FOR OFFICIAL USE

F

	KU	PS
Total Mark		

3700/401

NATIONAL QUALIFICATIONS 2007

MONDAY, 21 MAY
9.00 AM – 10.00 AM

SCIENCE
STANDARD GRADE
Foundation Level

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename(s)

Surname

Date of birth
Day Month Year

Scottish candidate number

Number of seat

1 Answer as many questions as you can.

2 Read the whole of each question carefully before you answer it.

3 Write your answers in the spaces provided. Showing working may help in some questions.

4 Before leaving the examination room you must give this book to the invigilator. If you do not, you may lose all the marks for this paper.

SCOTTISH QUALIFICATIONS AUTHORITY

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1. Part of the index of a book is shown below.

(*a*) Which **two** pages should Craig look up to find out about the flexibility of carbon fibres?

Pages ..... and **1**

(*b*) James looked up pages 34 and 48.

What was he trying to find out about?

..... **1**

2. The boxes below show different sets of substances.

1 wood glass concrete	2 petrol paper alcohol
3 brass aluminium steel	4 water alcohol crude oil

Which box shows

(*a*) substances that **all** catch fire easily?

Box number **1**

(*b*) substances that are **all** liquids?

Box number **1**

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3. Some information about light bulbs is shown below.

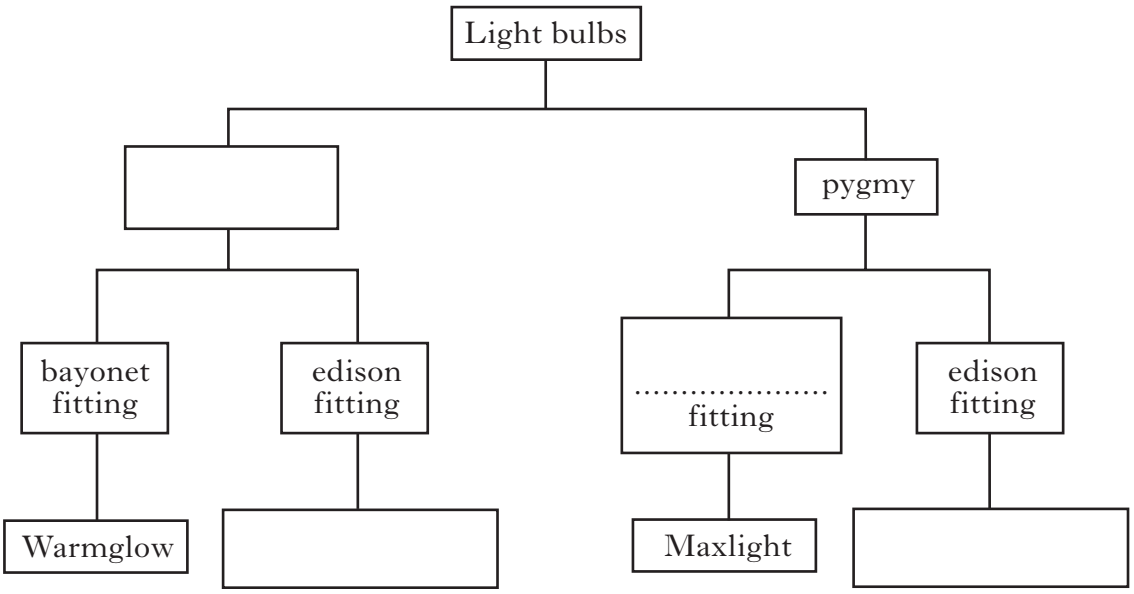
Warmglow and Softlight are candle bulbs.

Maxlight and Superspot are pygmy bulbs.

Warmglow has a bayonet fitting as does Maxlight.

Softlight and Superspot have edison fittings.

Use this information to complete the key below.



2

4. Which box shows **two** basic needs of human beings?

1 air and water	2 food and work
3 work and shelter	4 money and warmth

Box number .....

1

[Turn over

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5. (*a*) Which electrical appliance costs **most** to use for 1 hour?

A Vacuum cleaner

B Computer

C Cooker

D Bedroom lamp

Underline the correct answer. **1**

(*b*) Which part of an electric heater keeps the temperature steady?

A Earth wire

B Thermostat

C Fuse

D Switch

Underline the correct answer. **1**

6. Crude oil is a fossil fuel.

(*a*) (i) Name **one** other fossil fuel.

