

FOR OFFICIAL USE

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3700/402

	KU	PS
Total Mark		

NATIONAL
QUALIFICATIONS
2010

THURSDAY, 27 MAY
10.20 AM – 11.35 AM

SCIENCE
STANDARD GRADE
General Level

Fill in these boxes and read what is printed below.

Full name of centre

Town

Forename

Surname

Date of birth

Day Month Year

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Scottish candidate number

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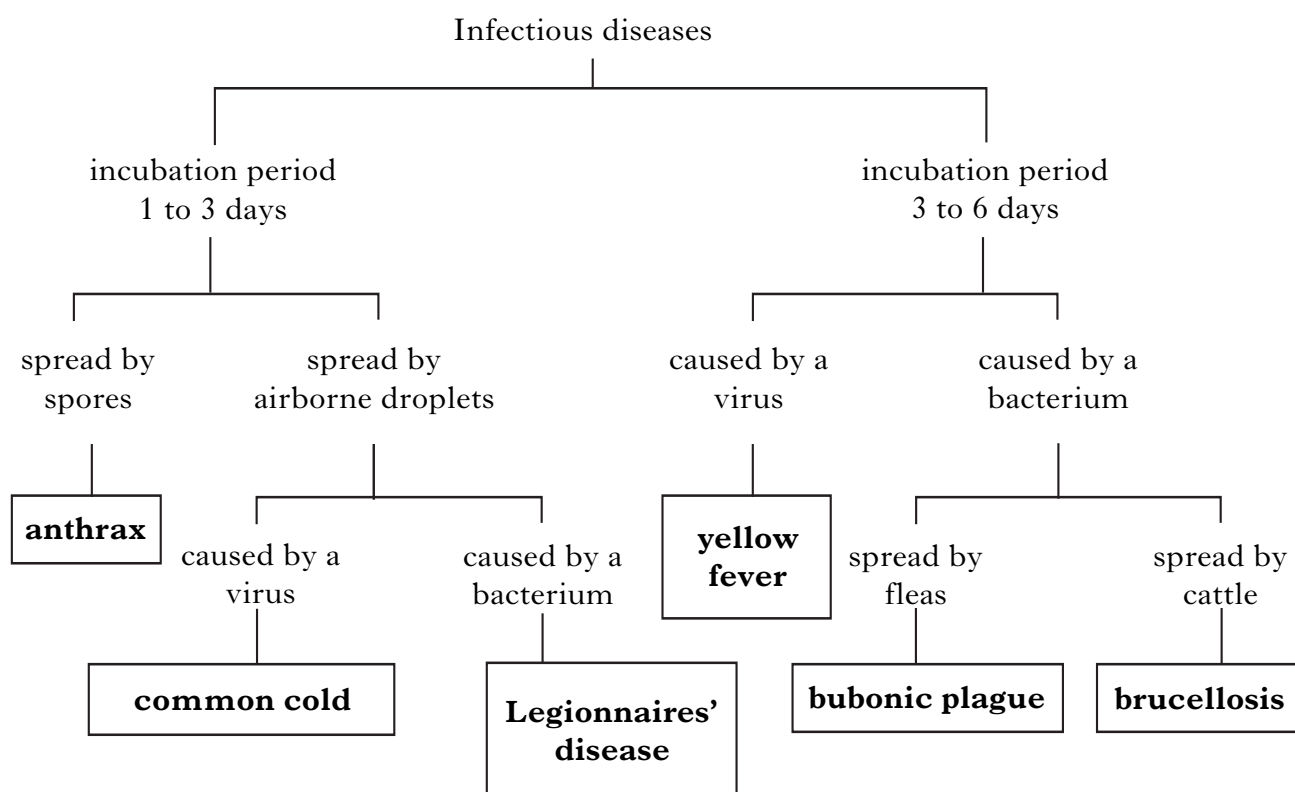
Number of seat

- 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.



Marks

1. The key below gives information about some infectious diseases.



Use the information in the key to answer the following questions.

(a) Give **one** difference between bubonic plague and brucellosis.

.....
.....

