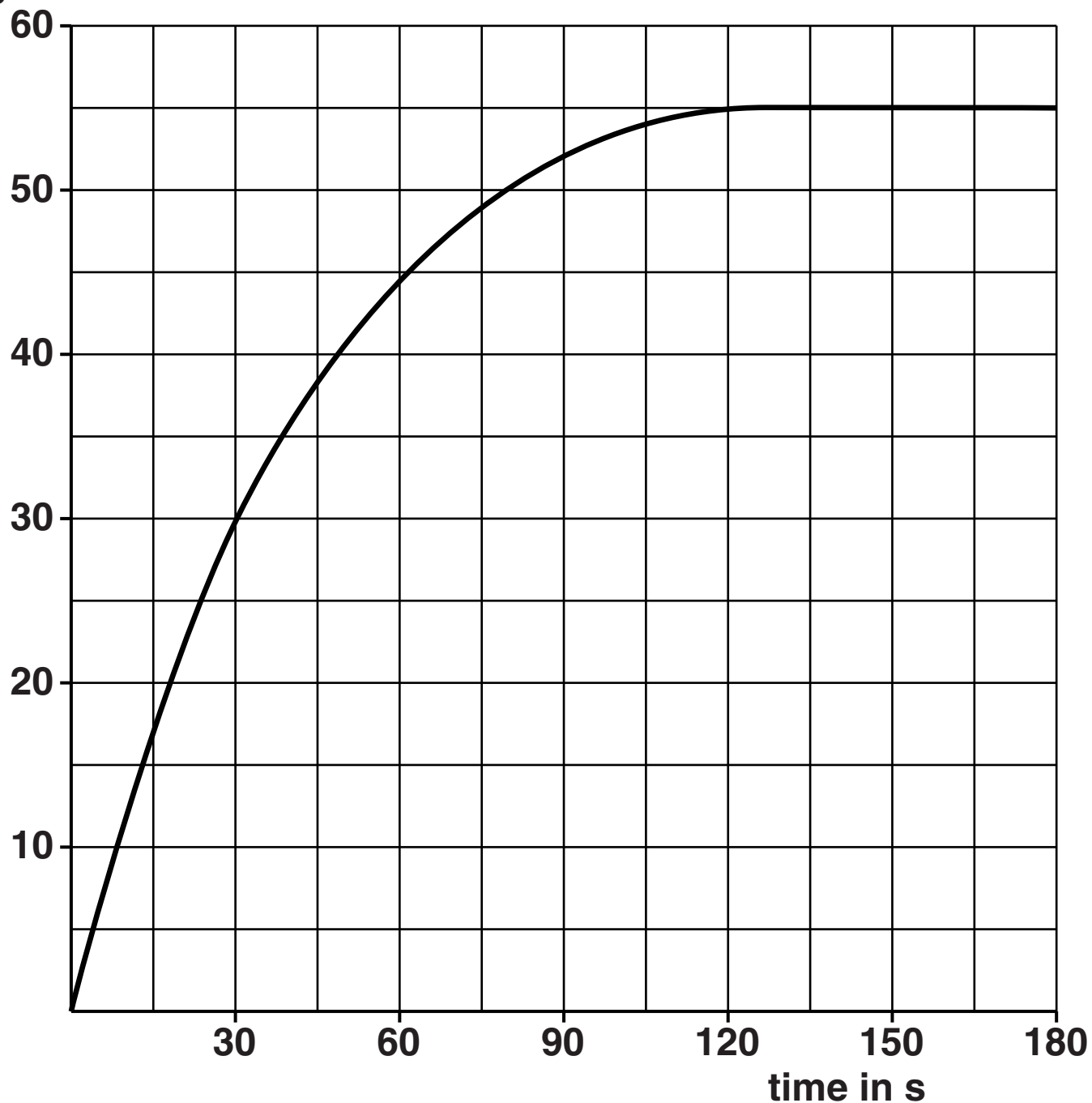
(ii) Put a tick (✓) in one box in each row to show what each chemical is; an element, a compound or a mixture.

CHEMICAL	ELEMENT	COMPOUND	MIXTURE
iron			
dilute sulfuric acid			
iron sulfate solution			
H ₂			

[2]

(b) Joe draws a graph to show the rate of the reaction.