..... **1**

(ii) Name the gas in air that is used up when fossil fuels burn.

..... **1**

(*b*) Many different products can be obtained from crude oil.
One of these is **petrol**.
Name **one** other product obtained from crude oil.

..... **1**

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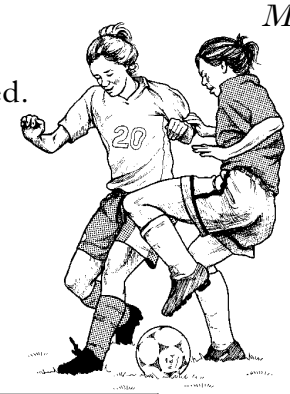
7. Katie and Penny played football.

Immediately after the game their pulse rates were measured. After resting, their pulse rates were measured again.

The results are shown in the table below.



Girl	*Pulse rate* (beats per minute)		
	Immediately after the game	*After resting*	*Change in pulse rate*
Katie	116	100	
Penny	104	74	

(*a*) Calculate the change in pulse rate for each girl and complete the table.

Space for working

1

(*b*) Complete the following sentence.

Immediately after the game, Katie's **heart** was beating at..... beats per minute. **1**

(*c*) Who is fitter, Katie or Penny? .....

Explain your answer.

.....

..... **1**

(*d*) Playing football regularly improved the girls' **stamina**.

Stamina is one aspect of fitness.

Name **one** other aspect of fitness.

..... **1**

[Turn over

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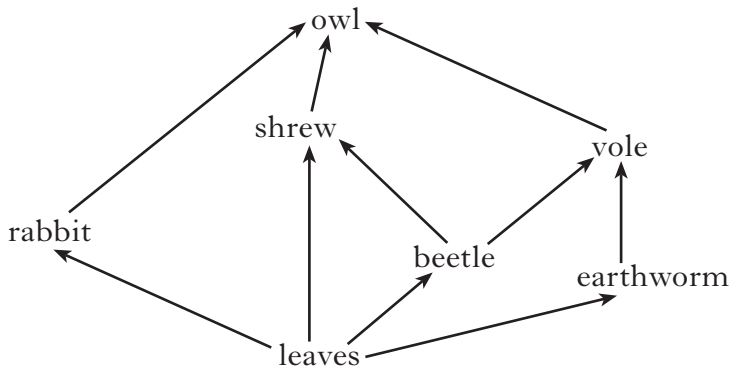
8. A food web from a woodland habitat is shown below.



(*a*) Where do the leaves get their energy from?

..... **1**

(*b*) The owl hunts and kills rabbits for food.

What word is used to describe an animal that hunts and kills other animals for food?

..... **1**

(*c*) An **omnivore** is an animal which eats both plants and animals.

Name the omnivore in this food web.

..... **1**

(*d*) **Using the food web shown above**, write down a food chain containing four organisms.

..... → ..... → ..... → **1**

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9. Use the information in the passage to answer the questions.

Traditional windmills use the power of the wind to turn mill stones and drive water pumps. Modern wind turbines also use the power of the wind. However, a modern wind turbine turns a generator which produces electricity.

The electricity produced by wind turbines goes into the National Grid. The National Grid then carries the electricity to homes and industries throughout Britain.

A 600 kW wind turbine can supply the electricity needed for 400 households. Although wind speeds are always changing, there is usually enough wind to operate the turbine for 70% of the time. A wind turbine is designed to last for about 20 years. However, moving parts such as blades and gearboxes must be regularly maintained to prevent the wind turbine from breaking down.

(*a*) What were traditional windmills used for?

..... **1**

(*b*) What happens to the electricity after it goes into the National Grid?

..... **1**

(*c*) How many households can a 600 kW wind turbine supply?

..... **1**

(*d*) Name **two** parts of a wind turbine that must be regularly maintained.

..... and **1**

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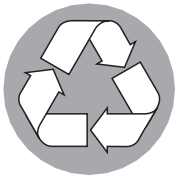
10. Special bins are used to separate household rubbish for **recycling**.



(*a*) What does **recycling** mean?

..... **1**

(*b*) **Glass** is one type of waste that can be recycled.

(i) Name one other **type** of waste that can be recycled.