1

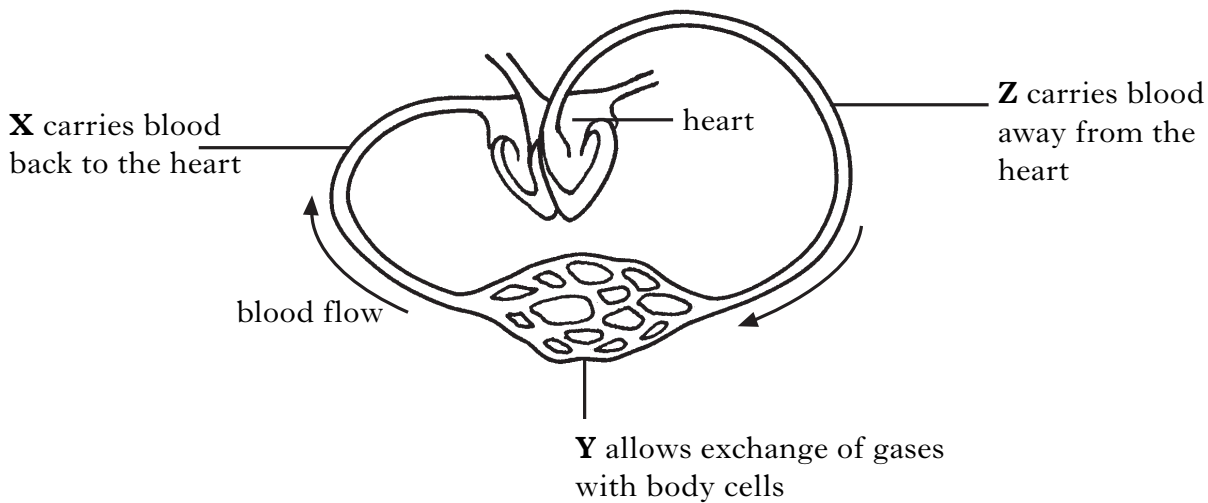
(b) List **all** the information that the key gives about Legionnaires' disease.

.....
.....
.....

2

Marks

2. Name the types of blood vessel labelled X, Y and Z in the diagram below.



X

Y

Z

3

3. (a) The energy used by an electrical appliance is measured in

- A Volts
- B Joules
- C Amps
- D Watts.

Underline the correct answer.

1

- (b) The electrical appliance which costs the most to operate is a

- A 1200 W microwave used for 3 minutes
- B 250 W computer used for 2 hours
- C 5 kW oven used for 3 hours
- D 1300 W dishwasher used for 2 hours.

Underline the correct answer.

1

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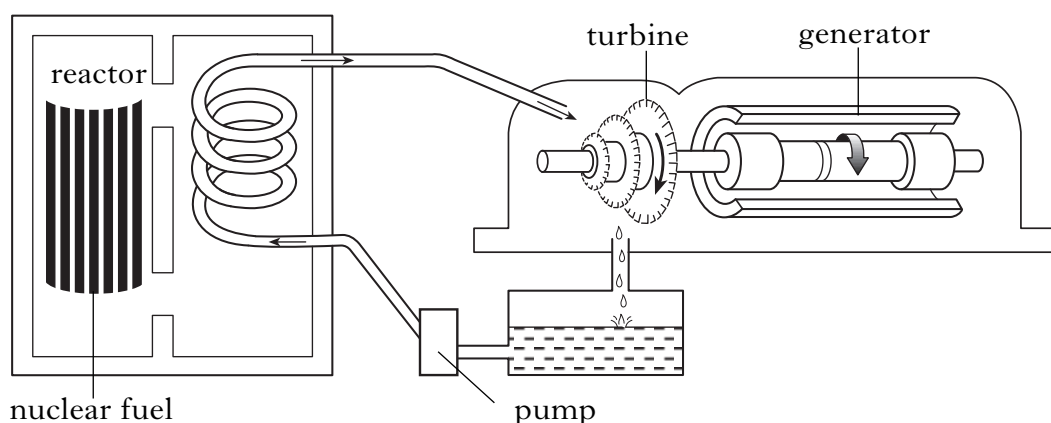
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1	strong	2	heat resistant
3	thermal conductor	4	wear resistant

(i) the tyres?