**volume of
gas in cm³**



- (i) Put a cross on the graph to show when the reaction is happening at the fastest rate. [1]**
- (ii) How long did it take for the reaction to finish? [1]**

[1]

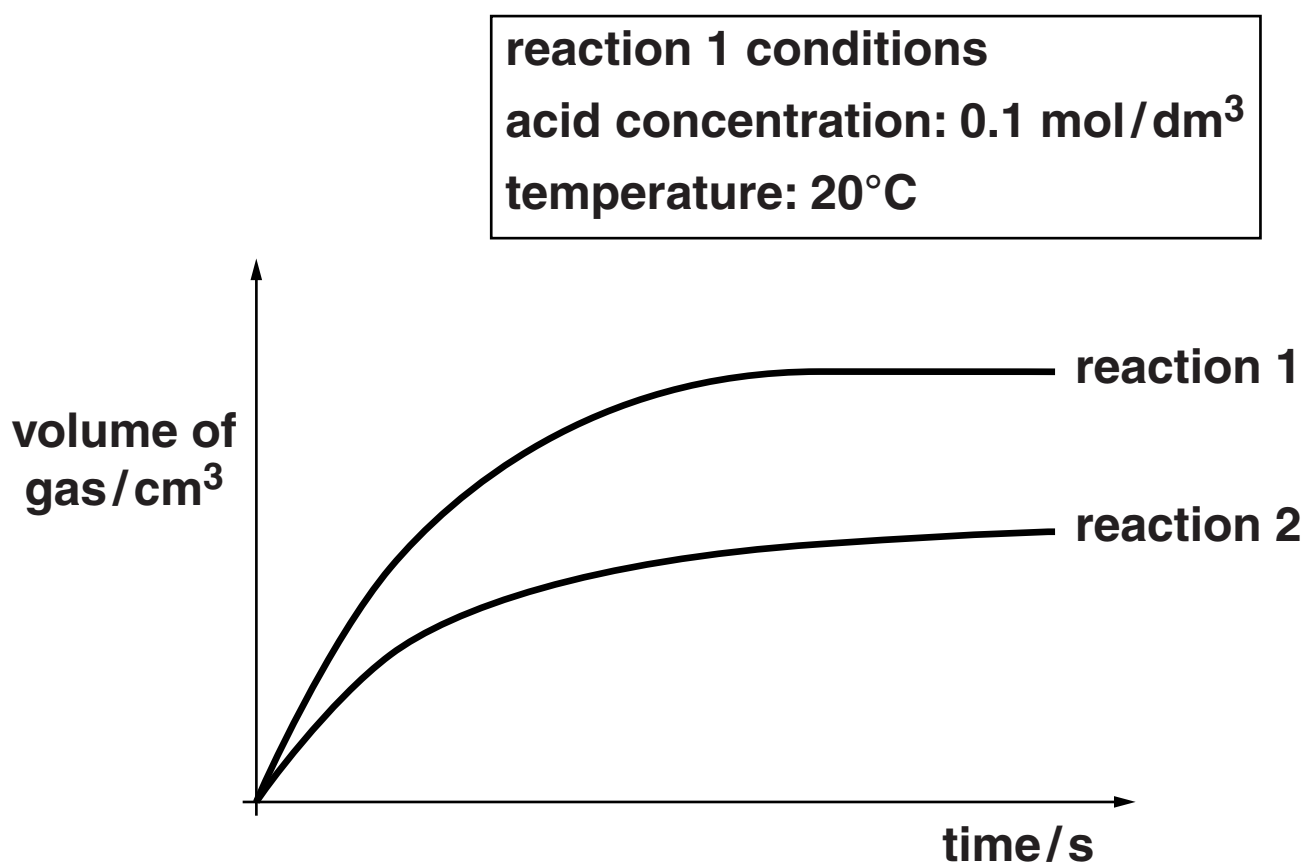
(iii) What volume of gas was given off at the end of the reaction?

_____ cm³ [1]

(c) Joe carries out a second reaction.

He changes the reaction conditions.

The graph shows the results for REACTION 1 and REACTION 2.



Suggest what different condition Joe used for REACTION 2 compared to REACTION 1.

_____ [1]

(d) Joe knows the iron sulfate he has made is not safe to take as a medicine.

Iron sulfate tablets made in factories go through several stages.