..... **1**

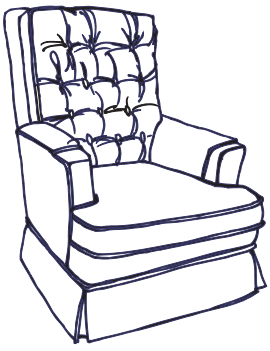
(ii) A household collected 96 glass bottles in 12 weeks.

How many bottles were collected, on average, each week?

Space for working

Answer **1**

11. A company is choosing a material for covering chairs.



The material must be flame-proofed so that it is safe.

Give **one** other factor that the company might consider when choosing which material to use.

.....

..... **1**

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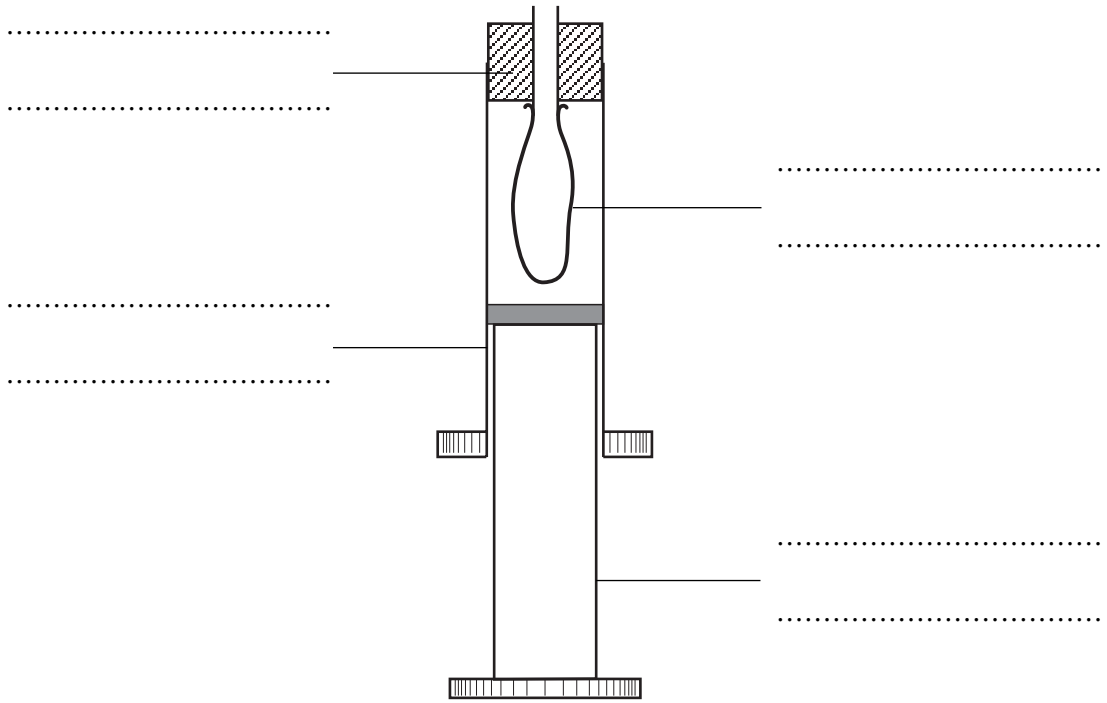
12. The table describes the parts of a model breathing system.

Part of breathing system	*Part of model*
Ribs	**Syringe barrel**
Windpipe	**Cork with tube**
Lungs	**Rubber balloon**
Diaphragm	**Syringe plunger**

When the syringe plunger is pulled out, air is drawn into the rubber balloon.
Use the information in the table to label the **parts of the model**.



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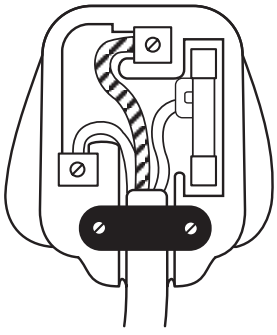
13. An electrical plug has a live wire, a neutral wire and an earth wire.



(*a*) Which of the wires has brown insulation?

..... **1**

(*b*) The earth wire in the plug acts as a safety device.

Name **one** other safety device in a plug.

..... **1**

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14. A group of students investigated the number of caddis fly larvae living in a river.
They counted the number of caddis fly larvae in water samples from five points in the river. They measured the speed of the river at each point.

Their results are shown in the table below.

Speed of river (cm/s)	50	100	150	200	250
Number of caddis fly larvae	15	20	50	70	80

(*a*) Complete the conclusion below by (circling) the correct answer.