Box number

5. A diagram of a nuclear power station is shown below.



- (a) What type of energy is produced by nuclear fuel?

- A light
- B sound
- C heat
- D movement

Underline the correct answer.

1

- (b) What turns the turbine?

- A water
- B steam
- C air
- D nuclear fuel

Underline the correct answer.

1

- (c) The radioactive waste from a nuclear power station is very dangerous. Describe **one** way of storing the waste as safely as possible.

.....

.....

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A black and white photograph of a bird's nest. The nest is constructed from a messy pile of dry twigs and sticks, forming a cup-like shape. Inside the nest, there are three eggs. The eggs are light-colored with dark, irregular speckles. The background is plain white.

Egg shells contain calcium. As the chick develops inside the egg, some of the calcium is used to help the chick's bones grow. After hatching, the mother may eat the shell to replace some of the calcium her body lost in making the egg.

-

1

-

1

-

2

-

1

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- (a) Name **two** other parts of blood.

1

2

2

- Describe **one** way in which white blood cells can destroy bacteria.

.....

.....

1

- Match each basic need with how the environment is adapted. The first one has been done for you.

How the environment is adapted

clearing land to build houses

- building a reservoir near a river

building wind generators on moor land

ploughing land to grow crops

2

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Marks

9. Complete the following sentences about steel by circling the correct answer in each box.

- (a) The steel used for a screwdriver is more **wear resistant** because it contains

the element

chromium
nickel
tungsten



1

- (b) **Stainless** steel used for scissor blades contains

the elements

chromium and tungsten
chromium and nickel
tungsten and nickel



1

- (c) The steel used for a saw blade is **heated and quickly cooled** to make

the steel

more flexible
stronger
harder



1

10. The recommended daily allowances of fat, fibre and sugar for an adult are given in the table.

<i>Substance</i>	<i>Recommended daily allowance</i> (g)
fat	25
fibre	30
sugar	5

A portion of yoghurt contains 2.5 g of fat.

What percentage of the recommended daily allowance of fat is in the yoghurt?