These make sure the tablets are safe to be taken as a medicine.

Which of the following stages help make sure that the tablets are safe to take?

Put ticks (✓) in the boxes next to the THREE correct stages.

purification

packaging

quality control

advertising

measurement of dosage per tablet

monitoring factory waste

[2]

[Total: 10]

6 Maria works for a company that makes duvets.

Her job is to test the duvets. She measures how well the duvets insulate.

(a) Which of the following is a scientific description of how insulation works?

Put a tick (✓) next to the correct SCIENTIFIC description.

- | | |
|-------------------------------------|--------------------------|
| keeps things warm | <input type="checkbox"/> |
| increases the flow of energy | <input type="checkbox"/> |
| keeps cold out | <input type="checkbox"/> |
| reduces energy transfer | <input type="checkbox"/> |

[1]

(b) The structure of the duvet makes it a good insulator.

Different features of the duvet reduce the transfer of heat.

Use straight lines to connect each METHOD OF HEAT TRANSFER to the FEATURE OF THE DUVET that reduces the transfer of heat.

METHOD OF HEAT TRANSFER

FEATURE OF THE DUVET

conduction

many air gaps

convection

surface of duvet is white

radiation

fibres are long

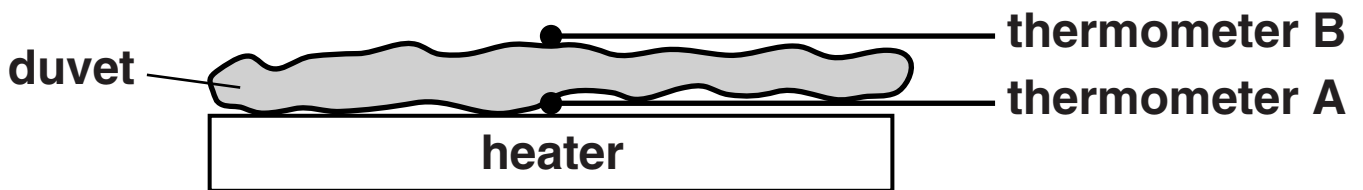
air gaps are small

[3]

(c) Maria uses a heater and two thermometers to make her measurements of how well duvets insulate.

She works out the temperature difference between A and B.

She sets the heater to provide 1 watt per metre squared.



The insulation of a duvet is measured in Togs.

THE TOG VALUE IS 10 TIMES THE TEMPERATURE DIFFERENCE WHEN THE FLOW OF HEAT IS 1 WATT FOR EACH METRE SQUARED OF DUVET.

(i) Using 1 watt per metre squared, Maria works out a temperature difference of 1.25°C .

What is the Tog value for the duvet?

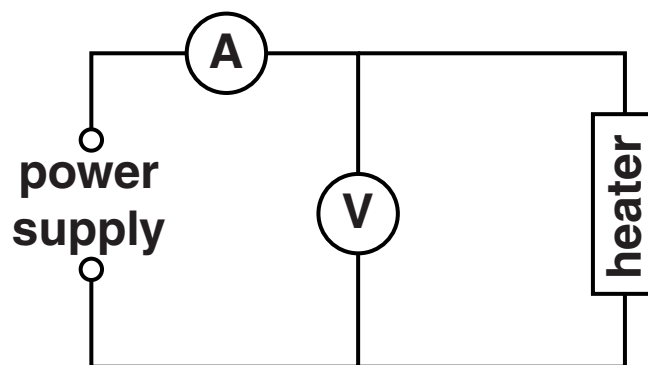
Tog value = _____ [1]

- (ii) With a duvet of 4.0 Togs and her heater using 1 watt per metre squared Maria reads thermometer A and thermometer B.

What is the temperature difference between the thermometers?

temperature difference = _____ °C [1]

- (d) Maria checks her heater is producing the right amount of power using this circuit.



- (i) What is the formula that links power, voltage and current?

[1]

- (ii) What is the power when the current is 0.2 A and the voltage is 6V?

You must show your working.

power = _____ unit _____ [2]

- (e) Duvets used in the warm summer are usually 4.0 Tog.

Duvets used in the cold winter are usually 14 Tog.

Explain why duvets with a higher Tog value are used in the cold winter.

[2]

[Total: 11]

END OF QUESTION PAPER

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