As the speed of the river increases, the number of caddis fly larvae

increases
decreases
stays the same

1

(*b*) Water speed is an environmental factor which affects where animals and plants live.

Name **one** other environmental factor that may affect where animals and plants live.

..... **1**

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15. The box below shows the names of different objects.

steel bridge	nylon carpet	gold ring
glass vase	wooden fence	aluminium ladder

(*a*) Which of the objects is **most** likely to be damaged by

(i) insect pests?

..... **1**

(ii) corrosion?

..... **1**

(*b*) Which of the objects is most likely to be protected against damage by

(i) anodising?

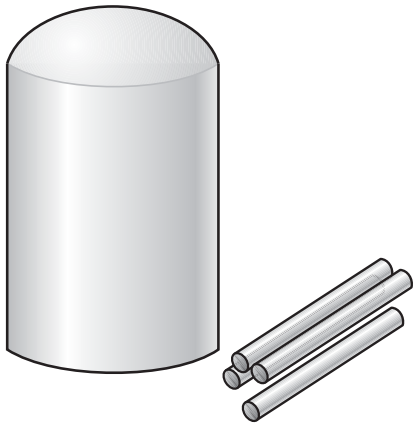
..... **1**

(ii) polystyrene packaging?

..... **1**

16. A plumber fitted a 12 kg water tank in a house.
He connected 4 copper pipes to the tank. Each pipe had a mass of 2 kg.
What is the **total mass** of the water tank and the four pipes?

Space for working



Answer ..... kg **2**

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17. Starlings are birds which are often found living in rough grass farmland areas.

The table shows how the number of starlings has changed over 25 years.

Year	*Number of starlings* (millions)	*Area of rough grass farmland* (hectares)
1970	3·6	1 300 000
1975	3·4	1 000 000
1980	3·2	700 000
1985	2·8	110 000
1990	2·3	100 000
1995	1·9	90 000

Use the **information in the table** to answer the questions.

(*a*) Give a reason for the decrease in the number of starlings between 1970 and 1995.

..... **1**

(*b*) Predict the number of starlings when the area of rough grass farmland was 850 000 hectares.

..... millions **1**

18. Cigarette smoke contains substances which are harmful to your health.

(*a*) Tick (✓) the **three** harmful substances in tobacco smoke.

nicotine		tar	
water vapour		carbon monoxide	
oxygen		nitrogen	

1

(*b*) Tick (✓) **two** health problems which can be caused by smoking.

anorexia		heart disease	
bronchitis		influenza	
measles		mumps	

1

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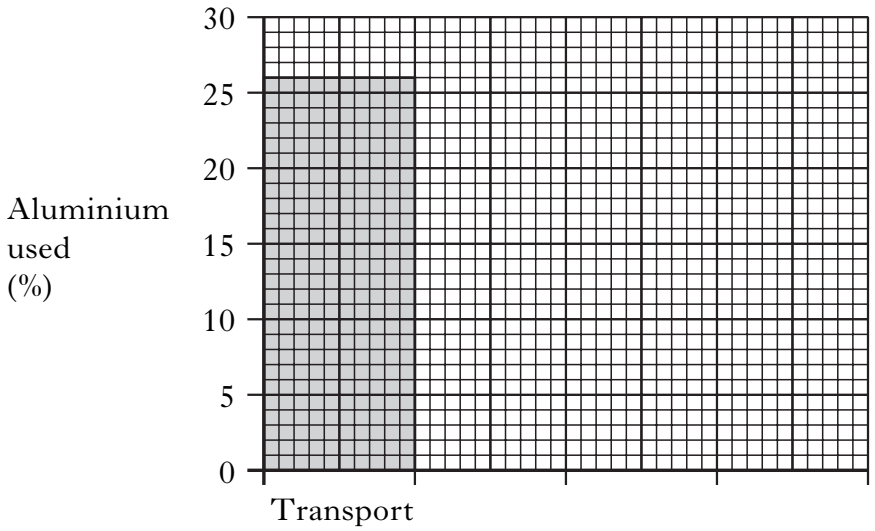
19. The transport industry is the biggest user of aluminium in the world. It uses 26% of the aluminium produced. 22% of the world's aluminium production is used by the packaging industry. The construction industry uses 20% of the aluminium produced, while the electrical engineering industry uses 9%.