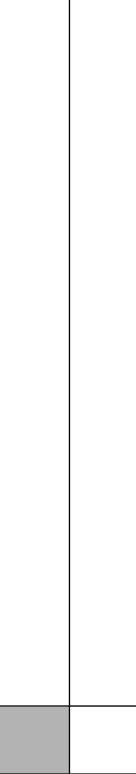
Space for working

Answer%

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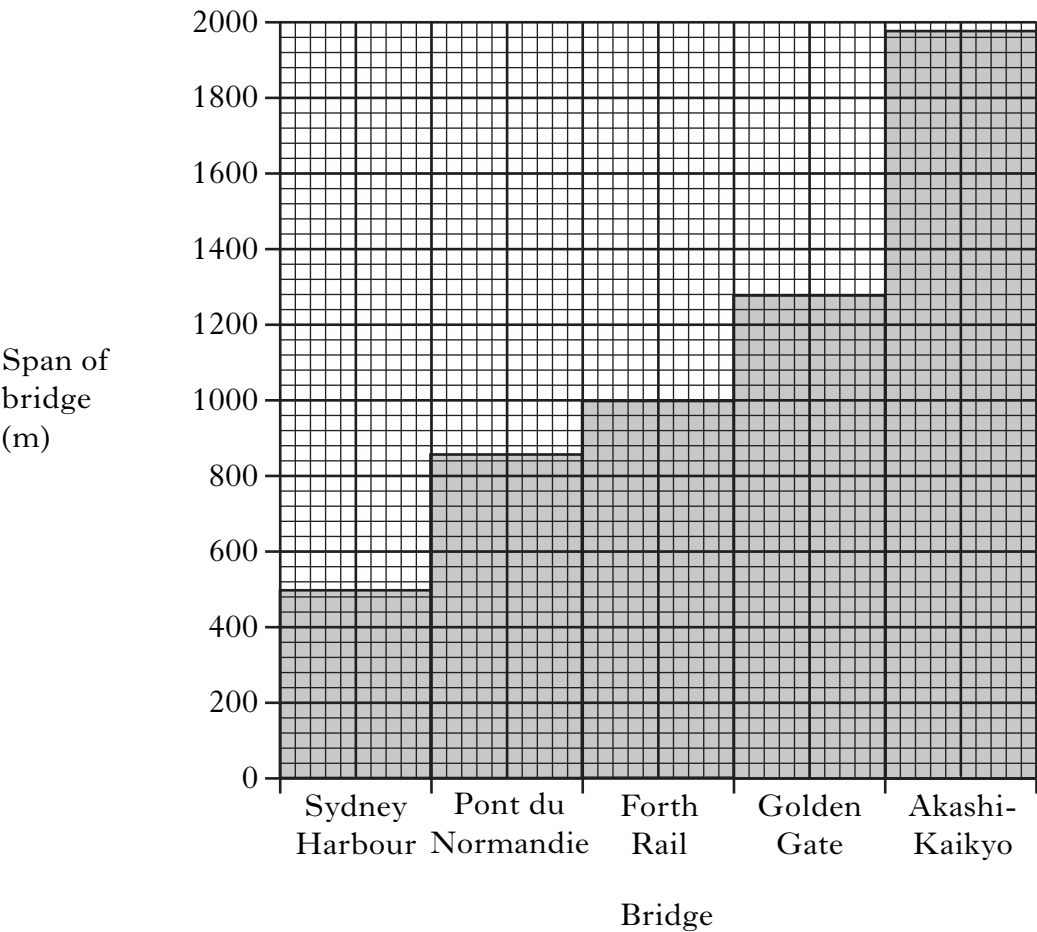
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12. The table below shows information about some famous bridges.

<i>Bridge</i>	<i>Type</i>	<i>Country</i>	<i>Total length (m)</i>
Sydney Harbour	arch	Australia	1149
Pont du Normandie	cable-stayed	France	2143
Forth Rail	cantilever	Scotland	2529
Golden Gate	suspension	America	2737
Akashi-Kaikyo	suspension	Japan	3911

The **span** of a bridge is the distance between its support towers.

The graph below shows the span of each bridge.



Marks

12. (continued)

Use the table and the bar graph to answer the following questions.

- (a) In which **country** is the longest bridge?

.....

1

- (b) What is the **span** of the cantilever bridge?

..... m

1

- (c) What is the **total length** of the bridge with a span of 500 m?

..... m

1

- (d) What **conclusion** can be drawn about the total length and span of these bridges?

.....

.....

1

13. The boxes below show some plastics.

1		2	
	polyvinyl chloride (PVC)		polystyrene
3		4	
	polythene		polyurethane

Burning plastics produce gases that are harmful to humans.

Which box shows a plastic that produces

- (a) hydrogen chloride gas?

Box number

1

- (b) hydrogen cyanide gas?

Box number

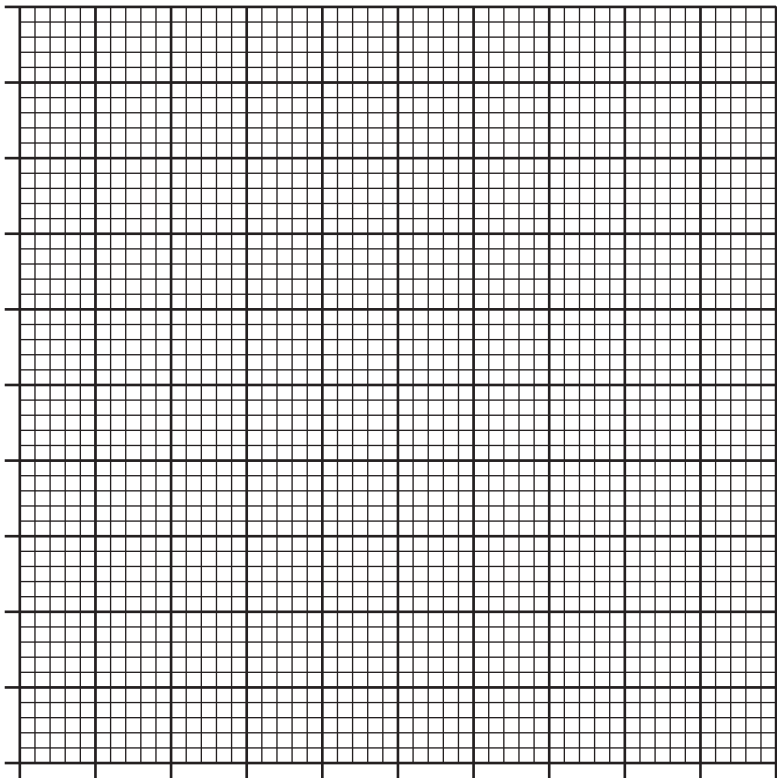
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14. The table below shows the percentage of heat lost from different parts of a house.

<i>Part of house</i>	<i>Percentage of heat lost (%)</i>
Roof	25
Walls and Floor	45
Windows	20
Door	10

- (a) Present the information in the table as a **bar graph**.
(Additional graph paper, if required, can be found on Page 22)



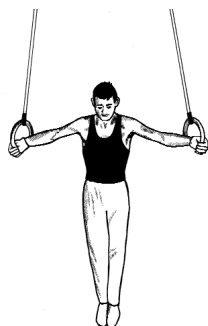
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- (b) In one second, the heat lost from a house is 10 000 Joules. How much of this heat is lost through the roof?

Space for working

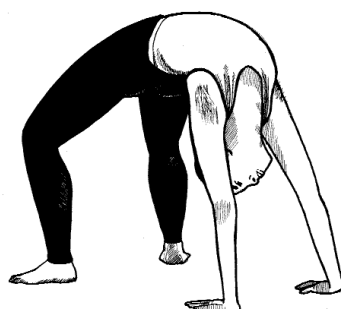
Answer Joules 1

- [illegible]



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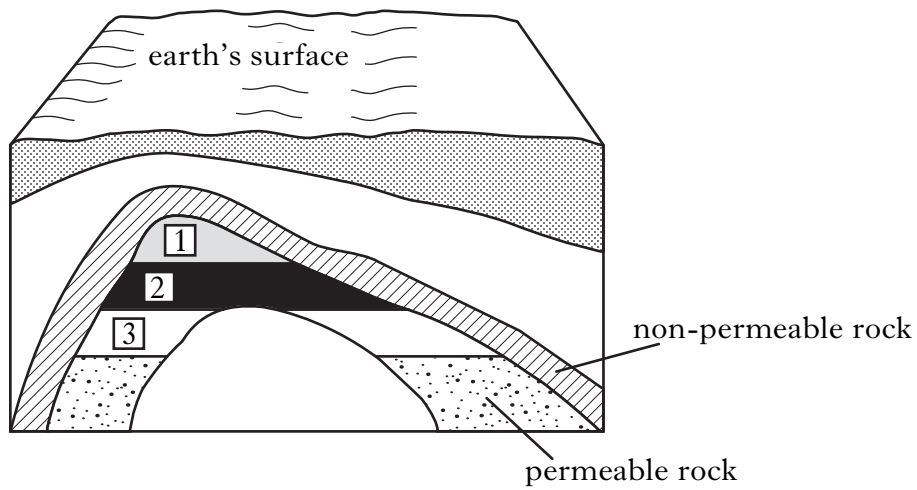


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(a) Complete the following sentences by circling the correct answer in each box.

The name given to this type of rock formation is

an anticline
a fault trap

The fossil fuel trapped in layer 2 is

gas
oil
coal

2

(b) Name **two** substances formed when fossil fuels burn.

..... and

2

Marks

17. Some famous **diamonds** have been found in different **countries**. Each diamond has a different **weight** measured in carats.

The Kohinoor diamond, from India, has a weight of 105·60 carats. The Millenium Star diamond has a weight of 203·04 carats and was found in Congo. The Centenary diamond weighs 273·85 carats and the Cullinan diamond, the largest ever found, weighs 530·20 carats. Both the Centenary and Cullinan diamonds were found in South Africa.