(*a*) Use this information to complete the table below.

Industry	*Aluminium used* (%)

2

(*b*) Use this information to complete the bar graph.
(Additional graph paper, if required, can be found on page 19.)



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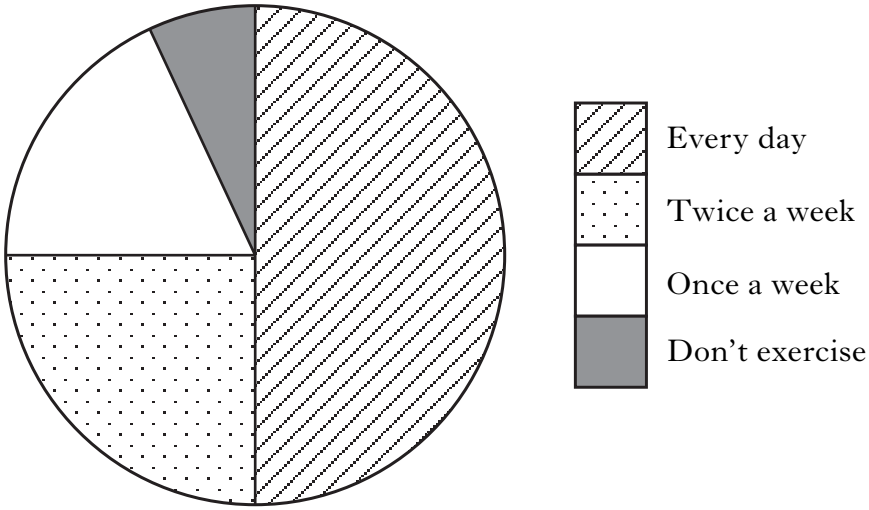
20. In a survey, pupils were asked how often they exercise.
The results are shown in the pie chart.



(*a*) What percentage of pupils exercise every day?

.....% **1**

(*b*) There were 60 pupils in the survey.
How many pupils exercise twice a week?

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Answer ..... pupils **1**

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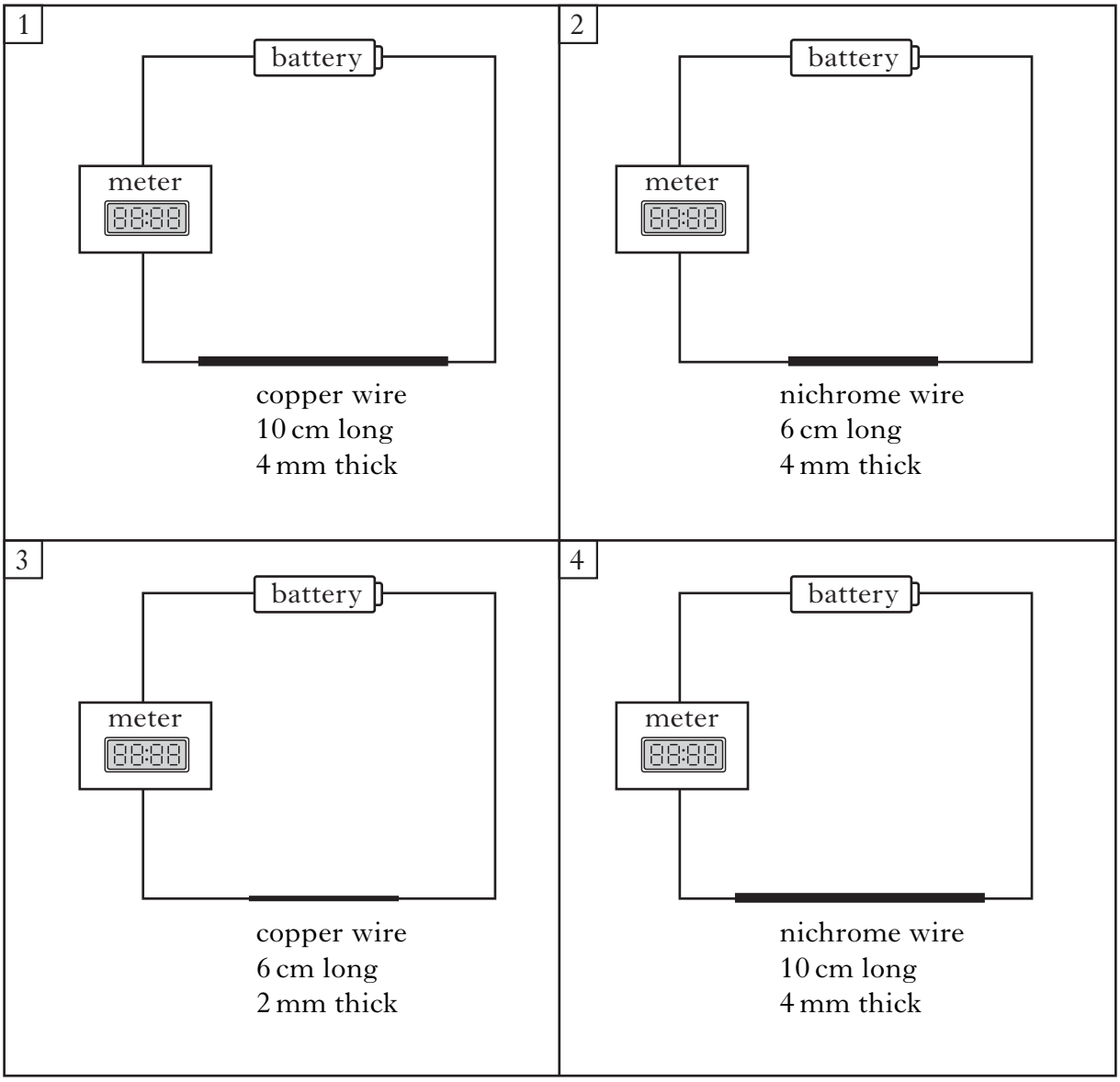
21. Susan compared the current that flowed in different wires. She set up the circuits shown below.