Present this information in a table with **three** suitable headings.

3

18. During very cold weather, elderly people may be unable to maintain their core body temperature.

What name is given to this inability to maintain core body temperature?

.....

1

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Marks

19. Mrs Shepherd is installing new lighting in her hall.
She buys 2 lights costing £45 each and 3 switches costing £14 each.
Calculate the total cost.

Space for working

Answer £.....

2

20. Some **fractions** obtained from crude oil and their **uses** are shown below.

- (a) Match each fraction to its use.

The first one has been done for you.

Fraction	Use
gasoline	aviation fuel
paraffin	plastics
bitumen	fuel for cars
diesel	road surfaces
naphtha	fuel for lorries

- (b) Which fraction is the least flammable?

.....

3

1

Marks

21. A group of students counted the caterpillars on the cabbages in five vegetable plots.

Their results are shown below.

<i>Vegetable plot</i>	<i>Number of caterpillars</i>
A	27
B	42
C	31
D	25
E	30

- (a) Calculate the average number of caterpillars in the vegetable plots.

Space for working

..... caterpillars

2

- (b) Cabbages are green plants and make their own food.

This food is stored as

A protein

B fat

C starch

D water.

Underline the correct answer.

1

[Turn over

He set up the following experiments.

He dropped a steel dart on each tile and measured the size of the mark which was made.

Figure 1 consists of six sub-diagrams labeled A through F, arranged in a 2x3 grid. Each diagram illustrates the experimental setup for measuring the coefficient of friction. In all cases, a dart is launched from a height of 100 cm (except for C, which is 80 cm) towards a horizontal surface. The dart's mass is 100 g in A, B, C, and E; 150 g in D; and 200 g in F. The surfaces are: A) wooden tile, B) ceramic tile, C) linoleum tile, D) wooden tile, E) linoleum tile, and F) wooden tile. The diagrams show the dart's trajectory as a line with an arrowhead pointing towards the surface.

(a) Which **two** experiments should Jared compare to find out if a wooden tile is harder than a linoleum tile?

Letters and

1

(b) Jared compared the results of experiments A, D and F.

What was he trying to find out?

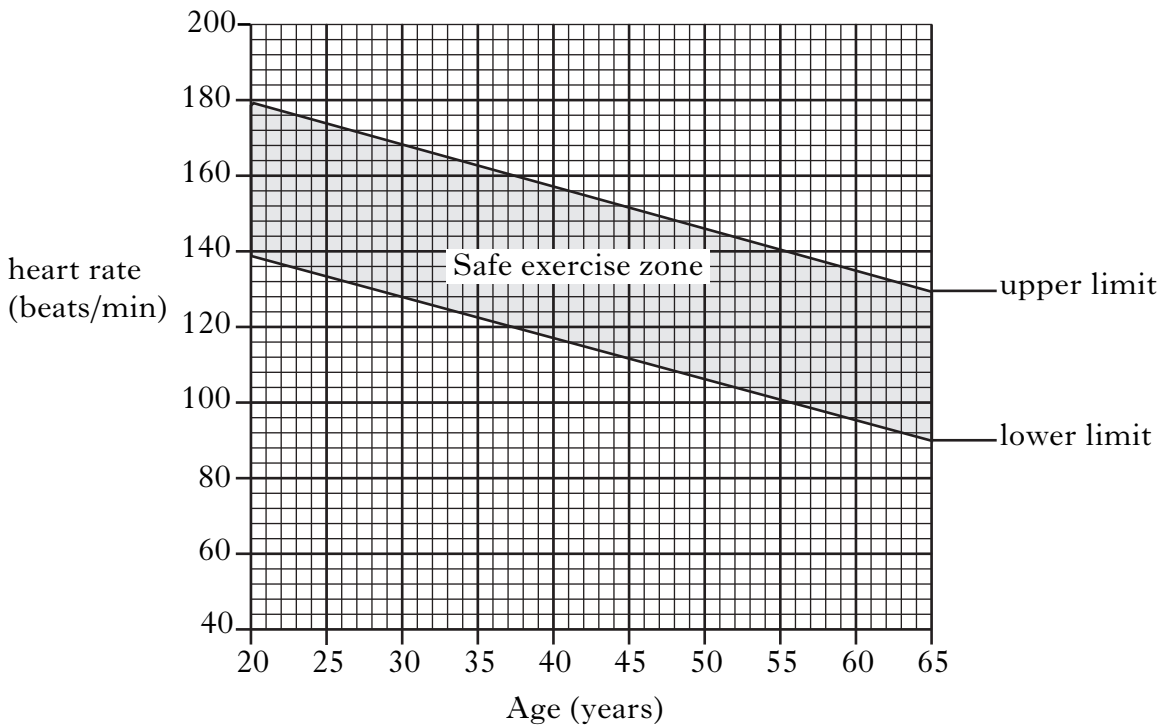
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23. When you exercise, your heart beats faster and this strengthens the heart muscle. During exercise, your heart rate should remain within your **safe exercise zone**. The chart shows the safe exercise zone for people of different ages and fitness levels.



The **upper limit** applies to a fit person who exercises every day.

The **lower limit** applies to an unfit person who rarely exercises.

- (a) Draw **two** conclusions from the information given above.

- 1
.....
- 2
.....

2

- (b) What is the upper limit of the safe exercise zone for a 55 year old?

..... beats/min

1

- (c) A fit person who exercises every day is advised to keep their heart rate at no more than 168 beats per minute during exercise.

How old is this person?

..... years

1

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- 1**

- 1

- 1

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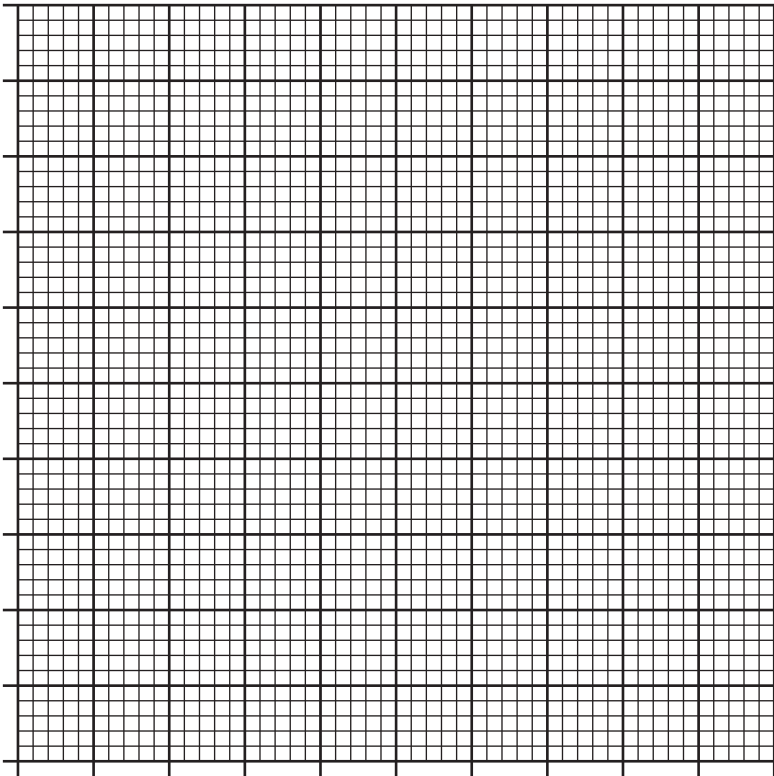
26. The table below shows the number of lichen species growing at different distances from a city centre.

<i>Distance from city centre (km)</i>	<i>Number of lichen species</i>
0	0
5	5
10	12
15	20
20	31
25	45

Draw a line graph to show these results.

(Additional graph paper, if required, can be found on Page 22.)