(*a*) Susan wanted to find out if more current flowed in copper wire or nichrome wire.

Which **two** circuits should she choose for a fair test?

Box numbers ..... and **1**

(*b*) What was Susan trying to find out if she compared circuits 2 and 4?

..... **1**

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22. The box below shows some properties of materials.

thermal conductivity	electrical conductivity
strength	resistance to corrosion

Use the properties to complete the table below.

Material	*Use of material*	*Property of material*
Steel	Girders	
Copper	Wiring	
Bronze	Ship propellers	
Aluminium	Saucepan	

2

23. Match up each statement with the **correct** temperature.
One has been done for you.

A person with a fever	24 °C
A sunny day in Scotland	29 °C
A person with hypothermia	37 °C
Normal body temperature	41 °C

2

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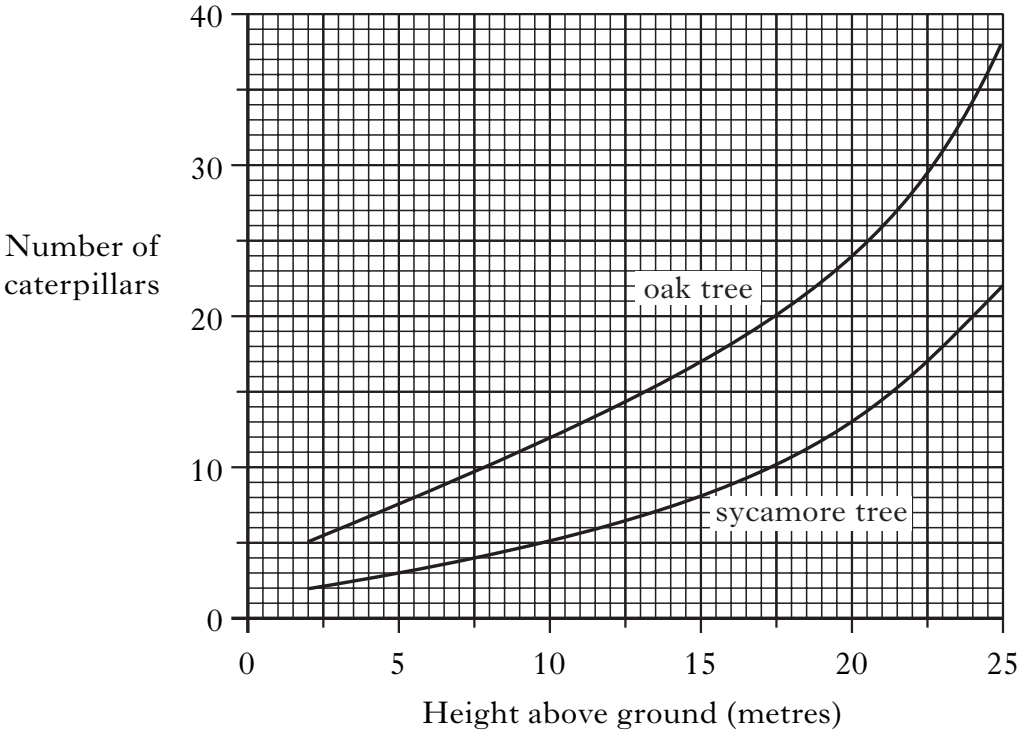
24. Students took samples of leaves at different heights from an **oak tree** and a **sycamore tree**.
They recorded the number of caterpillars in each sample.

Their results are shown in the graph.



(*a*) How many caterpillars were found in the leaf sample from the **oak tree** at a height of 15 metres?

..... **1**

(*b*) In a leaf sample collected at a height of 24 metres, there are 20 caterpillars.

What **type of tree** did the sample come from?

..... **1**

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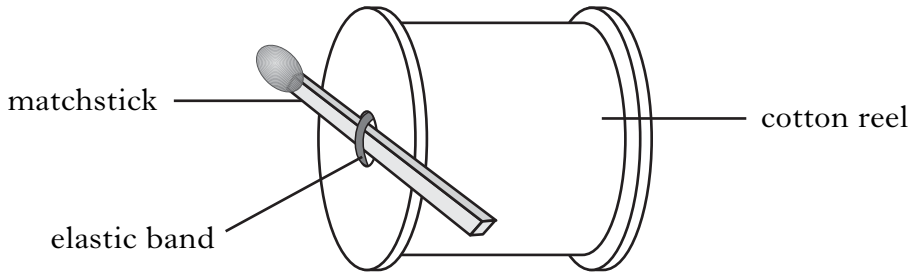
25. Edward made a model tank from a cotton reel, an elastic band and a matchstick. *Marks*



When he turned the matchstick and let go, the tank moved forward.

He investigated how far the tank travelled using different numbers of turns of the matchstick and different thicknesses of elastic band.

His results are shown below.

Number of turns of the matchstick	*Thickness of elastic band*	*Distance travelled* (cm)
5	thick	35
10	thick	69
15	thick	101
5	thin	23
10	thin	44
15	thin	69

Draw **two** conclusions from these results.

1 .....

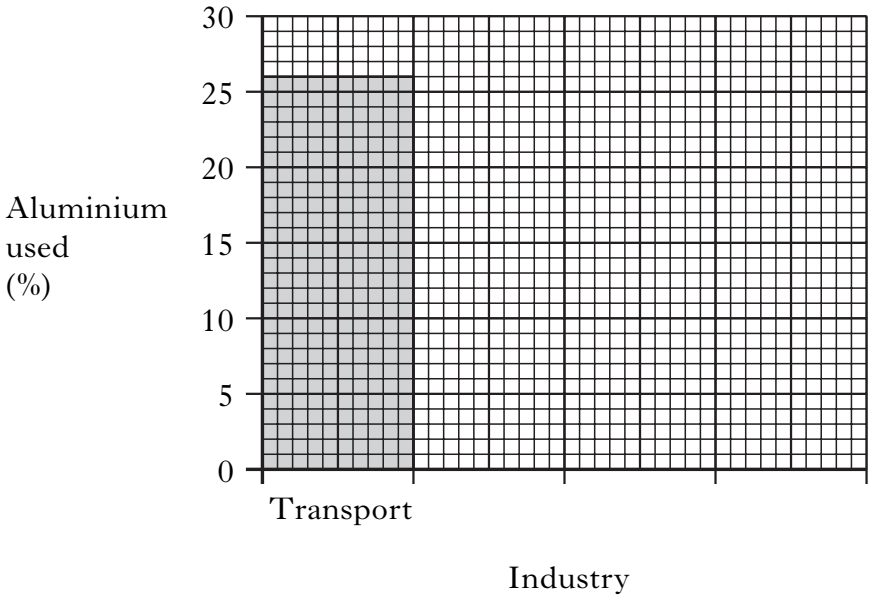
.....

2 .....

..... **2**

[*END OF QUESTION PAPER*]

ADDITIONAL GRAPH PAPER FOR USE IN QUESTION 19(*b*)



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