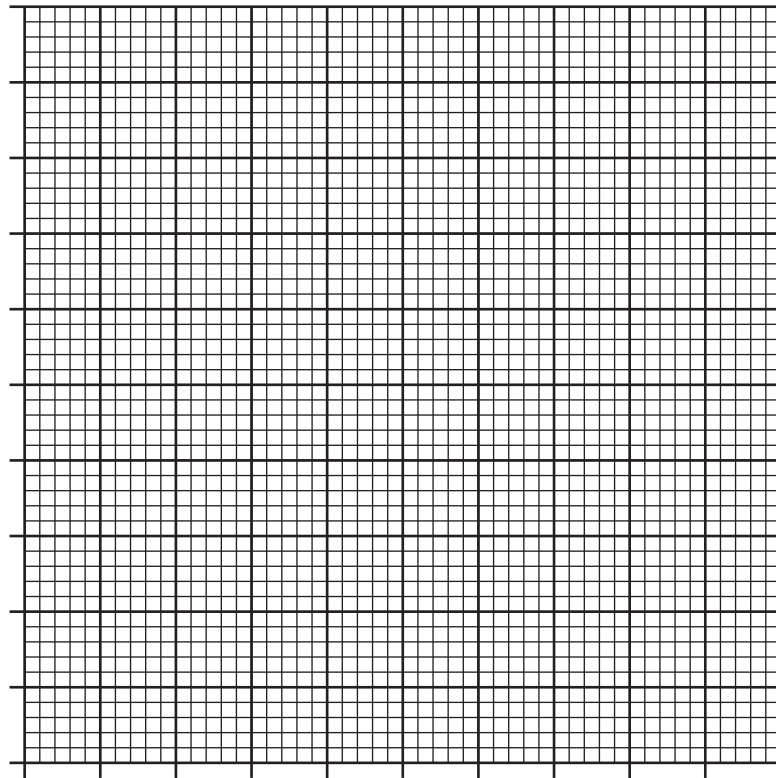
Number of
lichen species



3

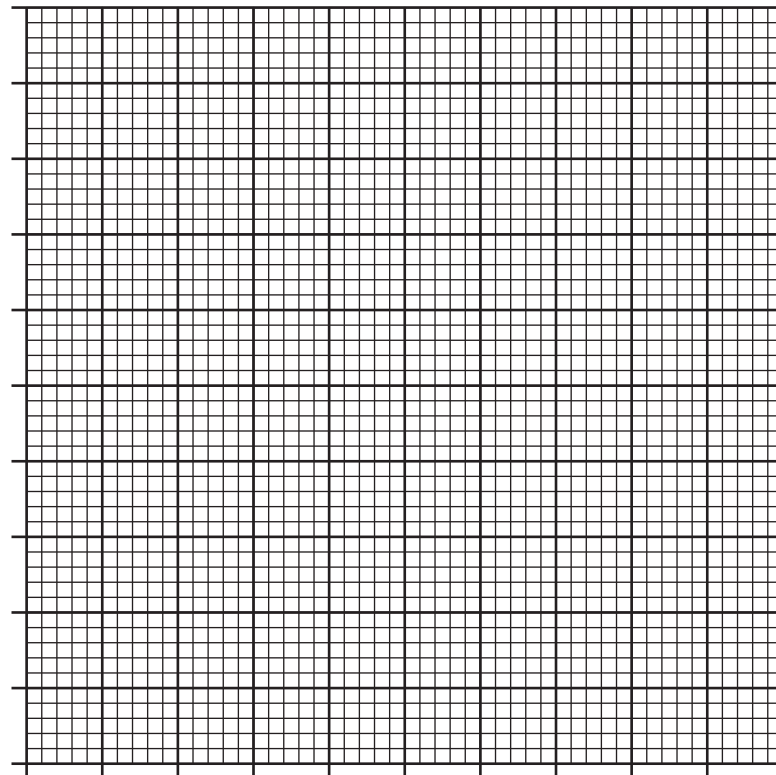
[END OF QUESTION PAPER]

ADDITIONAL GRAPH PAPER FOR USE IN QUESTION 14



ADDITIONAL GRAPH PAPER FOR USE IN QUESTION 26

Number of
lichen species



ACKNOWLEDGEMENTS

Question 9—Photograph of an arca handsaw. Permission is being sought from Ark Tools International Corporation.

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